Castleforbes Strategic Housing Development (SHD), Sheriff Street Upper, Dublin 1

Environmental Impact Assessment Report (EIAR) - Volume 2 Main Report

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Environmental Assessment **Built Environment**

Client: Glenveagh Living Ltd.

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Contents

1 Introduction

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) presents the assessment of environmental impacts and applicable mitigation measures associated with the proposed Strategic Housing Development (SHD) located at Castleforbes Business Park, Sheriff Street Upper and East Road, Dublin 1 (hereafter referred to as "*the proposed Project*").

This EIAR has been prepared in accordance with the requirements of the Planning and Development Act 2000-2020 the Planning and Development Regulations 2001-2020, and relevant guidance documents, and it conforms to the requirements as specified therein.

1.2 The Applicant

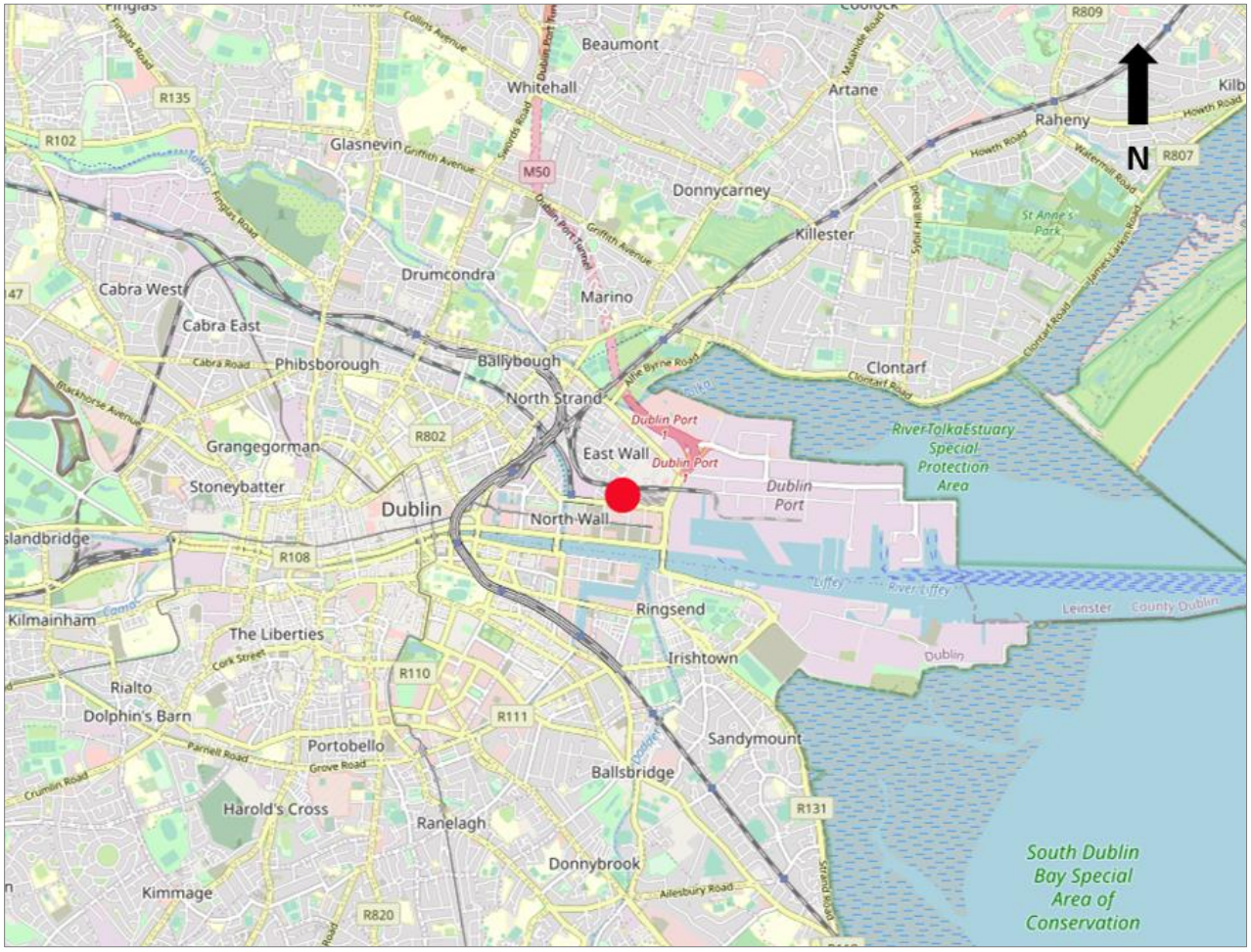
The applicant for the proposed Project is Glenveagh Living Ltd., owners of the lands at Castleforbes Business Park, Sheriff Street Upper and East Road, Dublin 1.

1.3 The Proposed Project

The Site of the proposed Project is located on Sheriff Street Upper and East Road, Dublin 1, approximately 1.4km east of Dublin City centre. The application Site boundary has an area of 2.44 hectares (ha) and the proposed Project development area is 2.02ha. The application Site boundary forms part of the Castleforbes Business Park. The Site is bound by East Road to the west, an Irish Water pump station to the north, CIE[1] lands to the north and east, and Sheriff Street Upper to the south, see Figure 1.1 below.

[1] Córas Iompair Éireann

Figure 1.1: Location of the Site for the Proposed Project[2] (Site location in red)



The Site is located north of the Docklands Strategic Development Zone (SDZ) area, and is located within the administrative area of Dublin City Council (DCC). Within the area there are numerous developments either completed, permitted or in construction nearby. More details on the background and Site history is provided in Chapter 5 (Description of the Proposed Project).

The proposed Project will provide for a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a standalone three storey childcare facility and residential tenant amenity. The proposed Project will also provide for a public plaza new public realm, and will accommodate car parking spaces, bicycle parking, storage, services and plant areas. A detailed description of the proposed Project is provided in Chapter 5 (Description of the Proposed Project).

[2] EPA Maps (2020). Source: *OpenStreet Maps.*

1.4 Environmental Impact Assessment (EIA)

Environmental Impact Assessment (EIA) is a process for the systematic examination of the *likely significant effects* on the environment of a proposed development or project; ensuring that adequate consideration is given to any such effects; and avoiding, reducing or offsetting any significant adverse effects. The findings of this systematic examination are set out in the Environmental Impact Assessment Report (EIAR).

The environmental assessment presented in this EIAR has evaluated the *Construction* (initial Site development works) and *Operational* (the day-to-day functioning/operation of the Site) Phases of the proposed Project. The EIAR describes the existing environment (baseline); identifies potential impacts of the proposed Project; details any mitigation measures required to reduce or eliminate potential impacts; and predicts any residual impacts. An overview of the EIA process and the steps involved are set out in Table 1.1 below. Further information on the approach to EIA are presented in Chapter 2 (The EIA Process).

Table 1.1: Overview of the EIA Process

Stage	Description	Status
1. Screening	Is an EIA required?	Yes
2. Scoping	The outline of the likely significant effects of the proposed Project and the aspects to be considered in the impact assessment.	Completed
3. Environmental Impact Assessment	This stage includes: ▪ Collection of the baseline information. ▪ Analysis of the proposed Project. ▪ Assessment of impacts. ▪ Developing mitigation measures. ▪ Setting our requirements for monitoring.	**Current Stage**
4. Review & Decision	The EIAR accompanies the planning application to the planning authority (*i.e.* An Bord Pleanála) for determination of the application.	
5. Monitoring	Implementation and monitoring of the proposed Mitigation Measures.	Next Stage

1.5 Format & Structure of the EIAR

Table 1.2 below sets out the format and structure of this Environmental Impact Assessment Report.

Table 1.2: Structure of the EIAR

Chapter No.	Description
Volume 1: NTS	
NTS	Summary of the EIAR in non-technical language
Volume 2: Main Report	
Chapters 1 - 3	Provide an introduction and background to the proposed Project.
Chapter 4	An assessment of the alternatives considered for the proposed Project.
Chapter 5	Description of the proposed Project assessed in the EIA.
Chapter 6	Consultation
Chapter 7	Population and Human Health
Chapter 8	Biodiversity (Flora and Fauna)
Chapter 9	Land, Soils, Geology and Hydrogeology
Chapter 10	Hydrology (Surface Water)
Chapter 11	Air Quality and Climate
Chapter 12	Noise and Vibration
Chapter 13	Landscape and Visual
Chapter 14	Cultural Heritage, Archaeology and Architectural
Chapter 15	Microclimate - Daylight/Sunlight
Chapter 16	Microclimate - Wind
Chapter 17	Traffic and Transportation
Chapter 18	Material Assets - Waste
Chapter 19	Material Assets - Services
Chapter 20	Presents an overview of all the major interactions between the different environmental aspects as outlined above and the interactions between the various attributes.
Chapter 21	Presents the cumulative impacts of this EIAR with committed development
Chapter 22	Presents the schedule of environmental commitments/mitigation measures included in the EIAR Document for ease of reference.
Volume 3: Appendices	
A9.1 - A18.2	Technical reference information supporting the EIAR Chapters.

1.5.1 EIAR Project Team

The EIA was project managed, co-ordinated and produced by Brady Shipman Martin (BSM). BSM coordinated the EIA process and liaised between the design team and various environmental specialist consultants.

Environmental specialists were commissioned for the specialist environmental chapters of the EIAR document as required of the EIA Directive and Regulations. The amended EIA Directive (Directive 2014/52/EU) states the following in relation to the persons responsible for preparing the environmental impact assessment reports:

> *'Experts involved in the preparation of environmental impact assessment reports should be qualified and competent. Sufficient expertise, in the relevant field of the project concerned, is required for the purpose of its examination by the competent authorities in order to ensure that the information provided by the developer is complete and of a high level of quality'.*

In compliance with this requirement, and in line with emerging best practice, including with the 2018 *EIA Guidelines for Planning Authorities* and An Bord Pleanála, Table 1.3 provides the names of the professionals who have prepared each element of the EIAR and lists their qualifications and relevant experience; demonstrating that the EIAR has been prepared by competent experts.

Table 1.3: EIAR Project Team and Environmental Specialist

Name	Role	Company	Qualification/Experience
Thomas Burns	EIAR Project Manager	Brady Shipman Martin	**B.Agr.Sc. (Land.) Dip. EIA Mgmt., Adv. Dip. Plan. & Env. Law** ▪ Environmental Planner and Landscape Architect ▪ Member of Irish Landscape Institute & Irish Environmental Law Association ▪ Over 30 years' experience in EIA.
Sorcha Turnbull	Planner and Co-ordinator	Brady Shipman Martin	**BSc (Spatial Planning), Dip. EIA Mgmt** ▪ Senior Planner ▪ Corporate Member of the Irish Planning Institute (IPI) & Associate Member of the Royal Town Planning Institute (RTPI) ▪ Over 10 years' experience in Planning and EIA.
Rebecca Dunlea	EIAR Co-ordination Population & Human Health and Material Assets Assessment	Brady Shipman Martin	**BA MA MSc** ▪ Environmental Consultant ▪ Member of the Chartered Institute of Water and Environmental Management - MCIWEM ▪ Over 5 years' experience.

Name	Role	Company	Qualification/Experience
Matt Hague	Biodiversity Assessment	Brady Shipman Martin	BSc MSc Adv. Dip. Plan. & Env. Law ▪ Chartered Environmentalist - CEnv ▪ Full member of the Chartered Institute of Ecology and Environmental Management - MCIEEM ▪ Over 18 years' experience.
Paul Conaghan	Soil/Lands and Water Assessment	AWN Consulting Ltd.	BSc MSc ▪ Member of the International Association of Hydrogeologists ▪ Over 8 years' experience.
Dr. Avril Challoner	Air Quality and Climate Assessment	AWN Consulting Ltd.	**PhD BEng (Hons)** ▪ Chartered Scientist ▪ Member of the Institute of Air Quality Management – IAQM ▪ Over 9 years' experience.
Leo Williams	Noise and Vibration Assessment	AWN Consulting Ltd.	BAI MAI PgDip ▪ Member of Institute of Acoustics (MIOA) ▪ Over 4 years' experience.
John Kelly	Landscape and Visual Assessment	Brady Shipman Martin	BArch (Hons) ▪ Member of the Royal Institute of the Architects Ireland - MRIAI ▪ Over 25 years' experience.
Dr. Clare Crowley	Cultural Heritage Assessment	Courtney Deery	BA (Hons) in Ancient History, Archaeology & French & PhD in Archaeology ▪ Senior Heritage Consultant ▪ Over 20 years' experience ▪ Certificate in Repair and Conservation of Historic Buildings (Dublin Civic Trust, 2004) ▪ Certificate in Condition Surveys of Historic Buildings (University of Oxford, 2017).
Amy Hastings	Microclimate - Daylight and Sunlight Assessment	ARC Architectural Consultants Ltd.	MSc Spatial Planning, Barrister-at-Law ▪ Director of ARC Architectural Consultants Ltd. ▪ Corporate Member of the Irish Planning Institute (IPI) ▪ Over 16 years' experience.
Réamonn Mac Réamoinn	Microclimate - Wind Assessment	ARUP	BA BAI & MSE (Civil) ▪ Chartered Engineer - CEng ▪ Member of Engineers Ireland - MIEI ▪ Over 15 years' experience (civil, structural and environmental engineering).

Name	Role	Company	Qualification/Experience
Aimee Dunne	Traffic and Transport Assessment	DBFL Consulting Engineers	BEng (Hons) MSc ▪ Member of Engineers Ireland (MIEI) ▪ Over 7 years' experience.
Chonaill Bradley	Waste Assessment	AWN Consulting Ltd.	BSc (Environmental Science) ▪ Associate Member of the Institute of Waste Management (AssocCIWM) ▪ Over 6 years' experience.

2 The Environmental Impact Assessment (EIA) Process

2.1 EIA Legislation

The European EIA Directive 85/337/EEC was introduced in 1985. The Directive along with its three subsequent amendments was eventually codified by Directive 2011/92/EU. The 2011 Directive was further amended by Directive 2014/52/EU. The amending Directive took effect in Ireland on the 16 May 2017, and transposing legalisation[3] came into effect on 1 September 2018.

The EIA Directive aims to provide a high level of protection to the environment and ensures that environmental considerations are taken into account in the preparation of a proposed development or project, with the view to reducing environmental impacts. EIA also includes public participation in decision-making and thereby strengthens the quality of decisions.

The 2014 Directive requires that certain developments be assessed for *likely environmental effects* before planning approval be granted. When submitting a planning application for such development, the applicant must also submit an accompanying Environmental Impact Assessment Report (EIAR).

The Department of Housing, Planning, Community and Local Government has brought forward the *Planning and Development Regulations 2001-2018* to provide for the transposition of the Directive into the Irish planning code. To this effect, the *European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018* transposed the 2014 Directive into Irish law.

The Department has also issued the updated the '*Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*' in August 2018, to provide practical guidance on legal and procedural issues arising from the requirement to undertake EIA in accordance with Directive 2014/52/EU. These Guidelines have informed the preparation of this EIAR. The preparation of the EIAR has also had regard to the EPA *Draft Guidelines on the Information to be Contained in EIARs* (2017).

2.2 EIA Process

EIA is the process for anticipating the effects on the environment caused by a proposed development or project. Where effects are unacceptable, design or other measures can be taken to avoid or reduce these effects to acceptable levels. The EIAR is the document produced as a result of the Environmental Impact Assessment (EIA) process, that:

- provides a description of the baseline environment;
- identifies the potential effects as a result of the proposed development or project; and

[3] European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).

- provides a description of any mitigation measures required to reduce or eliminate such potential effects.

The EIA process is summarised as follows:

- **screening** - is an EIA required?;
- **scoping** - what issues should be considered within the EIAR?;
- **baseline data collection** - establishing a robust baseline of the existing environment on/around the proposed site. This includes a review of existing available information and undertaking any surveys identified during Scoping;
- **impact assessment** - assessment of the environmental impacts and establishing their significance;
- **mitigation** - a description of the mitigation measures and/or factors that reduce or eliminate any significant environmental impacts identified, which cannot be avoided practically through design;
- **consultation** - with Statutory Stakeholders, the public and other bodies;
- **decision** - the competent authority, in this case An Bord Pleanála, decides, taking into consideration the results of consultations, if the proposed Project can be authorised; and
- **monitoring** - implementation and monitoring of mitigation measures.

In accordance with the requirements of Article 3 of the 2014 Directive, the EIA shall identify, describe and assess in an appropriate manner, the direct and indirect significant effects of the proposed Project on the following factors:

(a) population and human health;

(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;

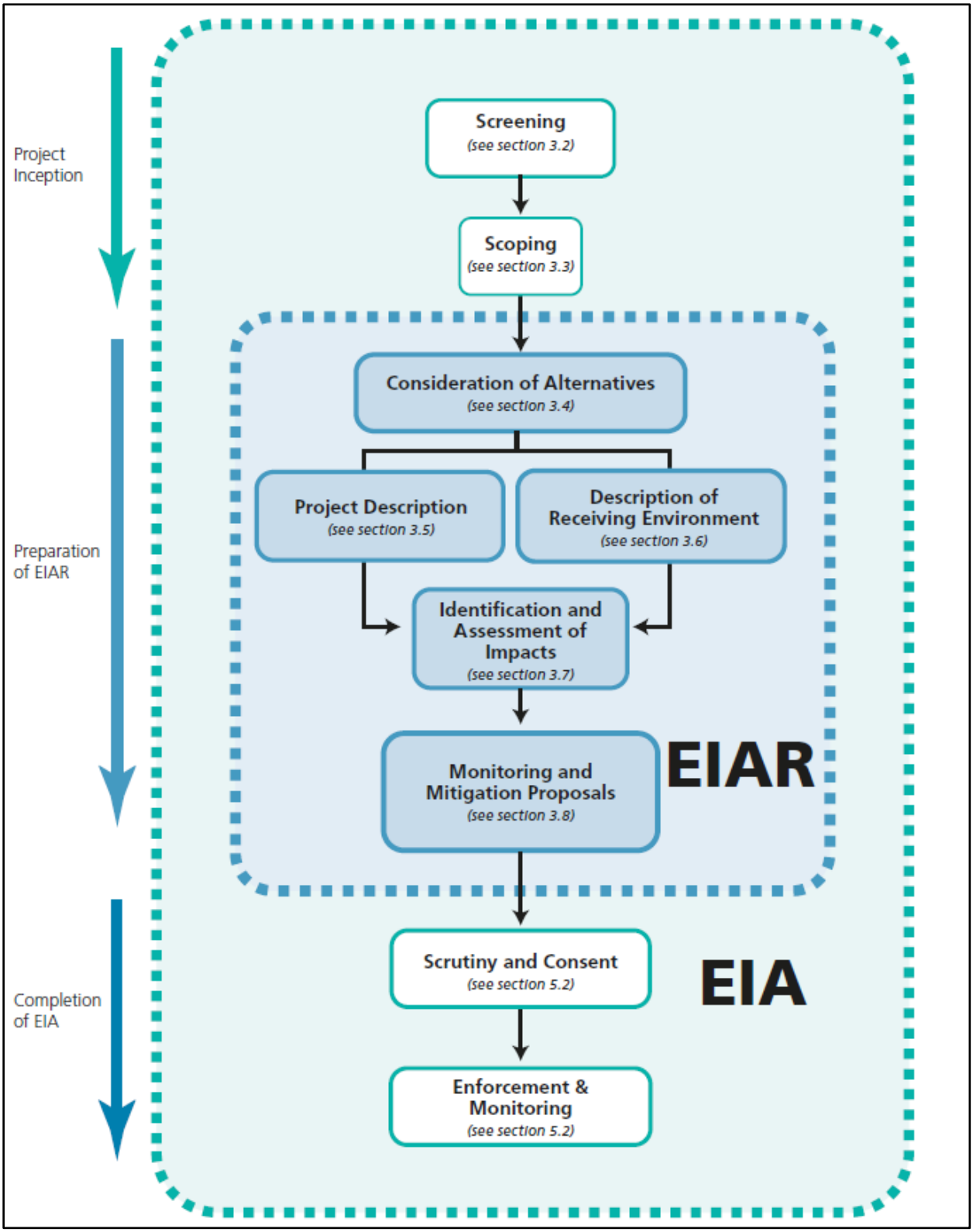
(c) land, soil, water, air and climate;

(d) material assets, cultural heritage and the landscape;

(e) the interaction between the factors referred to in points (a) to (d).

The EIA process is summarised in Figure 2.1 below.

Figure 2.1: The Position of an EIAR within the EIA Process[4]



[4] EPA (2017).

2.3 EIA Methodology

2.3.1 EIA Guidance

This assessment of environmental impacts has been completed in accordance with, but not limited to, the following legislation and current guidance:

- DHPLG (2018). *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment;*
- DHPLG (2017). *Circular letter PL 1/2017 - Advice on Administrative Provisions in Advance of Transposition*;
- EC (1999). *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions*;
- EC (2013). *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment*;
- EC (2017). *Environmental Impact Assessment of Projects. Guidance on Scoping*;
- EC (2017). *Environmental Impact Assessment of Projects. Guidance on the preparation of Environmental Impact Assessment Report;*
- EPA (2015). *Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* (2015);
- EPA (2017). *Draft Guidelines on the Information to be Contained in EIARs*;
- EU (2014). Directive 2014/52/EC, amending Directive 2011/92/EU on the *Assessment of the Effects of Certain Public and Private Projects on the Environmen*t;
- Planning and Development Act 2000, as amended; and
- Planning and Development Regulations 2001, as amended.

In addition to these guidance documents, all EU Directives and national legislation relating to the specialist areas (*e.g.* Biodiversity, surface water) have been considered under each relevant environmental aspect. Specific guidance are addressed in the Chapters of this EIAR.

2.3.2 EIA Screening

Screening is Stage 1 in the process, whereby a decision is made on whether or not an EIA is required. In order to determine whether an EIA is required for the proposed Project, it is necessary to determine whether it is a project listed in one of the Annexes to the Directive 2011/92/EU, as amended by Directive 2014/52/EU.

The 2014 Directive specifies the classes of project for which an EIA is required and the information which must be contained within the EIAR. In accordance with *Article 4(1)* of the 2014 Directive, all projects listed in Annex I are considered as having significant effects on the environment and shall be subject to EIA. For projects listed

in Annex II of the Directive, the national authorities may determine whether an EIA is needed, either on the basis of thresholds/criteria or on a case by case examination.

These Annexes have been transposed into Irish law by the provisions of the Planning and Development Act 2000-2020 and the Planning and Development Regulations 2001-2020. Specifically projects requiring mandatory EIA are listed in Part 1 and Part 2 of Schedule 5 of the Planning and Development Regulations 2001-2020.

Schedule 5 (Part 1) of the Planning & Development Regulations 2001 (as amended) lists major project classes for the purposes of mandatory EIA, which typically include industrial, chemical, energy, waste, infrastructure and intensive agricultural developments. The proposed Project does not correspond to a development set out in this Part and therefore, EIA is not a requirement under this provision.

Schedule 5 (Part 2) of the Planning & Development Regulations 2001 (as amended) sets mandatory thresholds for each project class above which EIA is required. Sub-sections 10(b)(i) and 10(b)(iv) addresses '*infrastructure projects*' referring to housing and urban developments, and require that the following classes of project, relevant to this project, be subject to EIA:

> "*Class 10(b) (i).* ***Construction of more than 500 dwelling units****."*
> *"Class 10(b) (iv). Urban development which would involve an* ***area greater than 2ha*** *in the case of a* ***business district****, 10ha in the case of other parts of a built-up area and 20ha elsewhere."*

The proposed Project provides for the 702 residential units on a business district site of 2.44 hectares and exceeds the stated thresholds and therefore, EIA is required and an EIAR (this report) has been prepared and will be submitted to An Bord Pleanála with the planning application.

2.3.2.1 Appropriate Assessment (AA)

European sites are also known as Natura 2000 Sites (Special Areas of Conservation (SAC) and Special Protection Areas (SPA). These are a network of sites designated for nature conservation under Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the "*Habitats Directive"*) and Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (the "*Birds Directive*"). The requirements for Appropriate Assessment are set out under Article 6 of the Habitats Directive, transposed into Irish law by the European Union (Birds and Natural Habitats) Regulations 2011-2015[5] (the "*Birds and Natural Habitats Regulations*") and the Planning and Development Act, 2000 - 2018 (the "*Planning Acts*").

Article 6(3) of the Habitats Directive states that:

[5] S.I. No. 477 of 2011.

(3) Any plan or project not directly connected with or necessary to the management of the site but likely to have significant effect thereon, either individually or in combination with other plans or projects, shall be subject to Appropriate Assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

The first test is to establish whether, in relation to a particular plan or project, appropriate assessment is required. Sections 177U of the Planning Acts and Regulation 42 of the Birds and Natural Habitats Regulations require that the AA screening test must be applied to the proposed development/project, as follows:

- To assess, in view of best scientific knowledge, if the development, individually or in combination with another plan or project is likely to have a significant effect on the European site;
- An appropriate assessment is required if it cannot be excluded, on the basis of objective information, that the development, individually or in combination with other plans or projects, will have a significant effect on a European site.

An AA Screening Report has been prepared in accordance with the requirements of the Birds Directive, the Habitats Directive, the Planning Acts and the Birds and Natural Habitats Regulations.

2.3.3 EIA Scoping

The EPA Guidelines state that 'Scoping' is a process of deciding what information should be contained in an EIAR and what methods should be used to gather and assess that information. It is defined in the EC guidance[6] as: *'determining the content and extent of the matters which should be covered in the environmental information to be submitted in the EIAR'.*

Scoping requires the consideration of the nature and likely scale of the potential environmental impacts likely to arise from a proposed development or project. This was carried out on an informal basis through the pre-planning process with both Dublin City Council and An Bord Pleanála where key issues to be considered were identified and discussed.

The Scoping process is an iterative process and is an ongoing phase throughout the development of the EIAR.

2.4 EIA Consultation

The EIAR document enables the competent/consent authorities to reach a decision on the acceptability of the proposed Project in the full knowledge of the project's *likely significant impacts* on the environment, if any.

[6] EC (2001).

Decisions are taken by the competent/consent authorities through the statutory planning process which allows for public participation and consultation while receiving advice from other key stakeholders and statutory authorities with specific environmental responsibilities. Public participation and consultation is an integral part of the SHD process as outlined in the Planning & Development (Strategic Housing Development) Regulations 2017[7] and in the Strategic Housing Development Pre-Application Consultation (Guidance for Prospective Applicants)[8]. Further information on the Consultation Process is provided in Chapter 6 (Consultation).

[7] *Planning and Development (Strategic Housing Development) Regulations 2017. S.I. No. 271 of 2017.*
[8] An Bord Pleanála (2017). *Strategic Housing Development Pre-Application Consultation. Guidance for Prospective Applicants.*

3 Planning and Development Context

3.1 Introduction

This Chapter sets out the legislative context governing the planning and development of the proposed Project. This includes a review of the planning policy context at a national, regional and local level and other relevant statutory and non-statutory planning documents.

National and regional plans and policies inform the policies and objectives of local authority Development Plans, of Local Area Plans (LAP) and of SDZ Planning Schemes, which set the local statutory planning context.

The proposed Project falls under the definition of Strategic Housing Development (SHD) as set out under Section 3 of the Planning and Development (Housing) and Residential Tenancies Act 2016 in that it comprises a development:

> '*of 100 or more houses on land zoned for residential use or for a mixture of residential and other uses*'.

3.2 National Planning Context

3.2.1 National Planning Framework - Project Ireland 2040

The *National Planning Framework (NPF) - Project Ireland 2040* requires delivery of a baseline of 25,000 homes annually to 2020, followed by a likely level of 30-35,000 annually up to 2027. As a result 112,000 households are expected to have their housing needs met in a social housing home over the next decade. To achieve the objective of compact growth, 40% of future housing delivery is to be delivered within and close to the existing footprint of built-up areas.

The NPF - Project Ireland 2040 identifies the urgent requirement for a major uplift of the delivery of housing within the existing built-up areas of cities and other urban areas. The NPF has a particular focus on brownfield development, targeting derelict and vacant sites that may have been developed before but have fallen into disuse.

With regards to Dublin the NPF identifies that the city needs to '*accommodate a greater proportion of the growth it generates within its metropolitan boundaries and to offer improved housing choice.'*

National Policy Objective 4 in this regards states:

> *'Ensure the creation of attractive, liveable, well designed, high quality urban places that are home to diverse and integrated communities that enjoy a high quality of life and well-being.'*

National Policy Objective 11 in this regards states:

> *'In meeting urban development requirements, there will be a presumption in favour of development that can encourage more people and generate more jobs and activity within existing cities, towns*

> *and villages, subject to development meeting appropriate planning standards and achieving targeted growth.'*

National Policy **Objective 13** in this regards states:

> *'In urban areas, planning and related standards, including in particular building height and car parking will be based on performance criteria that seek to achieve well-designed high quality outcomes in order to achieve targeted growth. These standards will be subject to a range of tolerance that enables alternative solutions to be proposed to achieve stated outcomes, provided public safety is not compromised and the environment is suitably protected.'*

Table 3.1 below provides a working list of some of the other key plans/planning documents of relevance to the future development of the subject lands.

Table 3.1: Key Plans/Planning Documents

Plan Name	Description
Urban Development and Building Heights - Guidelines for Planning Authorities (2018)	The *Urban Development and Building Height Guidelines - Guidelines for Planning Authorities* (2018) set out the national planning policy guidelines on building heights in urban areas in response to specific policy objectives set out in the National Planning Framework and Project Ireland 2040. The Guidelines state that it is Government policy to promote increased building height in locations with high quality public transport services.
Rebuilding Ireland - Action Plan for Housing and Homelessness (2016)	*Rebuilding Ireland- Action Plan for Housing and Homelessness* (2016), with the objective to double the annual level of residential construction to 25,000 homes and deliver 47,000 units of social housing in the period to 2021, while at the same time making the best use of the existing stock and laying the foundation for a more vibrant and responsive private rented sector.
Sustainable Urban Housing: Design Standards for New Apartments; Guidelines for Planning Authorities (2018)	The *Sustainable Urban Housing Design Standards for New Apartment* (2018) provides for an update on guidance on apartment developments in response to the National Planning Framework and Rebuilding Ireland. A key component of the guidelines is the acknowledgement of the importance of strategic sites in existing urban areas in close proximity to existing public transport facilities.
Eastern and Midland Regional Assembly - Regional Spatial & Economic Strategy (RSES)	The Regional Spatial and Economic Strategy is a strategic plan and investment framework to shape the future development of the Eastern & Midland Region to 2031 and beyond. The Site is located with the Dublin Metropolitan Area, as designated by the Strategy. The Metropolitan Area Strategic Plan (MASP) which is part of the RSES seeks to focus on a number of large scale strategic sites, based on key corridors that will deliver significant development in an integrated and sustainable fashion.
Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (2009)	The *Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas* aim to ensure the sustainable delivery of new development throughout the country. The Guidelines also provide guidance on the core principles of urban design when creating places of high quality and distinct identity. The Guidelines recommend that planning authorities should promote high quality design in their policy documents and in their development management process. In this regard, the Guidelines are accompanied by a Design Manual, discussed below.
Urban Design Manual - A Best Practice Guide (2009)	The *Urban Design Manual - A Best Practice Guide* sets out a series of 12 criteria which it recommends should be used in the assessment of planning applications and appeals.

Plan Name	Description
Delivering Homes, Sustaining Communities (2007)	The Department's policy statement, *Delivering Homes, Sustaining Communities, Guidance,* provides the overarching policy framework for an integrated approach to housing and planning. The statement notes that demographic factors will continue to underpin strong demand for housing, which in turn will present considerable challenges for the physical planning of new housing and the provision of associated services. Sustainable neighbourhoods are areas where an efficient use of land, high quality design, and effective integration in the provision of p people want to live in.
Design Manual for Urban Roads and Streets (DMURS) (2019)	The *Design Manual for Urban Roads and Streets*, sets out design guidance and standards for constructing new and reconfiguring existing urban roads and streets in Ireland. It also outlines practical design measures to encourage more sustainable travel patterns in urban areas.
Guidelines for Planning Authorities on 'The Planning System and Flood Risk Management (2009)	The *Planning System and Flood Risk Management Guidelines* (2009), were published by the Minister for the Environment, Heritage & Local Government under Section 28 of the Planning & Development Act 2000 (as amended). The Guidelines require the planning system at all levels to avoid development in areas at risk of flooding, particularly floodplains, unless there are proven wider sustainability grounds that justify appropriate development and where the flood risk can be reduced or managed to an acceptable level without increasing flood risk elsewhere.

3.3 Regional Planning Context

3.3.1 Eastern and Midland Regional Assembly - Regional Spatial and Economic Strategy (RSES)

The Regional Spatial and Economic Strategy is a strategic plan and investment framework to shape the future development of the Eastern and Midland Region to 2031 and beyond. The region is the smallest in terms of land area but the largest in population size and is identified as the primary economic engine of the state.

The Strategy identifies that -

> *'the Region is home to over 800,000 households, with 4 out of 5 living in conventional housing while apartments account for around 18% or our housing stock. One of the challenges facing the region is the continued growth rates of household formation coupled with a severe slowdown in the development of new housing stock during the economic recession, resulting in housing supply and affordability pressures in both sale and rental markets, particularly in Dublin and urban areas but affecting all of the region'*.

The Strategy is underpinned by key cross-cutting principles that reflect the three pillars of sustainability; *Social, Environmental and Economic*, and expressed in a manner which best reflects the challenges and opportunities of the Region. The Plan identifies that the central need is for the RSES to be people focussed, as '*quality of life*' encapsulates strong economic output and stability, good environmental performance and a good standard of living for all.

The Site is located with the Dublin Metropolitan Area, as designated by the Strategy. The Metropolitan Area Strategic Plan (MASP) which is part of the RSES seeks to focus on a number of large scale strategic sites, based on key corridors that will deliver significant development in an integrated and sustainable fashion.

Policy Objective relating to MASP Housing and Regeneration include:

> RPO 5.4: *Future development of strategic residential development areas within the Dublin Metropolitan area shall provide for higher densities and qualitative standards as set out in the 'Sustainable Residential Development in Urban Areas', 'Sustainable Urban Housing; Design Standards for New Apartments' Guidelines, and 'Urban Development and Building Heights Guidelines for Planning Authorities'.*

In regards to the Docklands the employment potential is identified as '*High tech, financial services and people intensive employment and regeneration of underutilised lands*'.

3.4 Local Level - Dublin City Development Plan 2016-2022

The Site is located within the administrative area of DCC. The Dublin City Development Plan 2016-2022 sets the statutory planning policy for development within the City Boundary, having regard to national and regional plans and policies.

The Development Plan sets out a new approach to meet the needs and aspirations of citizens of Dublin and the country, not only for the 6-year life of the plan, but for the long term. This approach is based on the principles of sustainability and resilience on the social, economic and environmental fronts.

The Development Plan has been informed by the Regional Planning Guidelines (RPGs) and the environmental sensitivities of the County. The Site is located within the Docklands Area.

3.4.1 Core Strategy - Dublin City Development Plan

The Core Strategy of the Development Plan promotes the intensification and consolidation of Dublin City, and the Docklands is identified as one of the Strategic Development Regeneration Area (SDRAs) capable of realising this objective.

The Plan notes that these SDRA areas *'represent significant areas of the inner and outer city with substantial development capacity and the potential to deliver the residential, employment and recreational needs of the city'.*

The majority of SDRAs relate to a zoning objective which seeks the social, economic, physical development or rejuvenation of an area with residential, employment and mixed-uses (Z14). The Development Plan notes that *'these SDRAs have substantial development capacity, not only for residential uses….'*

The Docklands is identified as Strategic Development Regeneration Area 6. In respect of SDRA 6, the City Development Plan identifies that '*the designation of the Docklands, including the Docklands SDZ, as a strategic development and regeneration area (SDRA) provides for the continued physical and social regeneration of this part of the city, consolidating the area as a vibrant economic, cultural and amenity quarter of the city, whilst also nurturing sustainable neighbourhoods and communities'*.

The zoning and standard provisions in the Development Plan have been devised to support the delivery of the core strategy. In particular, the Development Plan notes that *'the zoning provisions ensure adequate land to meet the population targets and economic role of the city as the national gateway; intensification along public transport corridors and a mixed-use approach to zonings (Z4, Z5, Z6, Z10, **Z14**) to underpin a compact and sustainable city'.*

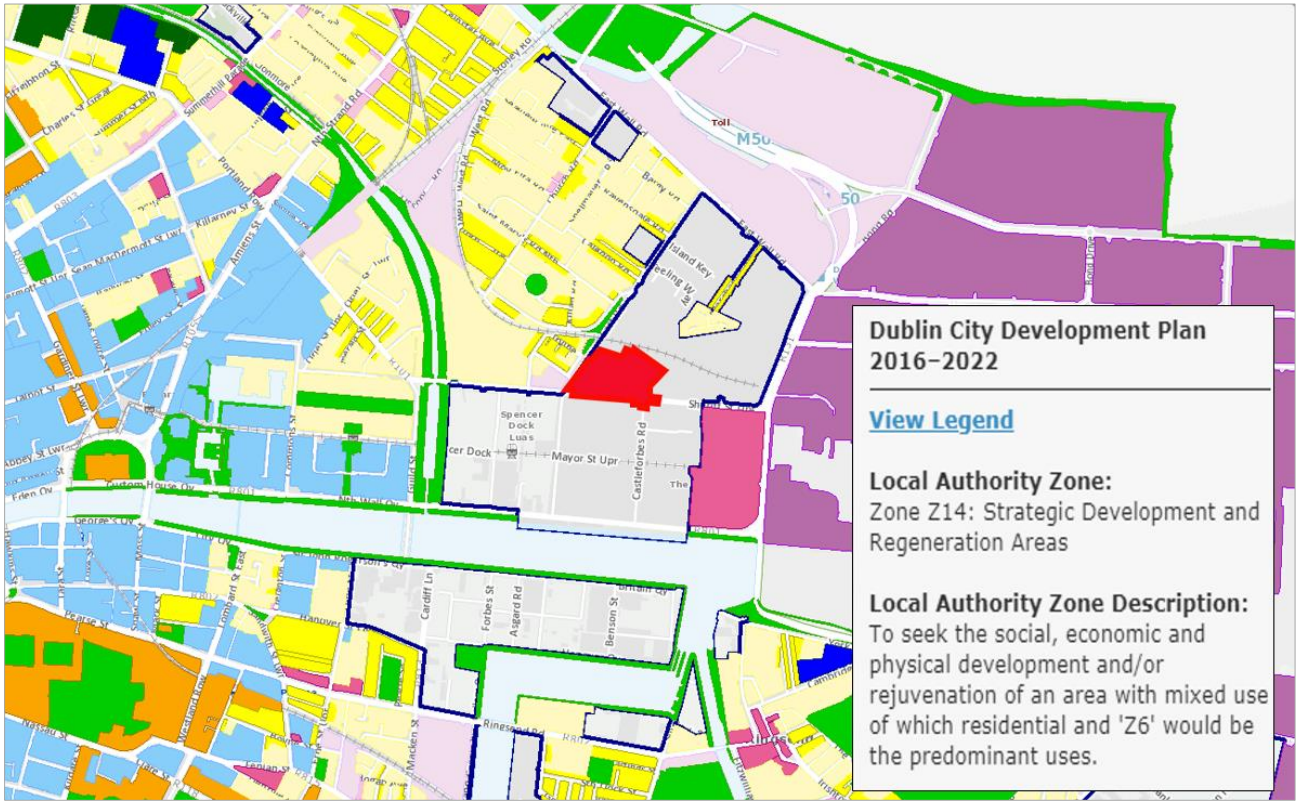
3.4.2 Zoning Objective - Dublin City Development Plan

The Site is zoned Z14 within the Development Plan, see Figure 3.1 below. The stated objective of this zoning is to:

> *'to seek the social, economic and physical development and / or rejuvenation of an area with mixed use, of which residential and 'Z6' would be the predominant uses.'*

The Z6 zoning aims to provide for enterprise and facilitate opportunities for employment creation. As such, both employment and residential uses are considered permissible with Z14 zoning making the principle of the proposed Project acceptable.

Figure 3.1: Land Use Zoning under the Current Dublin City Development Plan 2016-2022[9](Site in red)



3.4.3 Residential Development - Dublin City Development Plan

The Development Plan identifies that the provision of quality homes which provide for the needs of the city's population and which contribute to the making of good, connected neighbourhoods is a key priority.

In this regard it is the policy of DCC:

QH7: *To promote residential development at sustainable urban densities throughout the city in accordance with the core strategy, having regard to the need for high standards of urban design and architecture and to successfully integrate with the character of the surrounding area.*

[9] Department of Housing, Planning and Local Government (2020). My Plan. http://www.myplan.ie/webapp/

QH8: *To promote the sustainable development of vacant or under-utilised infill sites and to favourably consider higher density proposals which respect the design of the surrounding development and the character of the area.*

The Plan further notes that, in Dublin City, it is envisaged that the majority of new housing in the City area will be apartments or another typology that facilitates living at sustainable urban densities.

With regards apartments, the DCC policies are as follows:

QH18: *To promote the provision of high quality apartments within sustainable neighbourhoods by achieving suitable levels of amenity within individual apartments, and within each apartment development, and ensuring that suitable social infrastructure and other support facilities are available in the neighbourhood, in accordance with the standards for residential accommodation.*

QH19: *To promote the optimum quality and supply of apartments for a range of needs and aspirations, including households with children, in attractive, sustainable, mixed-income, mixed-use neighbourhoods supported by appropriate social and other infrastructure.*

QH20: *To ensure apartment developments on City Council sites are models of international best practice and deliver the highest quality energy efficient apartments with all the necessary infrastructure where a need is identified, to include community hubs, sports and recreational green open spaces and public parks and suitable shops contributing to the creation of attractive, sustainable, mixed-use and mixed-income neighbourhoods.*

3.5 Planning History of the Site

The Site of the proposed Project, and wider site, has been subject to a number of planning applications in recent years as set out as follows:

Plan Reg. Ref.: 3412/08 (3412/08/x1) Granted 29th Dec 2008 (and extended 16th Oct 2013) by Dublin City Council

> *The proposed development consisted of a building ranging in height from 8 to 10 storeys (33,257sqm) incorporating 4 levels of basement car parking (314 spaces) and ancillary areas. The south western corner of the proposed building fronts onto Sheriff Street Upper and extends to 8 storeys in height. An 8 storey glazed atrium with internal bridges on all levels between the 2nd and 7th floor forms a link to the 10 storey element of the building.*
>
> *More recently the applicant has sought and received planning permission for the eastern and western parts of the site to accommodate 2 hotels and a commercial office building. This ensures the objectives of the Z15 Zoning area achieved.*

Plan Reg. Ref.: 3433/19- Granted 7th Jan 2020

The proposed development consists of the demolition and partial demolition of all existing structures and the construction of a commercial office building and a 270 bedroom hotel. The commercial office building ranges in height from 6 to 9 storeys plus plant zone (maximum height of c.40m) with a total gross floor area of c. 10,265sq.m. The hotel contains 270 bedrooms and ranges in height from 7 to 10 storeys (maximum height of c.35.21m) with total gross floor area of c. 9,644 sq.m.

Plan Reg. Ref.: 2143/20- Granted 6th August 2020

The proposed development consists of the demolition of all existing structures on the site and the construction of a 219 bedroom hotel ranging in height from 6 to 9 storeys (maximum height of c.33.95m) with total gross floor area of c.9,241sq.m (incl. basement). The ground floor includes hotel reception/lobby/check in area, a public bar with seating area, a public restaurant area with seating area, a cafe/work zone, kitchen, staff area, storage areas, lifts and circulation areas, plant, and ancillary office areas. Floors one to eight typically contain, bedrooms, linen and clearing stores, lifts and circulation areas with a gym and wellness centre located on floor one. A proposed basement -1 level contains plant, storage, staff areas, laundry store and staff cycle parking.

Plan Reg. Ref.: 3197/20- Granted 16th November 2020

Amendments to the permitted hotel and office, permitted under 3433/19, to the east of the SHD application site to include minor alterations to the permitted buildings including minor reconfiguration of the permitted building footprints resulting in an overall increase in office floor space of 670 sq.m and hotel floor space of 393 sq.m.

4 Consideration of Alternatives

4.1 Introduction

Consideration of alternatives is an important aspect of the EIA process and is necessary to evaluate the *likely environmental consequences* of a range of development strategies for the Site within the constraints imposed by environmental and planning conditions.

This Chapter provides an overview of alternative designs that have been considered for the Site at Castleforbes Business Park, Sheriff Street Upper and East Road, Dublin 1.

4.2 Legislative Context

Article 5 (1) of the 2014 Directive requires the consideration of reasonable alternatives which are relevant to the project and taking into account the effects of the project on the environment. It states under Article 5 (1) that;

> *'Where an environmental impact assessment is required, the developer shall prepare and submit an environmental impact assessment report. The information to be provided by the developer shall include at least':*

And Article 5 (1) (d):

> *'a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment.'*

Schedule 6 of the Planning and Development Regulations, 2001 (as amended) sets out the information which is to be contained in an EIS and Part 1 (d) of Schedule 6 states that the following shall be included:

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

In accordance with EPA Guidelines (Draft), different types of alternatives may be considered at several key stages during the process. As environmental issues emerge during the preparation of the EIAR, alternative designs may need to be considered early on in the process or alternative mitigation options may need to be considered towards the end of the process.

The EPA Guidelines (Draft) states;

> *'The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting*

the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account is deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required.'

Thus, the consideration and presentation of the reasonable alternatives studied by the project design team is an important requirement of the EIA process.

4.3 Alternatives Examined

This Chapter provides an outline of the main alternatives examined during the design phase and sets out the main reasons for choosing the proposed Project. The alternatives may be described at five levels:

1. 'Do-Nothing' Alternative
2. Alternative Locations
3. Alternative Layouts
4. Alternative Designs
5. Alternative Processes.

4.3.1 '*Do-Nothing*' Alternative

A '*do-nothing*' scenario was considered to represent an unsustainable and inefficient use of these strategically located Strategic Development and Regeneration Areas (SDRA) (Z14) zoned lands.

The suitability of the lands for development as proposed *('Z14 areas are capable of accommodating significant mixed-use development'*) within an area which has capacity for SHD and a highly accessible location to public transport (Spencer Dock Luas Stop and the Docklands Rail Station) and road network were also key considerations.

4.3.2 Alternative Locations

Glenveagh Living Ltd. (the Applicant) acquired the Site on the basis that it is zoned Z14 as part of a wider Strategic Development and Regeneration Area (SDRA 6) within the Development Plan 2016-2022, which was itself subject to the Strategic Environmental Assessment (SEA) process.

The SDRA designation envisages that these areas have substantial development capacity and the potential to deliver the residential, employment and recreational needs of the city and the Z14 land-use zoning objective for SDRA 6 is:

"To seek the social, economic and physical development and/or rejuvenation of an area with mixed use, of which residential and 'Z6' would be the predominant uses."

As such it is considered that the Site is entirely suitable for the nature of development as proposed in this SHD application.

4.3.3 Alternative Design & Layout

During the design process for the proposed Project a range of iterations of the proposed Site layout were considered. The planning application and this EIAR demonstrates that the Site and the surrounding area have the environmental capacity to accommodate the proposed Project without significant risk of impact upon environmental sensitivities due to the Site location.

The proposed layout is designed to function, in combination with the already permitted developments on the wider site, as a mixed-use development on a currently underutilised site, and is intended to provide a landmark and gateway buildings and public space at Sheriff Street Upper that defines the site as a destination within the Docklands.

During the design process for the proposed Project a number of iterations of alternative designs were considered. The proposed Project at Castleforbes Business Park, Sheriff Street Upper has been prepared in accordance with the requirements of the National and Local Planning Policy and Design Standards. A detailed analysis of the architectural design strategy is provided in the *Architects Design Statement*, prepared by O'Mahony Pike, and should be read in conjunction with this Chapter of the EIAR.

The proposed Project has been the subject of a number of pre-application meetings with the Dublin City Council prior to lodgement (see Section 6.2 of this EIAR and the Planning Report which accompanies this planning application). The proposed Project was also subject of a pre-application SHD consultation with An Bord Pleanála, with design alterations arising out of this process also.

The key considerations which influenced the design of the proposed Project were as follows:

- To provide and promote a residential development in the City, with regard to the need for high standards of urban design/architecture and to successfully integrate the development with the character of the surrounding area.
- The need to promote sustainable development of vacant or under-utilised sites and to consider higher density proposals.
- The need to provide sustainable neighbourhoods by achieving suitable levels of amenity.
- The need to provide suitable social infrastructure and other support facilities are available in the neighbourhood.
- The need to include community hubs, sports and recreational green open spaces and suitable shops contributing to the creation of sustainable and mixed-income neighbourhoods.
- The quality of the urban environment to be delivered and the associated impact on human health.

4.3.3.1 Alternative Design 1

Initial Massing & Site Layout

At initial project inception and early meetings with DCC, a number of matters were raised regarding the baseline and conceptual design. These issues included the grouping and height of the development blocks which resulted in the following:

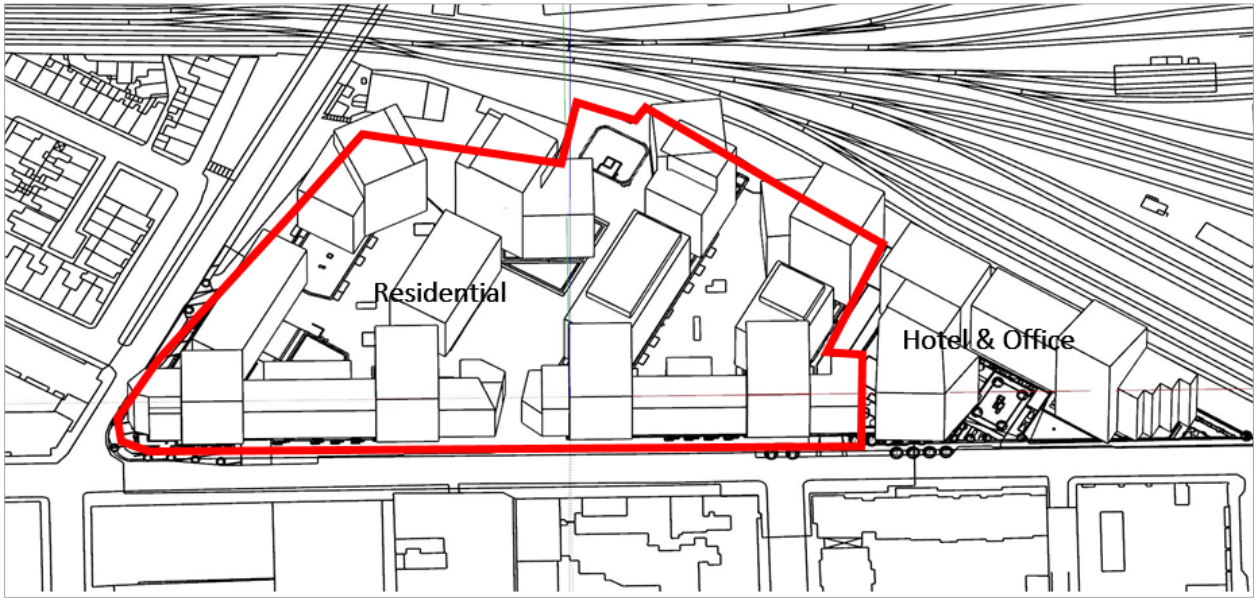
- Opportunity to provide for increased heights and density
- The need to provide sufficient **sunlight** access to the public.
- The need to provide sufficient and good quality communal **open space**.
- The need to have regard to provision of a new frontage on Sheriff Street and **appropriate design** in context with the area.
- Integration of the proposed commercial elements

The issues raised relate the following environmental aspects:

- Population & Human Health.
- Landscape & Visual.
- Microclimate - Daylight/Sunlight.

Figure 4.1 below illustrates the initial conceptual design.

Figure 4.1: Alternative Design Layout 1



4.3.3.2 Alternative Design 2

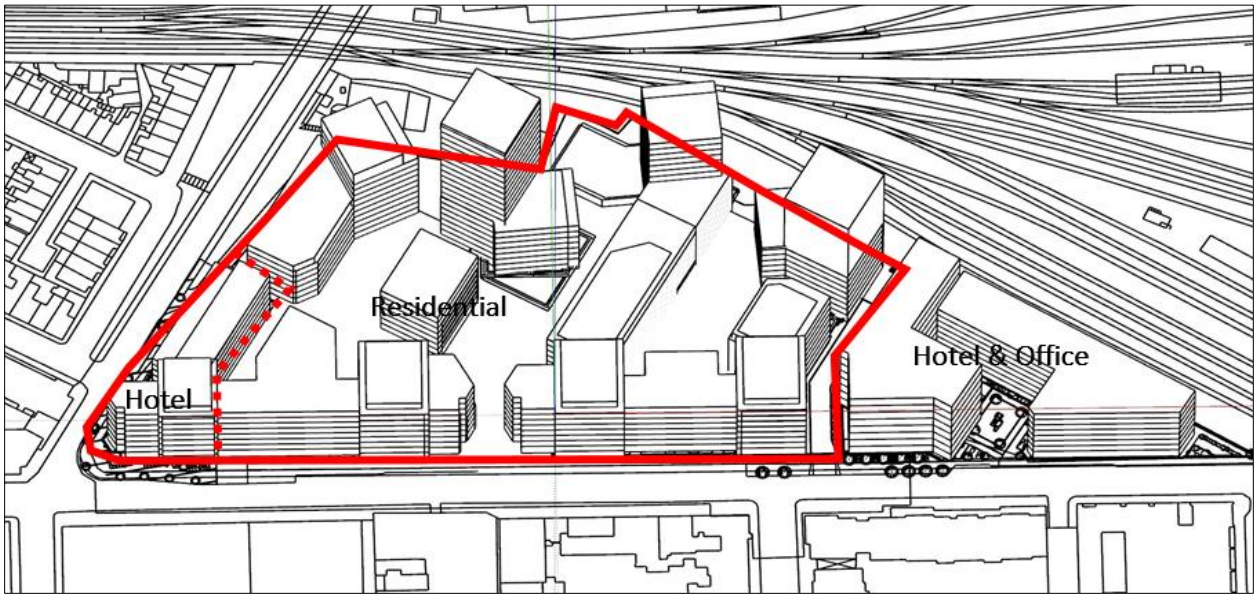
Emerging Massing & Layout

The proposed Project evolved from the initial conceptual design and the consideration of an alternative design resulted in significant environmental improvements in terms of Population & Human Health, Microclimate (Daylight/Sunlight) and Landscape & Visual as a result of an iterative design process and extensive engagement with Dublin City Council. The alternative design No. 2 resulted in:

- increased south light penetration;
- increased height to the northern edge of the Site;
- additional commercial elements to the west of the Site (subject to separate application); and
- introduction of a cultural focal building to the Site.

Figure 4.2 illustrates the alternative design which was presented at Pre-Application Consultation Stage with An Bord Pleanála.

Figure 4.2: Alternative Design Layout 2



4.3.3.3 Alternative - The Proposed Project

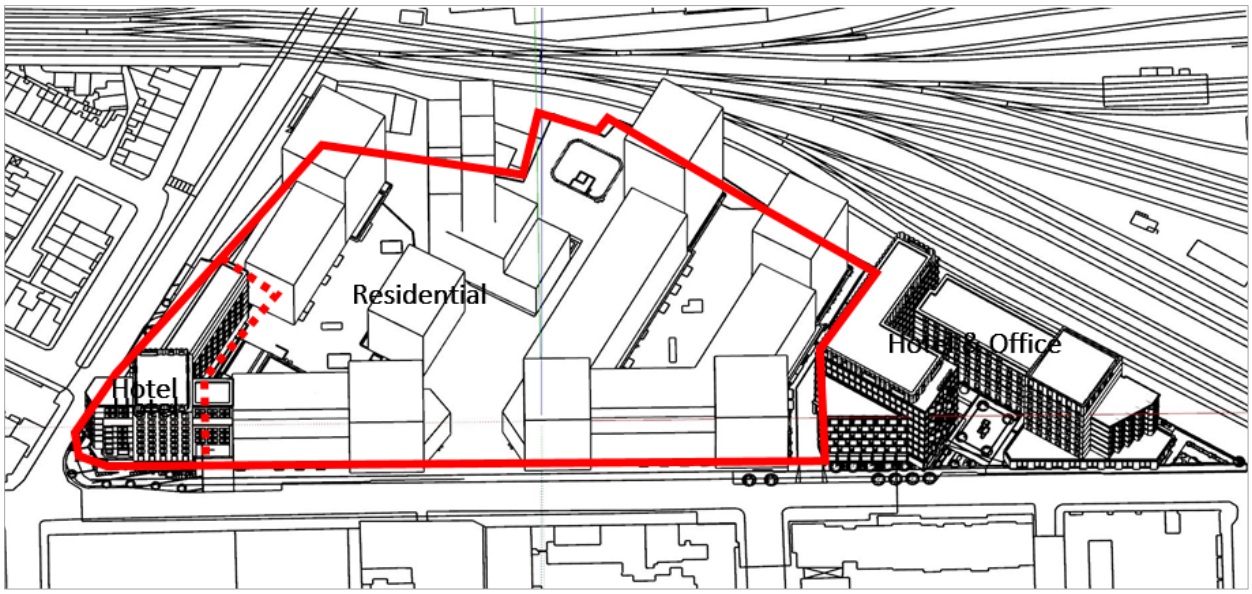
The final preferred proposed Project has been progressed via an iterative process, with changes having been made during the pre-application process with An Bord Pleanála based on their comments and environmental considerations pertaining to the development. The proposed Project design alternative has particular consideration for the following:

- increased entrance width increasing light penetration to public spaces;
- reallocation of taller elements- overall max height reduced from 20 to 18 storeys;
- reduced car parking numbers;
- increased residential units (switch to Build-To-Rent);

- increased separation between blocks; and
- greater potential for future connectivity to the north.

Figure 4.3 below illustrates the proposed Project design alternative.

Figure 4.3: The Proposed Project Alternative



4.3.4 Alternative Process

This is not considered relevant to this EIAR having regard to the nature of the proposed Project - a Strategic Housing Development, where the planning application will be submitted to An Bord Pleanála.

5 Description of the Proposed Project

5.1 Introduction

This Chapter describes the Site and surrounds, the need for the Project, and the characteristics of the proposed Project, together with the proposed design parameters. In accordance with Article 5(1)(a) of the 2011 Directive as amended by Directive 2014/52/EU the description of the proposal should comprise

'…information on the site, design, size and other relevant features of the project'.

This description sets the basis against which the specialist assessments presented in this EIAR have been undertaken.

5.2 Background to the Site

5.2.1 Site History

The East Wall area established during the late 18th century. The dominance of the railway system over the canal, saw the area develop with a mix of warehouses, stores and yards, and rows of small terraced houses. As such, the area was predominately a working class area, with many taking up employment in Dublin Port. The houses are typically single and two storey, were located in proximity to the larger scale industrial facilities in the North Docks and along North Wall Quay. A network of railway lines, brought both passenger and freight trains into the North Docks.

Looking at the historic relationship between the residential area of East Wall and the larger scale industrial and port related buildings at North Docks, East Road presented an abrupt change from the residential area into the North Docks, and that transition is also apparent to the south at Mayor Street. Railway infrastructure weaves through the area and was a defining feature of the locality.

See Chapter 14 (Cultural Heritage, Archaeology and Architectural) and Chapter 13 (Landscape and Visual) for more detail on the Site history.

5.2.2 Current Site Use

The Site is a brownfield site that is occupied by Castleforbes Business Park, which includes several warehouses and associated yards. The land uses surrounding the Site of the proposed Project are a mix of office, hotel and residential blocks as well as the railway lands to the north and northeast.

5.2.3 Site Location & Surrounding Area

The application Site boundary is 2.44 hectares (ha) and the proposed Project development area is 2.02ha. The Site of the proposed Project is located on Sheriff Street Upper and East Road, Dublin 1. The Site of the proposed Project is located immediately to the north of the Docklands Strategic Development Zone (SDZ), with numerous developments completed, permitted and others in progress nearby.

The Site is highly accessible and benefits from a range of transport connections. The Docklands Rail Station and the LUAS Red Line (The Point interchange) are c. 400m (5-minute walk) and c. 450m (6-minute walk) respectively from the Site. The LUAS Red Line currently provides access to Busáras, Connolly Station, Dublin City centre, Heuston Railway Station, Tallaght and Saggart in addition to other intermediate destinations along its route, see Figure 5.1 below.

The Site is within walking and cycling distance of the North and South Docklands employment hubs, the IFSC and the City centre.

Furthermore, Connolly Station and the proposed Clongriffin-Tallaght Bus Rapid Transport (BRT) interchange are within 1.2km from the Site, and the proposed interchange for the Dart Underground is located at the Docklands Rail Station, c. 450m from the Site.

Dublin Bus operates along the East Road corridor and along the R801 North Wall Quay (to the south of the Site) providing links to/from a range of destinations including Dublin City centre and Dublin Airport.

The Site of the proposed Project has two vehicular entry points on Sheriff Street Upper; one opposite the existing Sheriff Street Upper/Castleforbes Road, at the southeast corner of the Site and the other at the southwest corner via a gated entrance.

Figure 5.1: The Site of the Proposed Project (in red)[10]

5.2.4 Site Specific Flood Risk Assessment (SSFRA)

A *Site Specific Flood Risk Assessment (SSFRA)* was prepared by DBFL Consulting Engineers for the proposed Project to comply with current planning legislation and forms part of this planning application. The Flood Risk Management (FRM) Guidelines require a SSFRA to '*gather relevant information sufficient to identify and assess all sources of flood risk and the impact of drainage from the proposal*'.

The objectives of the SSFRA is to inform the planning authority regarding flood risk for the Site of the proposed Project. The SSFRA relates only to the Site of the proposed Project in the vicinity of Castleforbes and its immediate surroundings. The SSFRA report follows the requirements of *'The Planning System & Flood Risk Management - Guidelines for Planning Authorities'*[11]. The FRM Guidelines propose that a *Justification Test* be applied to assess the appropriateness, or otherwise, of particular developments that are being considered in areas of moderate or high flood risk.

There are no watercourses in the immediate vicinity of the Site and the Site is located c. 1.1km southwest of the Irish Sea at East Point. The nearest EPA designated watercourses are the River Liffey, 360m to the south and the River Tolka, 820m to the north of the Site.

[10] EPA Maps (2020). Source: *OpenStreet Maps.*
[11] DHPLG (2009).

The Site is located within the Flood Zone A, *i.e.* high probability of flooding. However, the Site is also located in an area protected by flood defences. (See Figures 3-4 and 3-5 of the SSFRA[12], submitted with this planning application pack).

Following a *Stage 1 Flood Risk Identification* assessment the main sources of flood risk were identified as:

- A low pluvial flood risk associated with the proposed Projects proposed drainage network.
- A low groundwater flood risk associated with the groundwater levels encountered in the Site investigation.
- A moderate risk of Tidal flooding associated with an extreme sea level rise.

Following a Stage 2 *Initial Flood Risk Assessment* and Stage 3 *Detailed Flood Risk Assessment* the SSFRA concluded the following:

- The proposed Project will consist of the construction of a mixed-use residential development with retail space, office space, a childcare facility, and amenities. The retail space, office space, childcare facility, and amenities are categorised by the Guidelines as *less vulnerable* development and appropriate to be located within Flood Zone A if the requirements of the Justification Test are met. Apartment units are habitable and are categorised as *highly vulnerable* development and must be located above Flood Zone A.
- The proposed Project passes the Justification Test in accordance with the Guidelines. The proposed Project is deemed appropriate to be located within Flood Zone A on the basis that the mitigation measures stipulated within justification are met.
- The Site of the proposed Project is within Flood Zone A for tidal flooding according to the ICPSS, (Irish Coastal Protection Strategy Study), however, the Site is located in an area that benefits from flood defence measures.
- The mitigation measures recommends the 'highly vulnerable' finished floor levels (FFL) are located above the 0.1% AEP flood level, in addition to a climate change allowance and a conservative freeboard, giving a minimum FFL for this type of development of 4.08m.
- The highly vulnerable development (residential units) will be located at a minimum of 4.10m AOD.
- The risk of surcharging or blockage of the drainage system is mitigated by suitable design of the drainage network[13].

[12] DBFL Consulting Engineers (2020b).
[13] As detailed in *DBFL Infrastructure Design Report.*

- The drainage design includes for a 20% climate change allowance.
- The proposed Project will not increase run-off rate when compared with the existing Site and satisfies the requirement of the SFRA to reduce flooding and improve water quality.

5.3 The Need for the Proposed Project

5.3.1 Introduction

The development of the proposed Project is supported by both national and regional policy and guidance documents which are outlined in Chapter 3 (Planning and Development Context, see Table 3.1) and in the Planning Report included in the planning application pack.

5.4 Main Features of the Proposed Project

The proposed Project consist of the demolition of all structures on the Site and the construction of a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a standalone three storey childcare facility and residential tenant amenity. The Site will accommodate 179 no. car parking spaces, 1,392 no. bicycle parking spaces, storage, services and plant areas. Landscaping will include a new central public space, residential podium courtyards and upgraded public realm on Sheriff Street Upper and East Road.

The 8 no. residential blocks range in height from 1 to 18 storeys, accommodating 702 no. build-to-rent residential units comprising:

- 100 no. studios;
- 406 no. 1 bed units;
- 169 no. 2 bed units;
- 15 no. 3 bed units; and
- 12 no. duplex units (eight 2 bed duplex units and four live-work duplex units).

The residential development is arranged around a central open space (at ground level) and raised residential courtyards at upper ground level over part basement level. Residential tenant amenity space is provided in Blocks A1, B3 and C2.

Ground floor level uses located off Sheriff Street and into the central open space include a cultural/community building, retail/restaurant/café units, and tenant amenity space.

Two vehicular access points are proposed along Sheriff Street, and the part basement car parking is split into two areas. The proposed Project will accommodate 179 no. car parking spaces, 1,392 no. cycle parking spaces

(1,010 no. long-term bicycle parking spaces, 30 no. disabled/cargo bicycle parking spaces and 352 no. short stay spaces) will be provided at basement and surface levels. The proposed Project will also include nine disabled parking bays, 18 no. e-Car parking spaces with a further seven on-street car parking spaces are provided along Sheriff Street Upper and one set down/loading area will also be available at surface level.

The main pedestrian access is located centrally along Sheriff Street with additional access points from East Rd and from the eastern end of Sheriff Street. The application also includes for a pocket park on the corner of Sheriff Street and East Rd to be provided as a temporary development prior to additional future development on this part of the Site.

Figure 5.2: The Proposed Project Site Layout[14]

5.4.1 Landscape Strategy and Design

The overall Site development strategy adopts a primary axis that has a north easterly alignment parallel to East Road. This arrangement facilitates the establishment of a pattern of four primary building lines with three intermediate open space zones across the site, and with maximum sunlight and daylight penetration into the development. The permitted hotel development at the corner of East Road and Sheriff Street will occupy the most westerly building line, and will have frontage onto both streets. Where the buildings meet Sheriff Street Upper, their geometries turn to align with the street frontage.

[14] O'Mahony Pike (2020). *Proposed Site Layout Drawing.*

The central open space zone will be substantially open onto the street, providing generous and direct pedestrian access from Sheriff Street Upper into the main central public open space of the development. Where the other two open space zones meet the street, 7 storey elements will complete the definition of the streetscape and also provide enclosure to the open spaces behind. These elements are lower, set back slightly, and have stronger horizontal expression than the 9 storey elements. As such, the northern edge of the streetscape will have a diverse and visually interesting appearance, incorporating a range of building heights, building lines and architectural detailing, as well as incorporating openings of different scales that will ensure the development is permeable and inviting.

Landscaping will include a high quality hard and soft landscaped central plaza as the main public open space, together with public and communal landscaped podium areas, and roof top terraces and garden spaces. All vehicle parking will be at basement and/or below podium level, ensuring the entire public realm of the development is available for pedestrian use and enjoyment. The location of pedestrian entrances and routes also permit permeability of the development and facilitate free movement through the development from Sheriff Street Upper to East Road. Additionally, the public streets will incorporate generous pavements formed with high quality materials that extend from the open spaces of the development, and will also include specimen tree planting.

Full details of the proposed Project are provided in the *Architectural Design Statement*[15].

5.4.2 Site Utilities

5.4.2.1 Electricity and Gas Infrastructure

Currently, gas is fed to the Site of the proposed Project from a gas main running from Sheriff Street Upper. The existing gas meter and incoming pipe size is insufficient for the proposed Project, so it will be removed, upgraded, and relocated to an appropriate location on the Site. It is proposed that the natural gas supply will be taken from Sheriff Street Upper to serve new natural gas rooms with multiple capped connections for future meter installation, located in the basements of the Site.

Based on information received from ESB Networks (ESBN), there are underground cables (10kV/20kV/400kV/230kV) traversing the western part of the Site. The underground cables will be rerouted as part of the enabling works for the proposed Project.

The proposed Project will be provided with a medium voltage (MV) power supply from ESBN. The building load and capacity shall be designed with future capacity allowed to meet the requirements of the proposed Project.

[15] O'Mahony Pike (2020).

5.4.2.2 Water Supply

The Site of the proposed Project is well served by watermains on Sheriff Street Upper. There are two connections to the existing building off this watermain to the south of the Site.

The water supply for the proposed Project will tie-in the existing watermains connection on Sheriff Street Upper.

5.4.2.3 Fire Hydrants

Existing fire hydrants are present at the south-eastern and south-western corners of the Site. These fire hydrants will be maintained to cater for any fire at the Site of the proposed Project.

5.4.2.4 Telecommunications

There are no existing electrical IT services on-site that require diversionary works. The Site of the proposed Project is currently serviced with respect to telecommunications lines for telephone and broadband services. The proposed Project will tie into the existing network. There is sufficient capacity on the existing site network to serve the proposed Project.

5.4.3 Site Infrastructure

5.4.3.1 Wastewater Services (Surface Water/Foul Drainage)

Irish water records show that there is a 990mm combined brick sewer, to the south of the Site of the proposed Project, that drains from east to west along Sheriff Street Upper before turning north onto East Road and eventually discharges into the Irish Water pump station at the north western corner of the Site. The Irish Water pump station then discharges into a surface water gravity main, via a syphon overflow, that then drains south down Castleforbes Road.

The original rising main from the East Road Pumping Station, which is now disused, cuts through the north eastern part of the Site before turning south turning eastwards onto Sheriff Street Upper.

Irish Water records also show a 1000mm combined brick sewer at the south-eastern corner of the Site of the proposed Project that drains south down Castleforbes Road[16].

The proposed **wastewater drainage** for the proposed Project will be designed to drain to slung drainage systems in the basement parking lots which will then discharge into a subsurface foul sewer in the courtyard.

The **surface water drainage** network will join into the last foul manhole before finally discharging the into the 1200mm diameter Irish Water combined sewer on Sheriff Street Upper to the south of the proposed Project[17].

[16] DBFL Consulting Engineers (2020c). *Infrastructure Design Report.*
[17] See DBFL drawing 180159-3100.

A pre-connection enquiry to Irish Water has been made for the proposed Project. Full details of the foul sewer design can be found in DBFL's *Infrastructure Design Report* submitted as a separate document to this application.

5.4.3.2 Existing Site Access

The Site of the proposed Project has a two vehicular entry points on Sheriff Street Upper; one opposite the existing Sheriff Street Upper/Castleforbes Road priority junction to the southeast corner of the Site and the other at the southwest corner via a gated entrance.

5.4.3.3 Fire Access

A single entrance for fire tender vehicles (and refuse vehicles) will be provided on Sheriff Street Upper at the southern end of the proposed Project. Vehicles will enter the Site at the ground floor level via a shared space and proceed to the north of the development.

The management company during the Operational Phase of the proposed Project will enforce restrictions for this entrance to ensure the area is accessible only by fire tender, refuse and maintenance vehicles.

5.4.3.4 Car & Bicycle Parking

As part of the proposed Project, the total car parking provision for the development will be consist of 179 no. car parking spaces (of which three would be car share spaces). The proposed Project will also include nine disabled parking bays, 18 no. e-Car parking spaces with a further seven on-street car parking spaces are provided along Sheriff Street Upper and one set down/loading area will also be available at surface level.

The proposed Project bike store areas will accommodate 1,392 no. cycle parking spaces (1,010 no. long-term bicycle parking spaces, 30 no. disabled/cargo bicycle parking spaces and 352 no. short stay spaces) will be provided at basement and surface levels.

5.5 Construction Phase and Construction Works

5.5.1 Construction Phase

A five year planning permission is being sought from An Bord Pleanála. It is expected that the Construction Phase will last for c. 48 month period (four years). The Construction Phase will commence in Q4 2021 with the projected completion of the mixed-use residential development by Q4 2025. A determination on the application is expected from An Bord Pleanála in Q2 2021.

Allowing a reasonable period for mobilisation and Site setup, it is expected that demolition works will commence in Q4 2021 subject to permission and the discharge of any pre-commencement planning conditions.

The preliminary Construction Management Plan[18] (pCMP) and Construction & Demolition Waste Management Plan[19] (C&D WMP), which are included with this planning application, should be referred to for more detail on the Construction Phasing. The appointed Contractor will prepare a detailed final CMP, including detailed construction phasing and a Construction Traffic Management Plan (CTMP).

5.5.2 Proposed Construction Works and Methods

Immediately after access to the Site is made, the Site will be secured with hoarding on all open sides and accessible approaches. The proposed location of the Contractor Compound will be internally within the Site of the proposed Project and will include construction staff accommodation, welfare facilities and car parking etc.

There are a number of construction works involved in a development of this nature. These activities (which are independent of phasing) can be divided into the general categories as set out in Table 5.1 below.

Table 5.1: Proposed Project General Construction Phase Activities

Activity	Description of Activity
Site Setup	Immediately after access to the Site is made and it is secure, the Site Compound will be established. Existing Site services will be isolated including the decommissioning of existing substations in conjunction with the ESB and the provision of a temporary builder's power supply. The Site will be secured with hoarding on all open sides and accessible approaches.
Demolition/ Clearance	The main demolitions will be carried out by a competent Demolition Subcontractor in accordance with the current code for demolition and the consultant engineer's specification. It is anticipated that full demolition of the existing buildings perimeter walls on-site will be require prior to the commencement of any construction works. The site also comprises of mainly hard standing area which will need to be cleared.
Earthworks	Earthworks will consist of reducing existing levels for the proposed basement structure and foundations. Suitable material such as rock will be crushed and used on-site where possible. Excess material will be disposed offsite to a suitably licensed facility in accordance with the project's Construction and Demolition Waste Management Plan (C&D WMP).
Structure	Structure includes the foundations and the physical frame of the blocks.
Enclosures	The enclosures for the building will be formed from brick, block work, timber, and glass, with all the required levels of insulation and water proof membrane.
Services	The requisite services will be provided including drainage and lighting.
Landscaping	The landscaping works include some hard landscaping, roads, footpaths, cycle-paths, bed and tree planting, and significant open spaces.

[18] DBFL Consulting Engineers (2020a).
[19] AWN Consulting Ltd. (2020).

The appointed Contractor will be required to prepare a final Construction Management Plan (CMP)[20] for the duration of the works which will include the following aspects:

- construction working hours;
- site access/egress;
- air quality (air and dust);
- noise and vibration;
- traffic management;
- health and safety; and
- construction waste.

5.5.3 Construction Working Hours

The final CMP will outline the construction hours for the proposed Project. The expected construction hours will be 08:00-19:00 Monday to Friday and 08:00-14:00 on Saturdays. There will be no works on Sundays or bank/public holidays in accordance with the Environmental Noise Regulations (S.I. No. 140 of 2006 Environmental Noise Regulations) and subject to final agreement with DCC. From time to time, in exceptional instances, works may be required outside of these hours. However, written approval will be sought by the Contractor from the Local Authority, prior to any works taking place.

The appointed Contractor will be required to prepare and adhere to a Construction Phase Health and Safety (H&S) Plan and any employed subcontractors will also be required adhere to this Plan.

Deliveries of material to the Site will be planned to avoid high volume periods. There may be occasions where it is necessary to have deliveries within these times. The appointed Contractor will develop, agree and submit a detailed Construction Traffic Management Plan (CTMP) for the proposed Project prior to commencement.

5.5.4 Site Access and Egress

The Site of the proposed Project will be accessed from the existing Site entrance off Sheriff Street Upper for the Demolition and Excavation Phase works, and traffic volumes are not anticipated to be significant. Construction Phase **traffic** will consist of the following categories:

- Private vehicles owned and driven by site construction and supervisory staff.
- Excavation plant, dumper trucks and materials delivery vehicles involved in site development works.

[20] DBFL Consulting Engineers (2020a).

Warning signage will be provided for pedestrians and other road users on all approaches[21]. **Pedestrian** access will be strictly controlled. Only 'SafePass' accredited personnel will be permitted on to the Site and a daily record (access/egress) of Site personnel will be maintained. No pedestrian access points will be provided during the Construction Phase.

As part of the Safety Plan during the Construction Phase, the appointed Contractor will develop, agree and submit a detailed CTMP for the proposed Project prior to commencement.

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

5.5.5 Air Quality - Dust and Dirt

The appointed Contractor shall put in place a regime for monitoring dust levels in the vicinity of the Site during the Construction Phase. The level of monitoring and adoptions of mitigation measures will vary throughout the Construction Phase depending on the type of activities being undertaken and the prevailing weather conditions at the time.

At the Construction Phase (planning stage), the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance. The prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind (to the east) of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The appointed Contractor must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised;
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the Site boundary, this notice board should also include head/regional office contact details;
- It is recommended that community engagement be undertaken before works commence on-site explaining the nature and duration of the works to local residents and businesses;

[21] In accordance with Chapter 8 of the *Traffic Signs Manual* and the Contractor's *Traffic Management Plan.*

- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein; and
- At all times, the procedures put in place will be strictly monitored and assessed.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures.

Other

- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.
- During periods of very high winds (gales), activities likely to generate significant dust emissions should be postponed until the gale has subsided.
- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the Site. Where possible storage piles should be located downwind of sensitive receptors.
- At the main site traffic exits, a wheel wash facility shall be installed if feasible. All trucks leaving the Site must pass through the wheel wash.

Monitoring of construction dust deposition at nearby sensitive receptors (residential dwellings) during the Construction Phase of the proposed Project is recommended to ensure mitigation measures are working satisfactorily

See Appendix A11.2 for full air quality/dust mitigation measures. The potential impacts associated with air quality during the Construction Phase are addressed in Chapter 11 (Air Quality and Climate).

5.5.6 Noise and Vibration

It is not envisaged that any significant prolonged noise and vibration producing activities will be carried out on-site. The most likely generator will be construction activities and mobile plant. The appointed Contractor will ensure that all best practice noise and vibration control methods will be used as necessary in order to ensure impacts to nearby residential noise sensitive locations are *not significant*.

Noise-related mitigation methods are described below and will be implemented for the project in accordance with best practice. These methods include:

- no plant used on-site will be permitted to cause an ongoing public nuisance due to noise;

- the best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on-site operations;
- all vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract;
- compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers;
- machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use;
- during construction, the appointed Contractor will manage the works to comply with noise limits outlined in *BS 5228-1:2009+A1 2014. Part 1 - Noise;*
- 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;
- limiting the hours during which Site activities which are likely to create high levels of noise or vibration are permitted; and
- monitoring levels of noise and vibration during critical periods and at sensitive locations.

The appointed Contractor shall ensure that the level of noise and vibration resulting from the Construction Phase, does not constitute a nuisance, and that noise and vibration emissions conform to the requirements of *BS 5228: 2009 Code of Practice for Noise and Vibration Control on Construction Sites, Part 1 and Part 2*. All plant shall be adequately silenced to conform to the requirements of BS 5228.

With respect to vibration management, it is recommended that the appointed Contractor is proactive in engaging with local sensitive receptors and should notify them of any works forecast to generate appreciable levels of vibration, explaining the nature and duration of the works. This will be of particular importance during periods of demolition or piling activities.

Further details on noise and vibration mitigation measures are outlined in the *Preliminary Construction Management Plan*[22] submitted with this planning application.

The potential impacts associated with noise and vibration during the Construction Phase, are addressed in Chapter 12 (Noise and Vibration).

[22] DBFL Consulting Engineers (2020a).

5.5.7 Construction Traffic Management Plan (CTMP)

A Construction Traffic Management Plan (CTMP) will be prepared prior to any works commencing on-site and will be discussed with Dublin City Council. The Site will be accessed from the existing Site entrance off Sheriff Street Upper. Traffic volumes are *not anticipated to be significant*. Warning signage will be provided for pedestrians and other road users on all approaches[23]. All vehicular access will be controlled at the gate where all access and egress will be recorded. All site personnel will have to undergo a Site induction.

Deliveries of material to the Site will be planned to avoid high volume periods, however there may be times where it is necessary to have deliveries within these times. The appointed Contractor will develop and agree this in the CTMP prior to commencement of the proposed Project. The CTMP will establish appropriate access routes, times of access, and any occasional or temporary traffic management requirements at the interface of the Site and either East Road or Sheriff Street Upper.

There will be appropriate on-site staff parking and visitor parking within the confines of the Site hoarding, to prevent overflow onto the public roads. Construction traffic will not be permitted to park on the public roads or within the general area outside the Site. HGV's queuing on any local or public road shall not be permitted and it shall be the responsibility of site management to ensure this policy is enforced.

Travel by car to the Site by site personal will not encouraged and minimised where possible. It is likely that some numbers of the construction team will be brought to/from the Site in vans/minibuses, which will serve to reduce the trip generation potential. Site personnel will generally arrive before 08:00, thus avoiding the morning peak hour traffic and generally depart after 19:00..

5.5.8 Health and Safety

A detailed Construction Phase Health and Safety (H&S) Plan will be prepared by the appointed Contractor in advance of any works commencing on-site. This Plan will operate in line with ISO 18001 & ISO 14001[24].

The Construction Phase H&S Plan will apply to any persons working on the Site and in respect of passing pedestrians, motorists or other transport carriers.

A suitably qualified and competent Project Supervisor Design Process has been appointed (with Chris Mee) and a suitably qualified and competent Project Supervisor (Construction Phase) will be appointed in line with those requirements laid down in the Safety, Health and Welfare at Work Construction Regulations 2013 (S.I. No. 291 of 2013 Safety, Health and Welfare at Work (Construction)).

[23] In accordance with Chapter 8 of the *Traffic Signs Manual and the Contractor's Traffic Management Plan.*
[24] (ISO 18001) Occupational Health and Safety Management System (OHSMS) and (ISO 14001) Environmental Management System (EMS).

The proposed Project will comply with all Health & Safety Regulations during the Construction Phase. Where possible, potential risks will be omitted from the design so that the impact on the Construction Phase will be reduced.

The Operational Phase of the proposed Project is unlikely to precipitate any significant impacts in terms of health and safety.

5.5.9 Construction Waste

Waste is defined as any substances or object belonging to a category of waste specified in the First Schedule (of the Waste Management Act 1996) or included in the European Waste Catalogue and Hazardous Waste List[25], which the holder discards or intends or is required to discard and anything which is discarded or otherwise dealt with as if it were waste shall be presumed to be waste until the contrary is proved.

Construction and Demolition (C&D) waste is the largest '*municipal*' waste stream contributing to the current pressure on landfills in Ireland. However, DCC no longer operates any municipal waste landfill in the area. There are a number of waste permitted and licensed facilities located in the Eastern-Midlands Waste Region for management of waste from the construction industry as well as municipal sources.

During the Construction Phase, the proposed Project will generate a range of non-hazardous and hazardous waste materials during Site excavation, demolition and construction. General housekeeping and packaging will also generate waste materials as well as typical municipal wastes generated by construction employees including food waste. Waste materials will be required to be temporarily stored on-site pending collection by a waste contractor.

The appointed Contractor will endeavour to ensure that material is reused or recovered offsite insofar as is reasonably practicable or disposed of at authorised facility. Wastes arising will need to be taken to suitably registered/permitted/licenced waste facilities for processing and segregation, reuse, recycling, recovery, and/or disposal as appropriate. There are numerous licensed waste facilities in the Eastern Midlands region which can accept hazardous and non-hazardous waste materials. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific C&D WMP (see Appendix A18.1).

There are two main types of C&D waste, hazardous and non-hazardous, see Table 5.2 below. Hazardous waste is defined as waste which can have a harmful effect on the environment and on human health and as such

[25] EPA (2002). *European Waste Catalogue and Hazardous Waste List.*

they can be ignitable, reactive, corrosive and/or toxic and/or are listed as hazardous by the European Waste Catalogue. See Chapter 18 (Material Assets - Waste) for further information regarding Waste Management.

Table 5.2: Main Type of Construction Waste

Non-Hazardous Waste	Hazardous Waste
Timber	Adhesives and Sealants
Scrap Metal	Asbestos
Paper/Cardboard	Aerosols
Canteen Waste	Batteries
Litter	Chemicals
Glass	Cleaning
Plasterboard	Products
	Oil (Contaminated absorbent Material or debris)
	Paints and Thinner
	Fuels (hydrocarbons such as diesel)

5.6 Description of the Operational Phase of the Proposed Project

The proposed Project is a mixed-use residential development consisting of residential apartments ranging in height from 1 to 18 storeys and residential tenant amenity.

The primary direct significant environmental effects will arise during the Construction Phase. As a result, the Operational Phase of the proposed Project is therefore relatively benign and not likely to give rise to any significant additional impacts in terms of activities, materials or natural resources used or effects, residues or emissions which are likely to have a significant impact on human beings, flora and fauna, soils, water, air and climate.

The primary *likely significant environmental impacts* of the Operational Phase as a result of the proposed Project are fully addressed in the relevant specialist chapters of this EIAR. These impacts relate to Population and Human Health, Landscape and Visual, Noise and Air Quality and Climate associated with the traffic generated.

The proposed Project also has the potential for *cumulative, secondary and indirect impacts* (*i.e.* traffic) and can be difficult to quantify due to complex inter-relationships.

However, all interactions and cumulative impacts are *unlikely to be significant*, have been addressed in Chapter 20 (Interactions) and Chapter 21 (Cumulative Impacts) of this EIAR.

6 Consultation

6.1 Introduction

This Chapter describes the consultation process of the proposed Project. The 2014 Directive places emphasis on effective public participation in the decision-making procedures for EIA cases. Early involvement of the public and other stakeholders ensured that the views of groups and individuals were taken into consideration throughout the preparation of the EIAR.

It was recognised at an early stage of the project that public and stakeholder engagement is a critical component to the process. The structure, presentation and the Non-Technical Summary (NTS) of the EIAR, as well as public access, all facilitate the dissemination of the information contained in the EIAR. The core objective is to ensure that the public and local community are aware of the *likely environmental effects* of projects prior to the granting of consent.

Informal scoping of potential environmental impacts was undertaken with the Planning Authority through pre-application meetings. Direct and formal public participation in the EIA process will be through the statutory planning application process under the new SHD procedures.

Consultation was undertaken which identified the environmental and community issues that needed to be taken into consideration in designing the proposed Project for the Site.

Section 4(1) of the Planning and Development Act of 2016 provides that an application for permission for a SHD shall be made directly to An Bord Pleanála and not to a Planning Authority, as was the case previously.

The SHD process comprises three mandatory stages, which are outlined in Table 6.1.

Table 6.1: SHD Consultation Stages[26]

Stage	Description
Stage 1	**Consultation** with the Planning Authority (under *Section 247 of the Planning & Development Act, 2000, as amended*).
Stage 2	**Pre-Application Consultation** with An Bord Pleanála (under *Section 6 of the Planning & Development (Housing) and Residential Tenancies Act, 2016*).
Stage 3	**Planning Application** to be submitted directly to An Bord Pleanála.

[26] DHPLG (2017). *SHD Pre-Application Consultation. Guidance for Prospective Applicants.*

6.2 Consultation - Stage 1

Pre-application Consultation is a new and mandatory step required prior to making an application for a SHD to An Bord Pleanála.

Both the context and approach to the development and the emerging design rationale for the proposed Project, have been subject to considerable consultation with the Planning Department under *Section 247*.

A series of meetings have been held with both the Development Agency and DCC's Planning Department as formal pre-application discussions on the substance of the proposed Project. The pre-application attendees and dates of these meetings are listed in Table 6.2. In addition meetings and consultation took place with officials from the Roads & Traffic Section, Drainage and Housing Departments.

Table 6.2: List of Consultation Meetings

Date	Attendees
22 January 2019	Mary Conway (Deputy City Planner) Myles Farrelly (Senior Executive Planner) Sean Flahive (Executive Planner)
6 March 2019	Mary Conway (Deputy City Planner) Colm Harte (Executive Planner)
25 April 2019	Mary Conway (Deputy City Planner) Colm Harte (Executive Planner)
27 May 2019	Mary Conway (Deputy City Planner) Claire Sheehan (Senior Executive Planner) Colm Harte (Executive Planner)
30 July 2019	Mary Conway (Deputy City Planner) Claire Sheehan (Senior Executive Planner) Colm Harte (Executive Planner)
10 September 2019	Mary Conway (Deputy City Planner) Colm Harte (Executive Planner) Stephanie Farrington (Executive Planner)
1 October 2019	Mary Conway (Deputy City Planner) Colm Harte (Executive Planner) Stephanie Farrington (Executive Planner)
28 May 2020	Mary Conway (Deputy City Planner) Colm Harte (Executive Planner)

6.3 Pre-Application Consultation - Stage 2

The new SHD Pre-Application process requires a number of key steps to be completed which are:

- **Request for a Pre-Application Consultation** meeting by the prospective applicant to An Bord Pleanála.
- **Planning Authority submits their opinion and Section 247 records** to An Bord Pleanála, following request for a Pre-Application Consultation.
- **Pre-Application Consultation Meeting** will be held with An Bord Pleanála, the Planning Authority and the prospective applicant.
- **Record** of the Pre-Application Consultation.
- **Forming and Issuing of Opinion** by An Bord Pleanála.

A tri-partite meeting took place with An Bord Pleanála and Dublin City Council on 7 February 2020 as part of the Pre-Application Consultation Request submitted on the project (ABP Reg. Ref. 306163-19).

6.3.1 Other Consultation

Following pre-application consultations an Opinion was received from An Bord Pleanála. This provided details of the prescribed bodies to be notified in the SHD planning application, which are as follows:

- Irish Water
- Transport Infrastructure Ireland (TII)
- National Transport Authority (NTA)
- Dublin City Childcare Committee
- Córas Iompair Éireann
- Commission for Railway Regulation
- Iarnród Éireann.

Before lodging this planning application, information in relation to the EIAR was uploaded to the DHPLG EIA Portal[27]. The EIA Portal is an online map-based website that provides users with access to applications for development consent with an EIAR.

This proposed Project has a dedicated website: www.castleforbesshd.ie

6.4 Planning Application - Stage 3

The planning application is submitted directly to An Bord Pleanála, and this stage allows for further consultation. The application and all accompanying documents will be available on public display for review by the public and interested parties. Submissions on any aspect of the proposed Project may be made to An

[27] DHLPG EIA Portal: https://www.housing.gov.ie/planning/environmental-assessment/environmental-impact-assessment-eia/eia-portal

Bord Pleanála and such submissions will be taken into account in the determination of the application by the Board.

7 Population and Human Health

7.1 Introduction

This Chapter of the EIAR was prepared by Brady Shipman Martin and provides a description of the local population/community in the vicinity of the proposed Strategic Housing Development (SHD) (referred to as "*the proposed Project*"), located at Sheriff Street Upper and East Road, Dublin 1.

This Chapter considers and assesses the potential effects of the proposed Project on the people and businesses in the surrounding community, during the Construction and Operational Phases. Potential impacts of the proposed Project on Population and Human Health can arise from traffic, air quality, climate change, noise and vibration, landscape and visual, material assets (utilities) and the risk of unplanned events. These aspects are dealt with in the relevant specialist chapters of this EIAR.

The proposed Project will consist of the demolition of all structures on the Site and the construction of a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a standalone three storey childcare facility and residential tenant amenity. The proposed Project will also accommodate car parking spaces, bicycle parking, storage, services and plant areas. More details on the background and Site history is provided in Chapter 5 (Description of the Proposed Project).

The 2014 Directive updated the list of topics to be addressed in an EIAR and has replaced '*Human Beings*' with '*Population and Human Health'*. The term '*human health'* is not defined in the 2014 Directive, however the European Commission (EC) Guidance relating to the implementation of the 2014 Directive, states:

> *'Human health is a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population*[28]*'.*

[28] EC (2017).

The EPA Draft Guidelines[29] state that:

> *'in an EIAR, the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in this EIAR e.g. under the environmental factors of air, water, soil etc.'*

This Chapter also meets the requirement for assessment of '*Human Beings'* as per Schedule 6 of the Planning and Development Regulations 2001-2018.

7.2 Methodology

The assessment considers attributes and characteristics associated with population, community and residential settlement, economic activities and employment, community infrastructure and tourism and recreation.

The assessment was carried out in accordance with the following guidance and tailored accordingly based on professional judgement:

- EPA (2017). *Guidelines on the Information to be Contained in Environmental Impact Statements*; and
- EPA (2015). Advice Notes on *Current Practice in the Preparation of Environmental Impact Statements* (2015).

A desktop study was carried out to characterise the environment in relation to human beings including the receiving population, to identify neighbouring industry and dwellings and to assist in the characterisation of land use.

The following sources were used for this assessment:

- Central Statistics Office (CSO). Census data from 2011 and 2016;
- CSO (2020). *Quarterly Labour Force Survey Q1 2020;*
- CSO Small Area Population (SAP) Statistics: http://census.cso.ie/sapmap/;
- ESRI (2020). *Quarterly Economic Commentary for Summer 2020;*
- Eastern & Regional Assembly (2019). *Regional Spatial and Economic Strategy 2019-2031*;
- Dublin City Council. *Dublin City Development Plan 2016-2022;*
- Department of Housing, Planning & Local Government (DHPLG) (2020). My Plan map-viewer; and
- The World Health Organisation (WHO) (2020): https://www.who.int/ .

[29] EPA (2017).

This assessment is a study of the potential indirect and direct socio-economic impacts of the development of the Site as well as the operations of the proposed Project.

Receptors were assessed for sensitivity, magnitude and significance to provide an appropriate and adequate assessment of how they could be impacted by the Construction and Operational Phases of the proposed Project. The characteristics of this impact assessment are defined in Table 7.1 to Table 7.3, as per the EPA Draft Guidelines[30].

Table 7.1 defines the *quality of effects* from *positive* to *negative* on the environment.

Table 7.1: Quality of Effects

Quality of Effect	Description of Effect
Positive Effects	A change which improves the quality of the environment (for example, by increasing species diversity or improving the reproductive capacity of an ecosystem; or removing nuisances; or improving amenities).
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing a nuisance.

Table 7.2 outlines the definitions of *significance of effects* which range from *imperceptible* to *profound* effects.

Table 7.2: Definitions of Significance of Effect

Significance of Effects	Description of Significance of Effects
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without noticeable consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.

[30] EPA (2017).

Table 7.3 describes the *duration of effects*. Momentary effects lasting from *seconds* to *minutes* will often be less concerning than long term and permanent effects, depending on their severity.

Table 7.3: Describing Duration of Effects

Duration of Effects	Description of Duration of Effects
Momentary Effects	Effects lasting from seconds to minutes.
Brief Effects	Effects lasting less than a day.
Temporary Effects	Effects lasting less than a year.
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years.
Permanent Effects	Effects lasting over sixty years.

7.3 Baseline Environment

This Section provides a description of the relevant aspects of the baseline environment in relation to Population and Human Health.

The baseline environment is considered in this Section under the following headings:

- social patterns (population);
- land use and settlement patterns;
- economic and employment activity;
- tourism and amenity; and
- human health.

7.3.1 Social Patterns (Population)

The CSO provides data on population and socio-economic aspects of the population at different levels from the State, county level, Local Electoral Area (LEA), individual Electoral Districts (ED) to Small Areas (SA) within each County. The most recent census by the CSO was undertaken in 2016.

The CSO data illustrates that the population of the Irish State increased between 2011 and 2016 by 3.8%, bringing the total population of the Irish State to 4,761,865, see Table 7.4 below. The rate of growth slowed from 8.1% in the previous census, attributable to the slower economic activity in the early part of the census period resulting in a reduced level of immigration, albeit offset to a degree by strong natural increase. The economy has recovered in recent years with consequent population growth predominantly attributed to natural increase, greater economic activity, increased job opportunities and continued immigration.

The Site is located in the Local Electoral Area (LEA) of North Inner City and the ED of North Dock B. The CSO population statistics relevant to this EIAR are set out in Table 7.4.

Table 7.4: Population Change in the State, LEA and ED Level 2011-2016[31]

Area	Number of Persons		
	2011	2016	% change between 2011 - 2016
Ireland - State	4,588,252	4,757,976	3.7
North Inner City (LEA)	67,309	72,982	7.8
North Dock B (ED)	6,895	7,695	11.6

The population of North Dock B (ED) grew almost at double the rate of the overall population growth rate for Dublin County and Dublin City. CSO data illustrates that growth within North Dock B saw an increase of c. 11.6% between 2011 and 2016. The growth in the area is also likely to be attributable to the designation of growth areas in this part of the County, the availability and provision of physical and social infrastructure, including the Luas, and the associated redevelopment of this area in recent years for an increase in residential development.

The total population (Census 2016) for the North Dock B consists of 4,174 males and 3,521 females. The average age in North Dock B is 34.3 years in 2016 compared with 33.3 years in 2011, which was a percentage change of 3.0%.

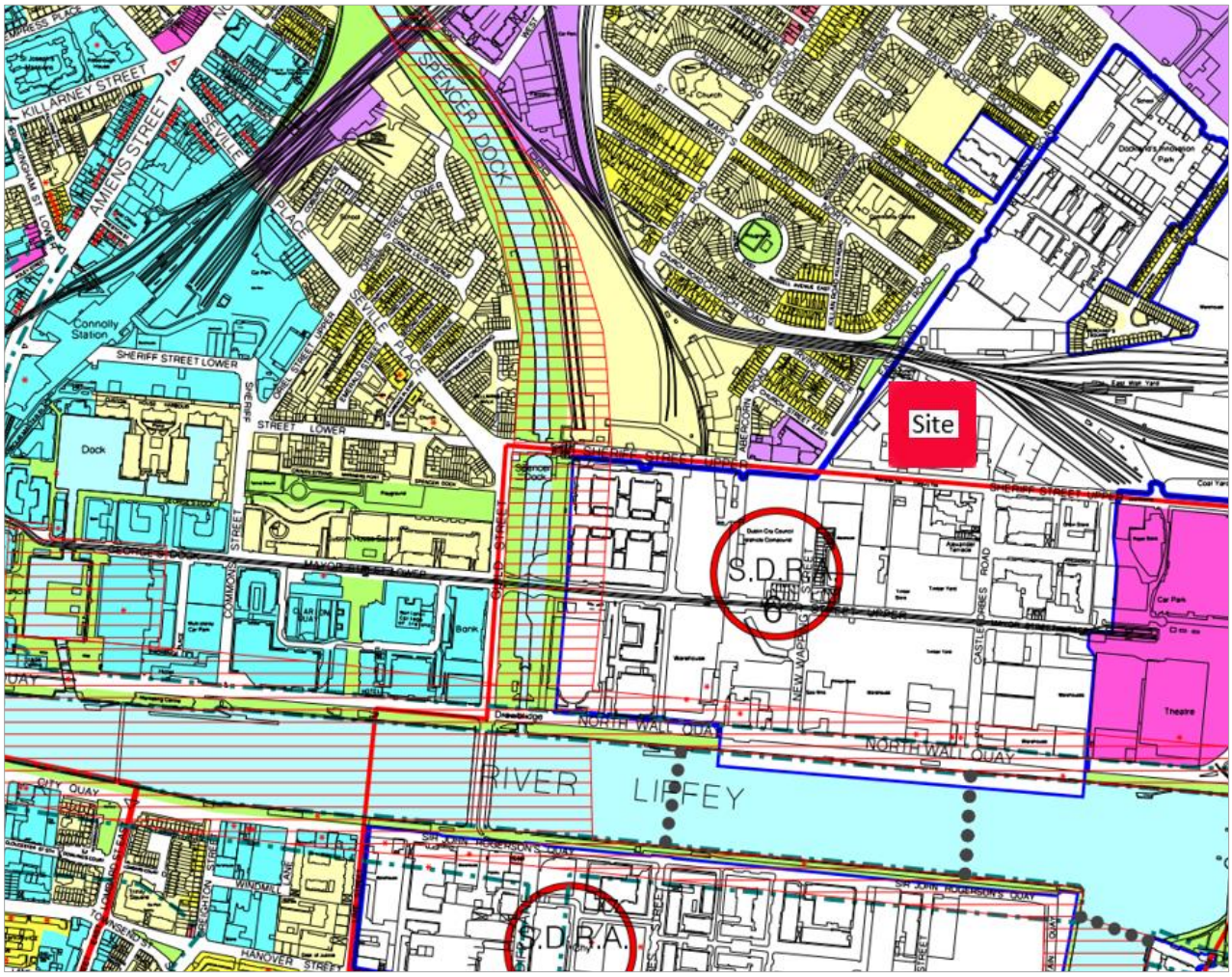
7.3.2 Land Use and Settlement Patterns

The application Site boundary has an area of 2.44 hectares (ha) and the proposed Project development area is 2.02ha. The Site is located on Sheriff Street Upper and East Road, Dublin 1. The Site is a brownfield site that is occupied by Castleforbes Business Park, which includes several warehouses and associated yards. The land uses surrounding the Site of the proposed Project are a mix of office, hotel and residential blocks with railway lands to the north and northeast.

The Site of the proposed Project is highly accessible and benefits from a range of transport connections. The Docklands Rail Station and the LUAS Red Line are c. 400m (5-minute walk) and c. 450m (6-minute walk) respectively from the Site. The Site is within walking and cycling distance of the North and South Docklands employment hubs, the IFSC and the City centre.

[31] CSO (2016). *SAP Mapping 2016* and CSO (2011). *SAP Mapping 2011.*

Figure 7.1: Extract from Map E, Zoning Objectives as part of the Dublin City Development Plan 2016-2022[32] (Site location in red)



The Site lies is located within the administrative area of Dublin City Council and is therefore subject to the objectives and policies contained within the Dublin City Development Plan 2016-2022. The Site lies within the '*Docklands Area',* and outside the area identified as SDRA 6 in the City Development Plan, see Figure 7.1 above. The Site of the proposed Project is located immediately to the north of the Docklands Strategic Development Zone (SDZ), with numerous developments completed, permitted and others in progress nearby.

The Site is zoned Z14 with the objective "*to seek the social, economic and physical development and/or rejuvenation of an area with mixed use of which residential and "Z6" would be the predominant uses*". Z14 areas are capable of accommodating significant mixed use development, therefore, developments must include proposals for additional physical and social infrastructure/facilities to support same. Residential development is listed as a permissible use within this zone. The proposed Project comprises 9 no. blocks,

[32] Map E, Dublin City Development Plan 2016-2022.

ranging in height from 1 to 18 storeys, accommodating 702 no. build-to-rent residential units. The proposed mix of uses is compatible with the zoning objective on the Site.

7.3.3 Economic and Employment Activity

Note: *The CSO's Labour Force release has been compiled during the COVID-19 crisis. The results contained in this release reflect some of the economic impacts of the COVID-19 situation*.

The CSO's Labour Force Survey (LFS) (which has now replaced the Quarterly Household Survey) for Q2 of 2020[33] identified that there was an annual decrease in employment of -3.4% (77,600) in the year to the second quarter of 2020, with total employment at 2,222,500. This compares with an annual increase of 2.2% (51,500) in employment in the previous quarter.

The decrease in total employment of 77,600 in Q2 2020 was represented by a decrease in full-time employment of -1.1% (19,800) and a decrease in part-time employment of -12.5% (57,800).

There was an annual decrease in unemployment of -9.2% (12,000) in the year to Q2 2020, bringing total unemployment to 118,700.

The Economic and Social Research Institute (ESRI) Quarterly Economic Commentary for summer 2020, outlines that the Irish economy is now in the midst of a substantial downturn prompted by COVID-19. The impact of the COVID-19 downturn on the Irish labour market has been unprecedented.

The scale of the employment shock can be seen in the number of people either on the Live Register or availing of the Pandemic Unemployment Payment, which increased to over 815,000 in April. By comparison, in the same period the previous year there were just over 193,000 on the Live Register. On top of this, there were also over 425,000 people availing of the Wage Subsidy Scheme who do not show up in the unemployment figures[34].

In addition to the size of the employment shock, the distribution of job losses has also been uneven across sectors and demographics[35].

The path for the labour market over the rest of the year will be dependent on the performance of the underlying economy.

7.3.4 Tourism and Amenity

Tourism has been identified as one of the country's most important economic sectors and is credited with playing a significant role in the economic recovery in recent years. Tourism is particularly important in that it can assist in providing business and employment opportunities across regions and leads to jobs across the

[33] CSO (2020). *Quarterly Labour Force Survey Q2 2020.*
[34] ESRI (2020). *Quarterly Economic Commentary for Summer 2020.*
[35] Byrne *et al.,* (2020)

spectrum of skills requirements. In 2015 the national policy framework for the tourism sector '*People, Place and Policy: Growing Tourism to 2025'*, was published with a strong focus on developing the sector to attract ten million overseas visitors, create a range of direct and indirect enterprise opportunities and to grow employment in the sector to 250,000 persons by 2025.

Dublin's tourism industry relies largely on the city's built heritage, with its unique character and identity as a City of neighbouring but distinct quarters. Tourism, including business tourism and the attraction of international conferences and events, is one of the key economic pillars for the City.

The Site is located c. 1.4km east of Dublin City centre, which is a highly developed and concentrated area of residential, commercial, industrial, community and leisure receptors. Dublin City has a range of community facilities including parks/open spaces, sports/recreational, playgrounds, youth centres and libraries.

Leisure activities (e.g. walking, running, cycling) in the area located in close proximity (c. 2km) to the Site include, parks (Fairview Park and Ringsend Park) and waterbody amenities (Royal Canal, River Liffey and North and South Dublin Bay) and cycle routes.

South Dublin Bay and River Tolka Estuary SPA (c. 820m to the north and c. 2.2km to the southeast), considered as a cultural asset, provides the local community with an amenity site suitable for walking, running and cycling. Further afield the natural heritage provides amenity at the Wicklow area and the Dublin Mountains.

7.3.5 Human Health

Health, as defined by the World Health Organization (WHO), is '*a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*'. The Healthy Ireland Framework 2013-2025 defines health as *'everyone achieving his or her potential to enjoy complete physical, mental and social wellbeing. Healthy people contribute to the health and quality of the society in which they live, work and play'*. This Framework also states that health is much more than an absence of disease or disability, and that individual health, and the health of a country, affects the quality of everyone's living experience.

Human health has the potential to be impacted upon by environmental factors such as air, water or soil through which contaminants could accumulate and have potential to cause harm through contact with human beings. Hazards or nuisances to human health can arise due to exposure to these vectors, for example arising from incompatible adjacent land uses. The impact of development on human health is also influenced by the extent to which new development is accompanied by appropriate infrastructure and the maintenance of the quality of water, air and soil.

The Department of Health's report '*Health in Ireland, Key Trends 2019*'[36] provides summary statistics on health and health care in Ireland over the past ten years.

The report highlights the following key trends:

- The numbers and proportion of the population in the older **age groups** continues to grow, with the number of people over the age of 65 continuing to increase by over 20,000 a year.
- **Life expectancy** continues to improve in Ireland, with the gap between the life expectancy of men and women also continues to narrow.
- **Mortality rates** have declined 10.5% since 2009. Age-standardised death rates for major causes of death such as cancers and circulatory system diseases have declined by 10% and 25% respectively over the past ten years.
- **Lifestyle factors** such as smoking, drinking, levels of physical activity and obesity continue to be issues which have the potential to jeopardise many of the health gains achieved in recent years.

7.3.5.1 Health of the Population

At a National level, population health presents a picture of decreasing mortality rates and high self-perceived health over the past ten years. Ireland has the highest self-perceived health status in the EU, with 82.9% of people rating their health as either '*good*' or '*very good*'.

The number of people reporting a chronic illness or health problem is also better than the EU average, at around 27.7% of the population. However, health status reflects income inequality, with fewer low income earners reporting good health both in Ireland and across the EU.

Infant mortality, measured as deaths per 1,000 live births, has also decreased by 5.2% since 2009 and remains below the EU average.

Ireland is currently below the EU average for suicide rates for both men and women. After a rise in the male suicide rate from 2008 to 2012, the three-year moving average has decreased and in 2015 the rate fell below the EU average for the first time since 2010. However, it should be noted that improvements in mortality rates and high levels of self-rated health can mask variations between regions, age groups and other population subgroups.

Cigarette consumption has decreased since 2000 and alcohol consumption has also decreased over the same period, but not as dramatically.

In addition the baseline conditions associated with Land, Soils, Geology and Hydrogeology are outlined in Section 9.3, the baseline conditions associated with Hydrology (Surface Water) are outlined in Section 10.3,

[36] Government of Ireland (2019). *Health in Ireland, Key Trends 2019.*

the baseline conditions associated with Air Quality and Climate are outlined in Section 11.3 and the baseline conditions associated with Noise and Vibration are outlined in Section 12.3, the baseline conditions associated with Traffic and Transportation are outlined in Section 17.3 of this EIAR.

7.3.5.2 Health and Safety

The surrounding context consists of a mix of commercial, industrial, residential, transport- related, recreational and amenity related land uses. The pCMP submitted with this application sets out the health and safety measures that will be put in place on-site to ensure the appropriate health and safety measures are in place throughout the construction of the proposed Project.

7.4 Potential Impact of the Proposed Project

This Section describes the effects that are likely to arise in the absence of mitigation, as a result of the proposed Project, during both the Construction and Operational Phases.

Potential Impacts are considered under the following headings: social patterns (population); land use and settlement patterns; economy and employment; tourism and amenity and human health.

7.4.1 Construction Phase

7.4.1.1 Social Patterns (Population)

The Construction Phase of the proposed Project is unlikely to have any significant impact on social patterns within the surrounding area. It is expected that the construction workers will travel from their existing residence rather than taking temporary accommodation in the local area. Impacts to the local population are considered to be *neutral, not significant* and *temporary* in nature and therefore not considered *significant.*

It is acknowledged that the Construction Phase of the proposed Project may have some *short-term negative* impacts on local residents. Such impacts are likely to be associated with construction traffic and possible nuisances associated with construction access requirements. These impacts are dealt with separately and assessed elsewhere in the EIAR, including Chapter 10 (Hydrology), Chapter 11 (Air Quality and Climate), Chapter 11 (Noise and Vibration) and Chapter 17 (Traffic and Transportation). Such impacts will be *short-term* in duration. Any disturbance is predicted to be commensurate with the normal disturbance associated with the construction industry where a site is efficiently, sensitively and properly managed having regard to neighbouring activities. The construction methods employed and the hours of construction proposed will be designed to minimise potential impacts to nearby residents. A CMP has been prepared and is submitted with this planning application.

7.4.1.2 Land Use and Settlement Patterns

The Construction Phase of the proposed Project will consist of site clearance, demolition, excavation and construction works. The proposed Project will comply with the statutory land use zoning policies and objectives of the Dublin City Development Plan and the NPF. Development of the Site will align with the NPF objective to achieve compact growth and in doing so will realise the efficient use of currently underutilised brownfield land with higher housing density.

Construction works are likely to take place over a c. 48 month period (four years). During this time, there will be no severance of land, loss of rights of way or amenities as a result of the proposed Project. However the Construction Phase has the potential to impact *negatively* and result of the *temporary* degradation of the local visual environment for a *short-term*. See Chapter 13 (Landscape and Visual) for more detail on the visual impact.

It is considered that the overall potential impacts are *negative,* of *slight significance* and are anticipated to be *short-term* in duration. The potential effect overall is considered to be *not significant*.

7.4.1.3 Economic and Employment Activity

The Construction Phase of the proposed Project is likely to result in a *positive* net improvement in economic activity in the area of the Site particularly in the construction sector and in associated and secondary building services industries.

The construction of a mixed use development to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units and all associated infrastructure will precipitate a *positive* impact on construction-related employment for the duration of the Construction Phase.

It is estimated that c. 400 no. personal will be employed on the Site, peaking at c. 700. A portion of the work will be undertaken by sub-contractors who will also work elsewhere on a phased basis over the construction period. Where practicable, a local labour will be employed.

The Construction Phase will also have indirect '*spin-off'* impacts on ancillary support services in the area of the site, such as retail services, together with wider benefits in the aggregate extraction (quarry) sector, building supply services, professional and technical professions *etc*. These beneficial impacts on economic activity will be largely *temporary* but will contribute to the overall future viability of the construction sector and related services and professions over the phased construction period.

The Construction Phase could have a *slight negative* impact on the surrounding area due to traffic and associated nuisance, dust and noise. These issues and appropriate mitigation measures are addressed in the relevant chapters of this EIAR, in the Traffic and Transportation Assessment, pCMP and the Waste

Management Plan which accompany the application. The Traffic and Transportation Assessment recommends that a Construction Traffic Management Plan (CTMP) be implemented for the Site which will minimise disruption to the surrounding road network.

7.4.1.4 Tourism and Amenity

Construction related activity has the potential to increase baseline noise, which could cause disturbance to the local residents and the users of the community and recreational facilities.

Construction traffic could cause disturbance from possible odour releases/air and dust emissions from the movement of materials to and from/around the Site. Such activities will result in *negative, short-term* impacts, however these impacts are addressed further in the relevant specialist chapters of this EIAR.

Construction of new residential structures will impact the existing views of surrounding residential properties, public roads and industries.

At the closer Docklands scale, there will be views of the construction activity and emerging structures along street corridors and from more open vantage points. Visual effects will range from *slight/not significant* and *negative*, to *significant/moderate* and *negative*.

At the local scale, construction activity and the emerging development, particularly following construction of the podium level and lower floors, will be more visible from the adjoining established residential streets. Visibility from these closer and generally more sensitive locations will typically give rise to *significant/moderate negative* visual effects as the new and larger scale buildings emerge in views where no existing structures are currently visible.

Effects on views during the Construction Phase will be *temporary* to *short-term*, and will also vary considerably from the wider city scale to the more local context of the Site.

There is not anticipated to be any direct socio-economic impacts on the parks (Fairview Park and Ringsend Park) and waterbody amenities (Royal Canal, River Liffey and South Dublin Bay) during the Construction Phase, due to their distance from the Site.

As a result, the potential effects are *adverse*, of *slight significance* and of *short-term* duration.

7.4.1.5 Human Health

The EPA Draft Guidelines[37] states that human health is to be considered through assessment of the environmental pathways through which health could be affected.

[37] EPA (2017).

During the Construction Phase of the proposed Project, the key pathways in relation to human health are air quality, noise and vibration, water, and soil. The EPA Draft Guidelines state that potential effects are best measured by referencing accepted standards in exposure or risk.

There is the potential for dust deposition (both dust and smaller particles) during the Construction Phase. However, Construction Phase activities will be confined within the Site of the proposed Project. The expected **air quality** effects and air quality legislative limit values which are based on the protection of human health are discussed in Section 11.1 in Chapter 11 (Air Quality and Climate).

The **noise** prediction for the Construction Phase activities and site establishment, is discussed in Section 12.5.1 of Chapter 12 (Noise and Vibration).

There is potential to impact local **surface water**, **groundwater** sources and **soil** during the initial Construction Phase, due to accidental leaking of fuels, storage of topsoil with sediment run-off, which have the potential to impact human health. These impact are discussed in Chapter 9 (Land, Soils, Geology and Hydrogeology) and Chapter 10 (Hydrology).

Health and Safety

The construction methods employed and the hours of construction proposed will be designed to minimise potential impacts. The proposed Project will comply with all Health & Safety Regulations during the Construction Phase. Where possible, potential risks will be omitted from the design so that the impact on the Construction Phase will be reduced.

7.4.2 Operational Phase

7.4.2.1 Social Patterns (Population)

The Operational Phase of the proposed Project will result in the provision a mixed-use residential development of 702 no. build-to-rent residential units, retail/café/restaurant units.

The addition of new residents to the area will improve the vibrancy and vitality of the area and will help to support existing community and social infrastructure. The proposed Project will provide much needed homes in this well served area of the County, which will help cater for the considerable and consistent demand in the GDA, which is not being met at present. Therefore, the proposed Project will have *a positive, significant* and *permanent* impact on the population of North Dock.

7.4.2.2 Land Use and Settlement Patterns

Currently, the Site of the proposed Project comprises Castleforbes Business Park, which includes several warehouses and associated yards. The land uses surrounding the Site of the proposed Project are a mix of office, hotel and residential blocks.

The Operational Phase of the proposed Project will result in the introduction of a residential land use to the Site which will provide much needed housing for the growing population of the immediate area and the GDA in general. In addition, a significant quantity of commercial development will enhance and support the proposed and existing residential uses on the Site. The provision of open space consisting of recreational and amenity space is also provided.

The Operational Phase of the proposed Project will have *no long-term significant adverse* impacts on pre-existing zoning at this Site or neighbouring land-uses or zoning.

7.4.2.3 Economic and Employment Activity

The Operational Phase of the proposed Project will result in the provision of 702 no. residential units and associated open space. This will provide accommodation for c. 1,123 no. persons, based upon the maximum number of bed spaces per unit. This increase in occupancy in the area will enhance local spending power and will assist with the delivery of a critical mass of population which will support a wide range of additional local businesses, services, transport infrastructure and employment opportunities. The provision of the retail/café/restaurant units will also generate some local employment opportunities in the area.

The impact of the proposed Project are assessed as *positive,* of *slight significance* and anticipated to have a *medium* to *long-term* duration.

7.4.2.4 Tourism and Amenity

The proposed Project has provisions for a retail/café/restaurant units and residential amenity. These facilities will benefit future residents and existing residents in the local environs.

The development of the Site from Castleforbes Business Park to a mixed-use residential development will improve the vitality and vibrancy of Sheriff Street Upper and East Road and will help support existing community and social infrastructure. The new residents of the will be able to avail of the existing range of community facilities and local amenities.

The impact of the proposed Project are assessed as *positive,* of *slight significance* and of *long-term duration.*

7.4.2.5 Human Health

A lack of physical activity[38], (identified by the WHO), is the 4th leading risk factor for global mortality[39]. Urban air pollution and traffic injuries are also responsible for a further 2.6 million deaths annually. The central location of the proposed Project promotes, walking, cycling and use of public transport thus promotes active

[38] Physical activity includes exercise as well as other activities which involve bodily movement and are done as part of playing, working, active transportation, house chores and recreational activities.
[39] WHO (2020). *Physical Activity*. https://www.who.int/dietphysicalactivity/pa/en/

movements for future residents. Health benefits of physical activity (walking and cycling combined with public transport) can prevent many of these deaths from physical inactivity. The central location of the proposed Project in the City has the potential to positively impact on human health.

The Operational Phase will result in an *adverse, slight* and *permanent* impact on local air quality, as a result of heating requirements for buildings and with the increase in traffic movements.

Health and Safety

The Operational Phase of the proposed Project is unlikely to precipitate any significant impacts in terms of health and safety. The design of the proposed Project has been formulated to provide for a safe environment for future residents and visitors alike. The paths, roadways and public areas have all been designed in accordance with best practice and the applicable guidelines. Likewise the proposed residential units accord with the relevant guidelines and will meet all relevant safety and building standards and regulations, ensuring a development which promotes a high standard of health and safety for all occupants and visitors.

The proposed Project will not result in any significant impacts on human health and safety once completed and operational.

7.5 Mitigation Measures

7.5.1 Construction Phase

The potential impacts on the human environment relate to other environmental aspects such as air quality, noise and vibration, water quality and traffic and where required, the related mitigation measures are dealt with in the corresponding chapters of this EIAR. Otherwise *no adverse effects* will arise on the population either during Construction or Operational Phases.

All construction works will proceed in line with the recommendations and guidance provided in the pCMP[40] for the proposed Project, which is included with this planning application pack.

A final CMP will be prepared by the appointed Contractor prior to work commencing on the Site. The final CMP shall contain the mitigation measures identified in this EIAR and ensure that they are fully implemented during the Construction Phase, to prevent or reduce the impacts identified in the impact assessment.

All Site personnel will be required to understand and implement the requirements of the final CMP and will be required to comply with all legal requirements and best practice guidance for construction sites.

A preliminary Health and Safety (H&S) Plan has been prepared and this Plan addresses health and safety issues from the design stages. The appointed Contractor will be required to prepare a final Construction Phase H&S

[40] DBFL Consulting Engineers (2020a). *Preliminary Construction Management Plan.*

Plan and any employed subcontractors will also be required adhere to this Plan. This Plan will operate in line with ISO 18001 & ISO 14001.

The design of the final proposal will be subject to safety design reviews to ensure that all requirements of the proposed Project are safe. A Project Supervisor for the Design Process (PSDP) has been appointed as part of the design process. Where issues are identified, corrective actions will be implemented to amend design issues prior to issuance of final design for construction.

The proposed Project will look to procure material and services from local providers, where reasonably practicable, and within the requirements of the procurement process. In doing so, this would encourage additional economic activity in the local economy which may subsequently result in indirect employment opportunities being created.

Adherence to the mitigation measures outlined in this EIAR will ensure that the construction works will an *imperceptible* and *neutral* impact in terms of health and safety.

The mitigation measures, proposed throughout this EIAR, are likely to result in any *significant and likely adverse* environmental impacts on Population and Human Health during the Construction Phase being avoided.

7.5.2 Operational Phase

The Operational Phase is considered to have likely *positive* impacts on human beings in relation to the provision of additional residential units and increase amenity spaces to cater for the demands of a growing population in accordance with the principles of sustainable development and residential zoning objectives pertaining to the Site.

No significant risks to Population and Human Health, as a result of the proposed Project, have been identified during the Operational Phase. The proposed Project is considered to have a *positive* and *significant* impact. No further mitigation measures are required.

7.6 Residual Impacts

Residual impacts are the final or intended impacts which occur after the proposed mitigation measures have been implemented. They refer to the degree of change that will occur after the proposed mitigation measures have taken effect.

The proposed Project is anticipate to provide a *significant positive* impact to the overall economy and social benefits for the local area and Dublin City. Adherence to the mitigation measures outlined above in this Chapter will ensure that there will be no *negative residual impacts or effects* on Population and Human Health, during the Construction and Operational Phases of the proposed Project. The provision of residential accommodation will result in a *likely significant positive effect* for the local area.

7.7 Monitoring

In relation to the impact of the proposed Project on Population and Human Health it is considered that the monitoring measures outlined in regards to the other environmental topics such as water, air quality and climate and noise *etc.* sufficiently address monitoring requirements.

Site specific Health and Safety requirements will be undertaken by the Site Project Manager for the Construction Process. The Building Regulations certification process will address the necessary monitoring requirements of specific conditions of planning permission.

7.8 Reinstatement

There are no reinstatement plans proposed specifically with respect to Population and Human Health.

7.9 Interactions

There are numerous inter-related environmental topics described in detail throughout this EIAR document which are of relevance to human health.

It is considered that there is the potential for *slight, temporary negative* impacts on the existing population due to dust (air), noise, emissions to water, construction traffic and waste associated with the Construction Phase of the proposed Project. In addition, the construction of the proposed Project will also have a *temporary* impact on the services in the area, when the Site has to interrupt these services to connect to the main lines and on the landscape of the area, in terms of both general visual disturbance and visual intrusion. These impacts are addressed in more detail in Chapters 8-19. These impacts are *not considered* to be *significant.*

There is a potential for the Operational Phase of the proposed Project to impact human health via water, air quality and climate, visual impact, daylight/sunlight, wind, traffic and waste. These issues are discussed fully under the relevant Chapters:

- Chapter 10: Hydrology.
- Chapter 11: Air Quality and Climate.
- Chapter 13: Landscape and Visual.
- Chapter 15: Microclimate - Daylight/Sunlight.
- Chapter 16: Microclimate - Wind.
- Chapter 17: Traffic and Transport.
- Chapter 18: Material Assets - Waste.

7.10 Cumulative Impacts

Cumulative impacts are those which result from incremental changes caused by other past, present or reasonably foreseeable actions, together with those generated by the proposed Project. Therefore, the

potential impacts of the proposed Project cannot be considered in isolation but must be considered in addition to impacts already arising from existing or planned development.

In addition to the proposed Project there are a number of additional developments proposed in the vicinity of the Site that are considered in terms of a cumulative impact on the surrounding communities. These projects are discussed in Chapter 21 (Cumulative impacts).

The Site, currently a brownfield site occupied by Castleforbes Business Park, will accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural building, a standalone three storey childcare facility and residential tenant amenity. The proposed Project on its own will have a *positive, significant* and *permanent* impact on the population of Sheriff Street Upper and East Road, in the provision of a mixed-use development and amenity facilities.

The proposed Project, in-combination with the wider Dublin City Development Plan is considered to be *positive,* having regard to the zoning objective for the subject lands, and their strategic location in close proximity to high quality, high frequency public transport, and the high level of demand for new housing in the area.

7.11 'Do-Nothing' Impact

A '*do-nothing*' scenario is not considered valid as the lands are currently zoned Z14 under the current Development Plan. Z14 areas are capable of accommodating significant mixed use development, therefore, developments must include proposals for additional physical and social infrastructure/facilities to support same.

In the event that the proposed Project does not proceed, it is likely that the Site will remain in its current use until an alternative redevelopment proposal is granted planning permission.

7.12 Difficulties Encountered in Compiling the Chapter

No difficulties were encountered in compiling this Chapter of the EIAR.

8 Biodiversity

8.1 Introduction

This Chapter of the EIAR was prepared by Brady Shipman Martin and comprises an appraisal of the likely effects on Biodiversity (Flora and Fauna) associated with the proposed Strategic Housing Development (SHD) (referred to as "*the proposed Project*"), located at Sheriff Street Upper and East Road, Dublin 1.

The potential for any impacts on sites designated as European (Natura 2000) sites, under the EU Habitats and Birds Directives was also appraised, and the results of that study are presented in a separate report (Information for Screening for Appropriate Assessment (AA)) that accompanies this application under separate cover.

The proposed Project will consist of the demolition of all structures on the Site and the construction of a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a standalone three storey childcare facility and residential tenant amenity. The proposed Project will also accommodate car parking spaces, bicycle parking, storage, services and plant areas. More details on the background and Site history is provided in Chapter 5 (Description of the Proposed Project).

8.2 Methodology

8.2.1 Desktop Study

A comprehensive desktop study was undertaken in September and October 2020. The Site was first surveyed in July 2019 and a second ecological site visit took place in September 2020. This Ecological Impact Assessment (EcIA) and EIAR Chapter has been prepared in accordance with the following publications:

- EPA (2017). *Draft Guidelines on the Information to be Contained in EIARs*;
- EPA (2015). *Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* (2015);
- European Commission (EC) (2013). *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment*;
- Department of Housing, Planning & Local Government (DHPLG) (2018). Guidelines *for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*;
- National Roads Authority (NRA) (2009). *Guidelines for Assessment of Ecological Impacts of National Road Schemes*; and

- CIEEM (2019). *Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater, Coastal and Marine* ('the CIEEM Guidelines', V1.1, September 2019 update).

This Chapter has regard to the following **legislative instruments**:

- The Planning and Development Acts (2000, as amended);
- The Wildlife Act 1976 as amended by the Wildlife (Amendment) Act 2000;
- EC Habitats Directive 92/43/EEC;
- EC Birds Directive 2009/147/EC;
- European Communities (Birds and Natural Habitats) Regulations 2011-2015;
- Flora (Protection) Order 2015;
- EIA Directive 2011/92/EU of the European Parliament;
- EIA Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014; and
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).

This Chapter has regard to the following **Policies** and **Plans**:

- DCHG (2017). *Third National Biodiversity Plan 2017-2021*;
- Inland Fisheries Ireland (IFI) (2016). *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*; and
- Dublin City Council. *Dublin City Development Plan 2016-2022 (*including the accompanying Appropriate Assessment documentation (Natura Impact Report).

Information was also collated from the **sources** listed below:

- Data on rare and protected plant and animal species contained in the following databases:
  - The National Parks and Wildlife Service (NPWS) of the Department of Culture, Heritage and the Gaeltacht at: www.NPWS.ie
  - The National Biodiversity Data Centre (NDBC) at: www.biodiversityireland.ie
  - Birdwatch Ireland at: www.birdwatchireland.ie
  - Bat Conservation Ireland at: www.batconservationireland.org
- Aerial photography and photographs taken at the Site;
- Recent and historic ordnance survey mapping at: www.geohive.ie
- Information on protected areas, as well as watercourses, catchments and water quality in the area available from https://gis.epa.ie/EPAMaps/

- Information on soils, geology and hydrogeology in the area available from www.gsi.ie
- NPWS (2019). *Information on the Status of EU Protected Habitats and Species in Ireland* (Article 17 report); and
- Information on land-use zoning from the online mapping of the Department of the Environment, Community and Local Government www.myplan.ie/en/index.html .

8.2.2 Field Surveys

In order to provide a comprehensive baseline on the local ecological environment, ecological surveys were undertaken at the Site, including habitat, invasive species, mammal and daytime bat surveys on 7th July 2019. The surveys were repeated on 8th September 2020.

Birds present on the Site were recorded during the Site visit and an assessment of habitat suitability for species with links to European sites was made, to appraise the potential for *ex-situ* effects on European sites.

8.2.2.1 Habitats

During the course of the Site visits the habitats were identified, described and mapped. Habitats were surveyed using the *Best Practice Guidance for Habitat Survey and Mapping*[41] and were classified using *A Guide to Habitats in Ireland*[42]. Vascular plant nomenclature follows that of the *New Flora of the British Isles 3rd Edition*[43].

8.2.2.2 Fauna

The Site is entirely urban in nature, regardless it was searched for any evidence of large mammals such as badger or otter. The Site was searched for evidence of breeding birds as well as for the presence of any habitat suitable for use by overwintering birds. A daytime assessment (internal and external) was undertaken of all buildings and other structures in order to assess the likely presence of any features suitable for use by roosting bats. Given the features encountered and the lack of any evidence of bats whatsoever it was not considered necessary to undertake a night-time (dawn/dusk) bat detector survey.

8.2.2.3 Watercourses

There are no watercourses on, or connected to, the Site. A review of Site drainage and potential links to off-site watercourses was therefore undertaken in conjunction with the Project Engineers[44].

The Site of the proposed Project is located in the River Liffey and Dublin Bay Catchment (09) and the Tolka Sub-catchment (Tolka_SC_020)[45]. The nearest such features are the River Liffey, 360m to the south, the Royal

[41] Smith G. F., O'Donoghue P., O'Hora K. and Delaney E. (2010).
[42] Fossitt J. (2000).
[43] Stace (2010).
[44] DBFL Consulting Engineers.
[45] WFD Sub-Catchment ID, EPA (2020): https://gis.epa.ie/EPAMaps/Water

Canal, c. 550m to the west, and the River Tolka, 820m to the north. These watercourses discharge to Dublin Bay to the east.

A review of the *Site Specific Flood Risk Assessment Report* was undertaken in conjunction with the Project Engineers[46].

8.2.3 Evaluation of Ecological Features

The methodologies used to determine the value of ecological resources, to characterise impacts of the proposed Project and to assess the significance of impacts and any residual effects are consistent with the EPA Draft Guidelines[47] and are in accordance with the NRA *Guidelines for Assessment of Ecological Impacts of National Road Schemes*[48]. This methodology is in turn consistent with the *Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland - Terrestrial, Freshwater, Coastal and Marine*[49].

In accordance with the NRA Guidelines, impact assessment is undertaken of sensitive ecological receptors (Key Ecological Receptors) within the Zone of Influence of the proposed Project. According to the NRA (TII) Guidelines, the Zone of Influence is the '*effect area*' over which change resulting from the proposed Project is likely to occur and the Key Ecological Receptors are defined as features of sufficient value as to be material in the decision-making process for which potential impacts are likely. In the context of the proposed Project, a Key Ecological Receptor is defined as any feature valued as follows:

- International Importance;
- National Importance;
- County Importance; and
- Local Importance (Higher Value).

Features of local importance (Lower Value) and features of no ecological value are not considered to be Key Ecological Receptors.

8.3 Baseline Environment

8.3.1 General Description of the Receiving Environment

The application Site boundary has an area of 2.44 hectares (ha) and the proposed Project development area is 2.02ha. The Site is located on Sheriff Street Upper and East Road, Dublin 1. The Site is a brownfield site that is occupied by Castleforbes Business Park, dominated by hard standing and includes several warehouses and associated yards, see Figure 8.1 below.

[46] DBFL Consulting Engineers (2020b).
[47] EPA (2017).
[48] NRA (2009).
[49] CIEEM (2018).

The Site of the proposed Project contains no features of any ecological significance. Although there are a number of buildings on the Site, the daytime bat survey undertaken recorded no evidence of any use of the site by roosting bats, and it concluded that there are no features suitable for use by roosting bats within the Site. Similarly, there is no evidence of nesting birds, with the exception of feral pigeons occupying the internal areas of a number of open warehouse-type buildings.

There are no watercourses on, or connected to, the Site. The nearest such features are the River Liffey, 360m to the south, the Royal Canal, c. 550m to the west, and the River Tolka, 820m to the north. These watercourses discharge to Dublin Bay to the east.

Figure 8.1: Location of the Proposed Project[50]

8.3.2 Designated Conservation Areas

In ecological and environmental impact assessment, for the risk of an impact to occur there must be a '*source*', such as a construction site; a '*receptor*', such as a designated site for nature conservation; and a '*pathway*' between the source and the receptor, such as a watercourse that links the Site to the designated site. Although there may be a risk of an impact, it may not necessarily occur and if it does occur, the impact may not be significant.

The potential for any impacts on European sites from the Site was considered. Full details of that study are presented in a separate report - *Information for Screening for Appropriate Assessment*. The report concluded

[50] EPA Maps (2020). *Source: OpenStreet Maps*

that there would be *no likely significant effects* on any European site as a result of the proposed Project, either alone or in-combination with other plans or projects.

8.3.2.1 Relevant European Sites

The nearest European sites are the Special Areas of Conservation (SAC) and Special Protection Areas (SPA) within a 15km radius of the proposed Project are the:

- Special Areas of Conservation (SAC)
  - South Dublin Bay SAC (site code 000210), c. 2.0km to the southeast;
  - North Dublin Bay SAC (site code 000206), c. 3.4km to the northeast;
  - Baldoyle Bay SAC (site code 000199), c. 8.6km to the northeast;
  - Howth Head SAC (site code 000202), c. 9.2km to the northeast;
  - Rockabill to Dalkey Island SAC (site code 003000), c. 9.4km to the east;
  - Malahide Estuary SAC (site code 000205), c. 11.7km to the north;
  - Ireland's Eye SAC (site code 002193), c. 12.4km to the northeast;
  - Wicklow Mountains SAC (site code 002122), c. 12.9km to the south; and
  - Glenasmole Valley SAC (site code 001209), c. 13.7km to the southwest.
- Special Protection Areas (SPA)
  - South Dublin Bay and River Tolka Estuary SPA (site code 004024), c. 950m to the north and c. 2.2km to the southeast;
  - North Bull Island SPA (site code 004006), c. 3.4km to the east;
  - Baldoyle Bay SPA (site code 004016), c. 8.7km to the northeast;
  - Howth Head Coast SPA (site code 004113), c. 11.8km to the northeast;
  - Dalkey Islands SPA (site code 004172), c. 12.0km to the southeast;
  - Broadmeadow/Swords Estuary (Malahide Estuary) SPA (site code 004025), c. 12.0km to the north;
  - Ireland's Eye SPA (site code 004117), c. 12.2km to the northeast; and
  - Wicklow Mountains SPA (site code 004040), c. 13.2km to the south.

Beyond the 15km zone, there are a number of additional European sites:

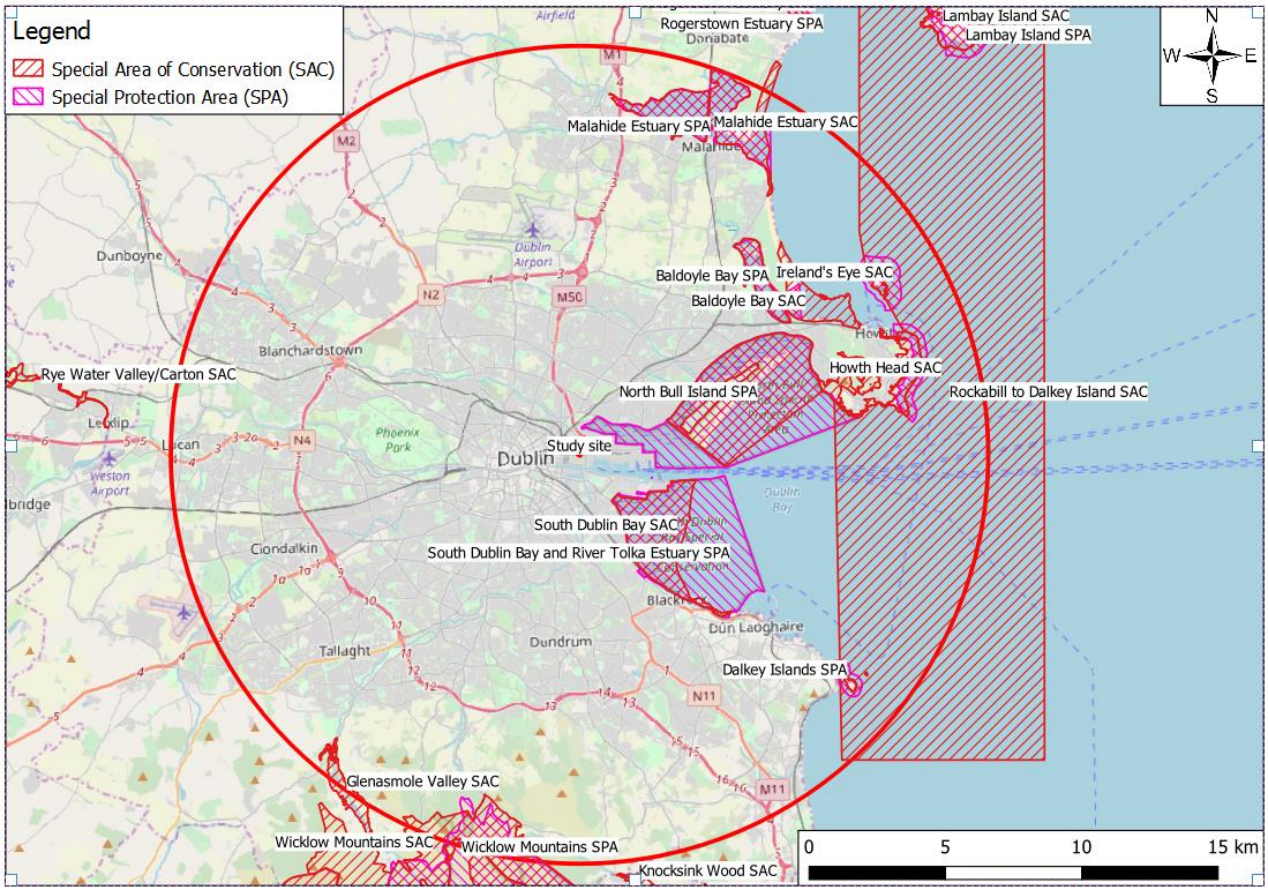
- Knocksink Wood SAC (site code 000725), 15.4km to the south;
- Ballyman Glen SAC (site code 000713), 16.4km to the south;
- Rogerstown Estuary SAC and SPA (site codes 000208 and 004015), c. 16.6km to the north;
- Rye Water Valley/Carton SAC (site code 001398), c. 17.3km to the west;
- Bray Head SAC (site code 000714), c. 19.6km to the southeast; and

- Lambay Island SAC and SPA (site codes 000204 and 004069), c. 20.0km to the northwest.

It is considered in the AA Screening report that no other sites have any connection (pathway) with the proposed Project, due to their locations and the features (qualifying interests) for which they are designated, as well as the scale of the proposed Project. These sites are not considered further in the AA Screening report.

The relevant European Sites are shown in Figure 8.2.

Figure 8.2: European Sites in Relation to the Study Area[51]



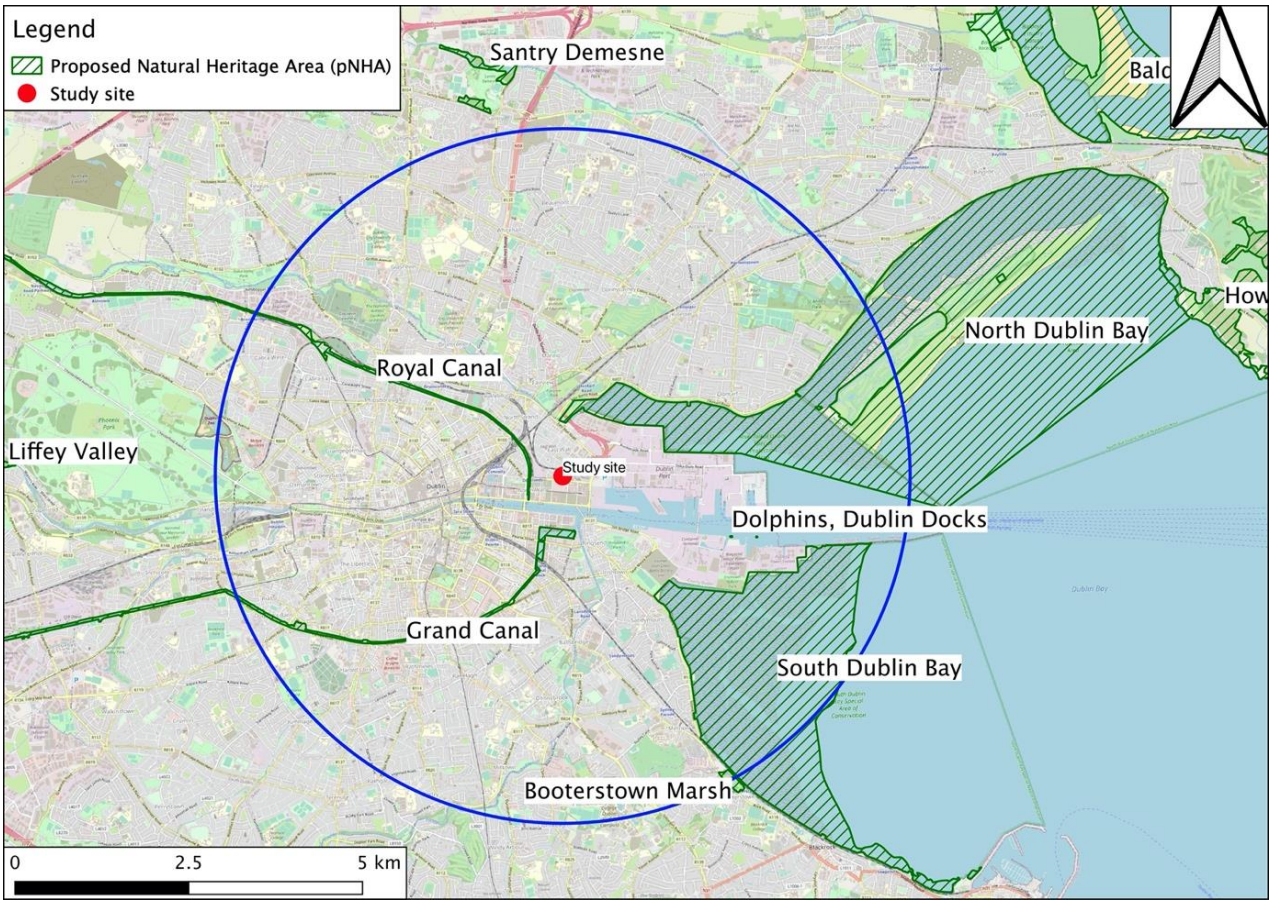
8.3.2.2 Other Designated Conservation Areas (other than European Sites)

The nearest site designated for nature conservation, not otherwise designated as a European site, is Royal Canal proposed Natural Heritage Area (pNHA site code 002103), 550m to the west.

The relevant national designated Sites are shown in Figure 8.3 below.

[51] BSM (2020). *Appropriate Assessment Screening Report.*

Figure 8.3: National Designated Sites in Relation to the Study Area



8.3.3 Rare and Protected Plant Species

The NPWS and National Biodiversity Data Centre (NBDC) databases were consulted with regard to rare species[52] and species protected under the *Flora Protection Order (*2015). There are no known records of rare or protected plant species within the immediate vicinity of the Site and none were recorded during the Site visit.

Several invasive plant species (*i.e.* those species listed on Schedule 3 of the Birds and Habitats Regulations, 2011-2015, including Japanese knotweed (*Fallopia japonica*) and giant hogweed (*Heracleum mantegazzianum*) have been recorded within 10km, however none were identified on-site).

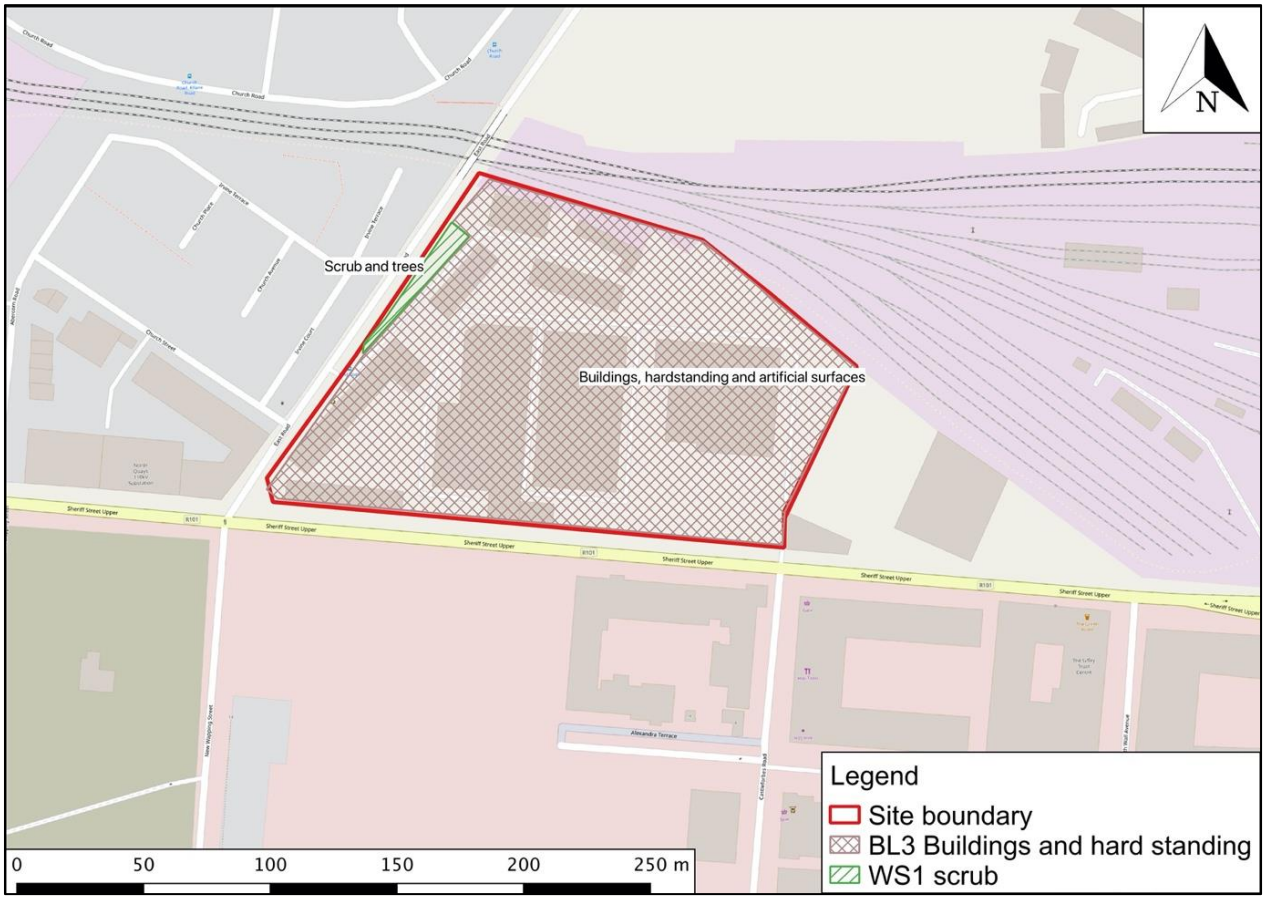
8.3.4 Habitats

The habitats present on the Site of the proposed Project are shown in Figure 8.4 below. The entire site comprises buildings and artificial surfaces/hard standing (Fossitt code **BL3**). Within this there are very small patches of ruderal vegetation, such as buddleia (*Buddleja davidii*), cleavers (*Gallium aparine*), beaked hawk's-beard (*Crepis vesicaria*), chickweed (*Stellaria media*) and dandelion (*Taraxacum officinale*). The small patch of

[52] Curtis & McGough (1988).

scrub (WS1) shown in Figure 8.4 comprises buddleia, with two sycamore trees (*Acer pseudoplatanus*) also present.

Figure 8.4: Habitat Mapping



8.3.5 Fauna

All Irish bat species are fully protected under the Wildlife Act (1976) and subsequent amendments, and under the *EU Habitats Directive*, via the *European Communities (Birds and Natural Habitats) Regulations,* 2011-2015. However, no evidence of bats was recorded on the Site and the Site contains no features whatsoever of any significant potential for use by roosting bats. Furthermore the presence of significant lighting and the lack of any significant vegetation on the Site greatly reduces the suitability of the Site for commuting or foraging bats.

Similarly no evidence of badgers or other species protected under the *Wildlife Act* including otter (further protected under the *European Communities (Birds and Natural Habitats) Regulations, 2011-2015*) was recorded. It is not considered remotely likely that these or other protected species utilise the Site, even on an occasional basis.

With very limited exceptions, birds, as well as their nests and eggs, are fully protected under the *Wildlife Act (1976)* and subsequent amendments. However, the bird fauna of the Site is notably poor, and other than very small numbers of magpies and some feral pigeons, no birds were recorded.

No evidence of any other protected species (such as reptiles, amphibians, butterflies or moths) was recorded on the Site.

8.3.6 Overall Evaluation of the Site of the Proposed Project

No rare habitats or habitats of any ecological value (*i.e.* International, National or County Importance, or Local Importance) are present, and there are no Key Ecological Receptors at the Site. No rare plants were recorded during the Site visits.

No evidence of badgers, otters, amphibians or reptiles has been recorded on the Site. No evidence of bats was recorded. In fact the Site is entirely unsuited to use by any protected fauna. The bird fauna recorded on the Site was very limited, and there is no habitat on the Site suitable for use, even on a very occasional basis, by any overwintering birds, such as pale-bellied Brent goose, or any other protected bird species listed as a Special Conservation Interest (SCI) in any European site.

Overall, the Site is of no ecological importance, in accordance with the ecological resource valuations presented in the *Guidelines for Assessment of Ecological Impacts of National Road Schemes*[53].

8.4 Potential Impact of the Proposed Project

8.4.1 Construction Phase

8.4.1.1 Designated Conservation Areas - Screening for AA

The potential for any impacts on European sites (sites designated for nature conservation under the EU Habitats and Birds Directives) has been assessed separately, and a stand-alone report (*Appropriate Assessment Screening Report*[54]), compiled in consultation with the wider design team including the Project Engineers[55], has been prepared for submission as part of the overall planning application.

Based on the studies undertaken and the proposed Project, the AA Screening process concluded that none of the habitats and species listed as qualifying features in any European site designation will be affected by the proposed Project and full AA, including the preparation of a Natura Impact Statement (NIS), is not required.

The following paragraphs are extracted from the AA Screening report conclusions:

> *In view of best scientific knowledge this report concludes that the proposed development at Castleforbes Business Park, individually or in combination with another plan or project, will not have a significant effect on any European sites. This assessment was reached without considering or taking*

[53] NRA (2009).
[54] BSM (2020).
[55] DBFL Consulting Engineers.

into account mitigation measures or measures intended to avoid or reduce any impact on European sites.

It is considered that this report provides sufficient relevant information to allow the Competent Authority (An Bord Pleanála) to carry out an AA Screening, and reach a determination that the proposed development will not have any likely significant effects on European sites under Article 6 of the Habitats Directive in light of their conservation objectives.

8.4.1.2 Habitat Loss and Disturbance

The proposed Project will require the removal of the existing hard standing, including warehouses and associated yards, and replacement with the mixed-use residential development and landscaping.

There will be *no significant* impacts as a result of this habitat loss.

8.4.1.3 Disturbance to or Loss of Habitat for Fauna

There are no features (including the buildings) potentially suitable for use by roosting bats, and there are no habitats of any importance for commuting/foraging bat species either on the Site or in the immediate vicinity. In addition no evidence of any protected species such as badger, or rare or protected plants, was recorded during the survey carried out, and the habitats present are not suitable for such species.

8.4.1.4 Discharges to Surface Water

The Construction Phase of the proposed Project could potentially have short-term impacts on water quality, via contaminated run-off and sedimentation. The main contaminants arising from Construction Phase activities include suspended solids, hydrocarbons and concrete/cement products. If not properly managed, such pollutants could pose a temporary risk to surface water quality in the local surface water network during the Construction Phase.

However, no watercourses are present within or connected to the Site of the proposed Project. While theoretically there are potential links between the Site of the proposed Project and the European sites of Dublin Bay via surface water run-off, no significant impacts on water quality are predicted during the Construction Phase.

The risk of contamination of any watercourses is extremely low, and even in the event of a pollution incident significant enough to impact upon surface water quality locally, it is reasonable to assume that this would not be perceptible in the offshore European sites, for the following reasons:

- The distance to the European sites – although for example the South Dublin Bay and River Tolka Estuary SPA is within 1km (straight-line distance to the north), there is no direct pathway between the Site and this European site; and
- The fact that a significant level of dilution and mixing of surface and sea water would occur.

No construction-related impacts, on European sites or otherwise, are envisaged as a result of the proposed Project, which will take place entirely within an already developed site.

All construction works will proceed in line with the recommendations and guidance provided in the preliminary Construction Management Plan (pCMP), for the proposed Project[56]. See Chapter 10 (Hydrology) for further information.

8.4.2 Operational Phase

8.4.2.1 Disturbance to Fauna

There will be no impacts on bats, breeding birds or large mammals once the proposed Project is operational.

8.4.2.2 Discharges to Surface/Foul Water from the Proposed Project

The surrounding area is predominantly served by a combined sewer network. The Site of the proposed Project itself is serviced by an existing 990mm combined brick sewer located on Sheriff Street Upper. This sewer runs from that drains from east to west along Sheriff Street Upper before turning north onto East Road and eventually discharges into the Irish Water pump station at the north western corner of the Site. Irish Water records also show a 1000mm combined brick sewer at the south eastern corner of the Site of the proposed Project that drains south down Castleforbes Road.

The management of **surface water** for the proposed Project (set out in the Infrastructure Design Report[57]) has been designed to comply with the policies and guidelines outlined in the *Greater Dublin Strategic Drainage Study* (GDSDS) and with the requirements of Dublin City Council (DCC). The proposed Project is being designed in accordance with the principles of Sustainable Urban Drainage Systems (SuDS). The development provides a SUDS treatment train approach.

Surface water calculations for the proposed Project made use of rainfall values for the local area as provided by Met Éireann. Rainfall intensities were increased by a factor of 20% to take account of climate change, as required by the DCC for attenuation storage design. Run-off from the proposed Project will be attenuated and has been calculated using with the requirements of DCC, using a 'hydrobrake optimum' or similar approved as a flow control device.

The *Site Specific Flood Risk Assessment* (SSFRA) prepared for the proposed Project[57], has concluded that the proposed Project will not increase run-off rate when compared with the existing site and satisfies the requirement of the SFRA to reduce flooding and improve water quality.

No Operational Phase impacts related to flooding or surface water management, on European sites or otherwise, are envisaged as a result of the proposed Project.

[56] DBFL Consulting Engineers (2020a).
[57] DBFL Consulting Engineers (2020b).

The proposed **foul drainage** has been designed to drain via one outfall to the Irish Water combined sewer in Sheriff Street Upper. Irish Water have confirmed by return of letter, subject to a valid connection agreement, that the proposed Project connection to the Irish Water wastewater network can be facilitated.

There will be no Operational Phase impacts related to foul water management, on European sites or otherwise, as a result of the proposed Project.

8.5 Mitigation Measures

8.5.1 Construction Phase

8.5.1.1 Designated Conservation Areas

No designated conservation areas will be impacted in any way by the proposed Project and no mitigation measures are required in this regard. Full details are provided in the AA Screening Report that accompanies the planning application.

8.5.1.2 Habitats

There will be no significant habitat loss as a result of the proposed Project. Regardless, new planting will be incorporated into the landscape design. The proposed planting/landscaping strategy (see Chapter 13 (Landscape and Visual) and the *Landscape Design Statement*[58] with the planning application) will use a mix of appropriate species, incorporating a range of species that will attract feeding invertebrates, including moths, butterflies and bees. It will take account of and implement the relevant objectives of the *All-Ireland Pollinator Plan 2015-2020*.

All planting plans and landscaping proposals will further ensure that no invasive species are introduced, either deliberately or inadvertently, to the Site.

8.5.1.3 Fauna

There are no significant areas on the Site suitable for use by nesting/breeding birds. No seasonal restrictions on demolition or site clearance are necessary.

No bat roosts have been recorded at the Site and it will not be necessary to apply for a derogation licence under Regulation 54 or 55 of the E*uropean Communities (Birds and Natural Habitats) Regulations 2011-2015*. The lighting design for the proposed Project will not require any particular measures to prevent any impacts on commuting or foraging bats.

No mitigation measures are considered necessary for the protection of fauna.

[58] BSM (2020).

8.5.1.4 Surface Water

Surface water mitigation measures will ensure that no sediment contamination, contaminated run-off or untreated wastewater will enter any on-site surface water drains during the construction of the proposed Project. See Section 10.5.1 of Chapter 10 (Hydrology), for details on the surface water mitigation measures.

8.5.2 Operational Phase

8.5.2.1 Foul Water

The Site of the proposed Project is serviced by an existing 990mm combined brick sewer located on Sheriff Street Upper. According to Irish Water (in its response to the pre-connection enquiry for the proposed Project a wastewater connection would be feasible:

> *"Irish Water confirms that subject to a compliant water and wastewater layout and a valid connection agreement being put in place between Irish Water and the developer, the proposed connection(s) to the Irish Water network can be facilitated."*

Full details of the foul sewer design can be found in *DBFL's Infrastructure Design Report* submitted as a separate document to this planning application.

8.5.2.2 Surface Water

The proposed drainage system for the Site[59] and has been designed in accordance with Greater Dublin Strategic Design System (GDSDS) specifications. The drainage system will employ a number of attenuation methods. The surface water strategy includes one attenuation tank to provide the required volume to ensure the development does not flood in the 1 in 100-year storm event (accounting for a 20% increase with climate change). The outflow to the combined sewer will also be filled with flow control device. As such the design includes improved measures for management of stormwater run-off in relation to flood impact. Additional Suds measures are also proposed onsite including green roofs, permeable paving, bioswales, raised planters and rain gardens. Information regarding these is included in Project Engineers *Infrastructures Design Report*[59].

Run-off from the new development will be attenuated using number of SUDS elements although the main volume will be based in a geo-cellular attenuation which will work in parallel with a 'hydrobrake optimum' or similar approved as a flow control device.

See Section 10.5 of Chapter 10 (Hydrology), for details on the surface water mitigation measures.

[59] DBFL Consulting Engineers (2020c).

8.6 Residual Impacts

Residual impacts are the final or intended impacts which occur after the proposed mitigation measures have been implemented. They refer to the degree of change that will occur after the proposed mitigation measures have taken effect.

The proposed Project will result in the removal of warehouses and associated yards and hard and their replacement with new development and associated public open space and landscaped areas. This will result in *no long-term residual* impact on any ecological receptors, either within or in the vicinity of the Site, or associated with any site designated for nature conservation.

The landscape planting that is proposed will ensure that there will be an overall increase in biodiversity on the Site.

8.7 Monitoring

No ecological monitoring is required.

8.8 Reinstatement

Given the lack of any habitats of any significant ecological value at the Site, no reinstatement is required. As set out in this Chapter and within Chapter 13 (Landscape and Visual), extensive ecologically sensitive planting will be undertaken, leading to an overall increase in ecological diversity at the Site.

8.9 Interactions

At the Sheriff Street the main interactions of importance to biodiversity relate to landscape and water. The mitigation measures for the proposed Project, and included in the CMP and in Chapter 10 and Chapter 13 have been designed to minimise the potential impact that the Construction and Operational Phases may have on the receiving environment.

The concept of control and attenuation at source of all emissions to water has been incorporated into the design and the Construction and Operational Phases of the proposed Project, with a CMP having been prepared for the proposed Project by the Project Engineers.

The landscape design for the proposed Project takes into account the requirements to maximise the benefits to biodiversity, both locally and within the wider landscape. The landscape scheme proposes significant ecologically sensitive planting to provide for potentially diverse habitats.

8.10 Cumulative Impacts

The proposed Project is already developed and is currently entirely in hard-standing. The proposed Project will not lead to any significant habitat loss or loss of green open space and on completion of construction works, the impacts of the proposed Project are *not considered to be significant*.

The landscape proposals for the Site prioritise ecologically sensitive planting including pollinator-friendly planting, with SuDS features and green roofs also featuring.

8.11 'Do-Nothing' Impact

Ecological diversity on the Site is currently *negligible*. Should the Site remain undeveloped and the current uses continue, no improvement in the biodiversity value of the Site can be expected. Should the Site be redeveloped at a later stage it is reasonable to expect that any potential impacts would be similar to those predicted to arise as a result of the proposed Project.

8.12 Difficulties Encountered in Compiling the Chapter

No difficulties were encountered in compiling the Biodiversity Chapter of this EIAR. All surveys were undertaken to an appropriate level given the nature of the Site and the proposed Project.

9 Land, Soils, Geology and Hydrogeology

9.1 Introduction

This Chapter of the EIAR was prepared by AWN Consulting Ltd. and assesses and evaluates the potential impacts on the land, soil, geological and hydrogeological aspects, associated with the proposed Strategic Housing Development (SHD) (referred to as "*the proposed Project*"), located at Sheriff Street Upper and East Road, Dublin 1.

In assessing likely potential and predicted impacts, account is taken of both the importance of the attributes and the predicted scale and duration of the likely impacts.

The proposed Project will consist of the demolition of all structures on the Site and the construction of a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a standalone three storey childcare facility and residential tenant amenity. The proposed Project will also accommodate car parking spaces, bicycle parking, storage, services and plant areas. More details on the background and Site history is provided in Chapter 5 (Description of the Proposed Project).

9.2 Methodology

9.2.1 Appraisals Methodology

The methodology used in this assessment follows current European and Irish guidance as outlined in:

- EPA (2017). *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.*
- Institute of Geologists of Ireland (IGI) (2002). *Geology in Environmental Impact Statements, a Guide.*
- Institute of Geologists of Ireland (IGI) (2013). *Guidelines for the preparation of Soils Geology and Hydrogeology Chapters of Environmental Impact Statements*
- National Roads Authority (NRA) (2009). *Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*.

The rating of potential environmental impacts on the hydrological environment is based on the quality, significance, duration and type of impact characteristic identified. Consideration is given to both the importance of an attribute and the magnitude of the potential environmental impacts of the proposed activities on that cited attribute. The Draft EIAR Guidelines[60] tables are presented in Appendix A9.1. The IGI

[60] EPA (2017).

and NRA criteria for rating the magnitude and significance of impacts at EIA stage on the geological related attributes are also relevant in determining impact assessment and are presented in Appendix A9.2.

The principal attributes (and impacts) to be assessed include the following:

- geological heritage sites in the vicinity of the perimeter of the Site;
- landfills & industrial sites in the vicinity of the Site and the potential risk of encountering contaminated ground;
- the quality, drainage characteristics and range of agricultural uses of soil around the Site;
- quarries or mines in the vicinity, the potential implications (if any) for existing activities and extractable reserves;
- the extent of topsoil and subsoil cover and the potential use of this material on-site as well or requirement to remove it off-site as waste for disposal or recovery;
- high-yielding water supply springs/wells in the vicinity of the Site to within a 2km radius and the potential for increased risk presented by the proposed Project;
- classification (regionally important, locally important etc.) and extent of aquifers underlying the site perimeter area and increased risks presented to them by the proposed Project associated with aspects of the development for example removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes, change in groundwater quality;
- natural hydrogeological/karst features in the area and potential for increased risk presented by the activities at the Site; and
- groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporally.

9.2.2 Sources of Information

Desk-based geological information on the substrata (both Quaternary deposits and bedrock geology) underlying the extent of the Site was obtained through accessing databases and other archives where available. Data was sourced from the following:

- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1: 100,000 mapping;
- Teagasc soil and subsoil database;
- Ordnance Survey Ireland (OSI) - aerial photographs and historical mapping;
- Environmental Protection Agency (EPA) - website mapping and database information;
- National Parks and Wildlife Services (NPWS) - Protected Site Register; and
- Dublin City Council (DCC) - illegal landfill information.

Site specific data was derived from the following sources;

- O'Callaghan Moran & Associates, *Environmental Desk Study and Waste Characterisation Assessment, Proposed Residential and Retail Development, Castleforbes Road, Dublin 1*.
- various design Site plans and drawings; and
- consultation with Site engineers.

9.3 Baseline Environment

The receiving environment is discussed in terms of; land use, geomorphology; superficial and solid geology and site history including potential for contamination.

The application Site boundary is 2.44 hectares (ha) and the proposed Project development area is 2.02ha. The Site of the proposed Project is located on Sheriff Street Upper and East Road, Dublin 1. The Site forms part of the Castleforbes Business Park and is bound by Sheriff St Upper to the south, CIE railyard to the north and east, and Castleforbes Business Park to the west. The proposed Project consist of the demolition of all structures on the Site and the construction of a mixed-use residential development to accommodate 702 no. build-to-rent residential units. More details on the proposed Project is set out in Chapter 5 (Description of the Proposed Project). The Site is relatively flat with a slight gradient from north to south. Figure 9.1 presents the topographic nature of the Site and surrounding area.

Figure 9.1: Site Location of the Proposed Project

9.3.1 Land Use

The Site of the proposed Project is located in East Wall Dublin, the area is largely industrial. The Site is located on Castleforbes Road/Sheriff Street Upper c. 360m north of the River Liffey. Rail lines servicing Dublin Port run along the northern Site boundary. There are residential dwellings to the west and south of the Site. There are industrial units on the opposite side of Sheriff Street near the southwest Site boundary and an open undeveloped site further to the southwest. Historical OSI maps (1837) shows the Site as being undeveloped land and the railway line had not yet been laid. Between 1888 and 1913 the site was used as a soap works and then a timber yard and the railyards had been developed. The 1995-2005 aerial photographs show the older buildings along the northern, western and southern site boundary and some of the newer units in the centre of the Site. By 2005 the layout was similar to the present day.

9.3.2 Drainage

The Site of the proposed Project is in the catchment of the River Liffey and is in proximity to the Liffey and Tolka Estuaries. The existing drainage is discussed in Chapter 10 (Hydrology) of this EIAR.

9.3.3 Soil and Subsoil

Site specific information was derived from a site investigation undertaken by Ground Investigations Ireland (GII) in October 2018 to January 2019 which included the installation of 31 no. window sample boreholes for collection of samples for waste classification purposes and 10 no. geotechnical boreholes. Additional Site investigations incorporating four window sample boreholes and two slit trenches were completed in February 2019 in the southwest of the Site where the initial investigation indicated the presence of hydrocarbon contamination, this is discussed in Section 9.3.11. This included the installation of four window sample boreholes (WS-201, 202, 203 and 204) and two slit trenches. ST-1 and ST-2. Site investigation locations can be seen in Figures 9.8 and 9.9 below. The GII logs of the window sample boreholes are in Appendix A9.3. The logs indicate that the subsurface comprises c. 1.0 -2.0m of made ground comprising brown and black sandy, gravelly, clay with occasional red brick, timber and ceramic fragments overlying fine, silty and sometimes gravelly sand with shell fragments. Overburden was mixed with possible stiff Dublin black boulder clay encountered at a number of locations with granular deposits to depth of c. 20m below ground level (bgl) in other locations. Bedrock was encountered at three locations BH01, BH11 and BH14 ranging from 29.30mbgl at BH11 and 34.50mbgl at BH14. Bedrock was recorded as consisting of mostly calcareous mudstone and limestone.

Additional information was obtained from a site investigation undertaken by GII in March 2018 and summarised in an E*nvironmental Desk Study and Waste Characterisation Assessment* prepared by O'Callaghan Moran & Associates in June 2018 as part of development works directly to the north of the Site[61]. Bedrock was

[61] BSM (2019).

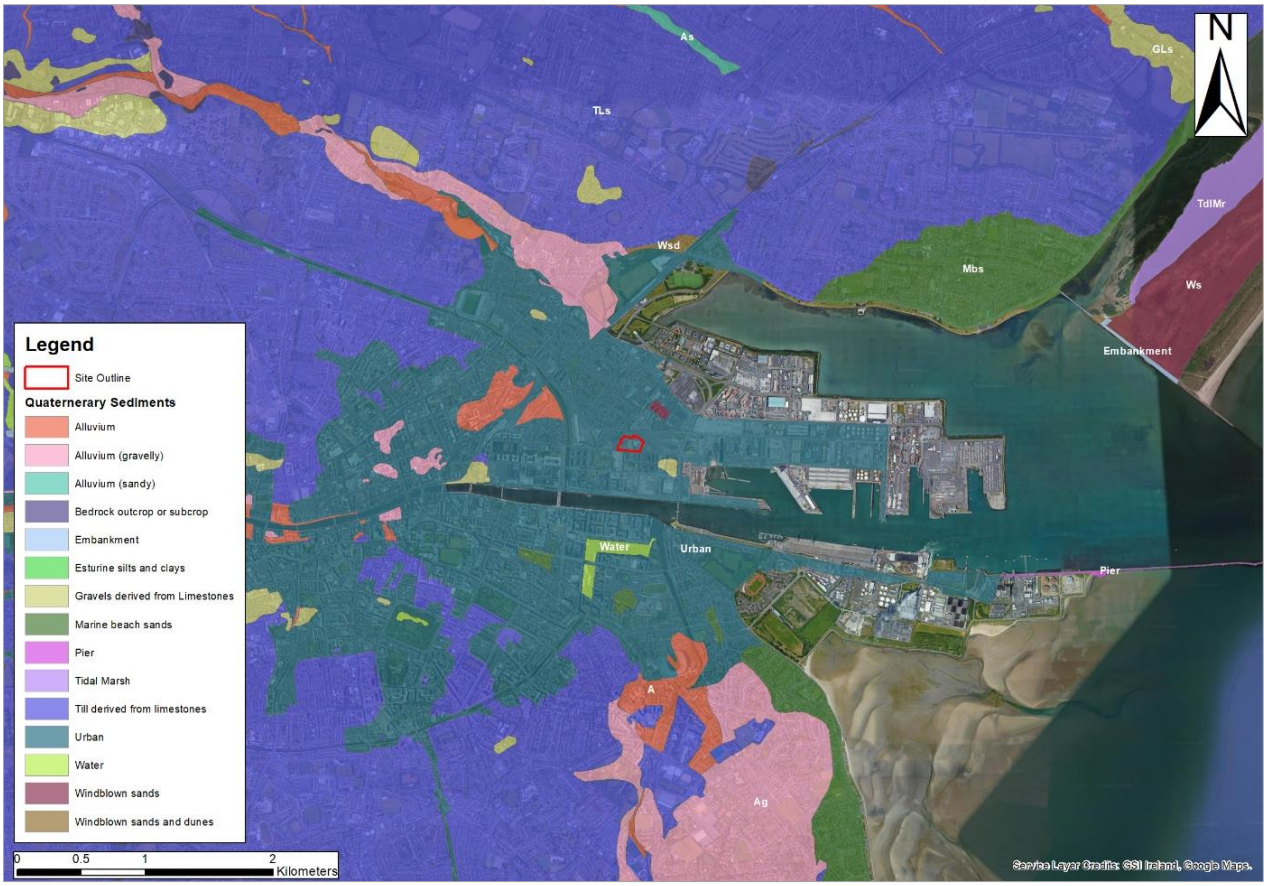
not encountered during these works with a maximum borehole depth advanced to 30.9mbgl. Table 9.1 below summarises the ground and subsurface conditions noted during both investigations.

Table 9.1: Subsurface Conditions at the Site of the Proposed Project (approximate)

Strata	Depth (mbgl) (circa)
Surfacing	0 - 0.1
Made Ground	0.1 - 2.0
Upper Granular Deposits	0.2 - 2.8
Upper Cohesive Deposits (SILT)	2.8 - 7.7
Laminated Cohesive Deposits (CLAY)	7.7 – 15.4
Lower Granular Deposited (SAND & GRAVEL)	15.4 - 17.9
Glacial till Deposits*	17.9 - 29.30

The Site investigations confirm the GSI regional mapping which states the strata immediately underlying the Site is mostly Made Ground. See Figure 9.2.

Figure 9.2: Subsoils Map[62]



[62] GSI (2020).

9.3.4 Bedrock Geology

Inspection of the available GSI data shows that the bedrock geology underlying the Site and surrounding area is dominated by rocks of the Carboniferous age. The Site and local area are underlain by dark grey to black limestone and shales and part of the *Lucan (Calp) Formation*. The formation comprises dark grey to black, fine grained occasionally cherty, micritic limestone that weather paler, usually pale grey. Figure 9.3 shows the local geology. Karstification has been noted in the wider *Lucan Formation* but there is no Karst feature recorded in the vicinity of the Site of the proposed Project.

Figure 9.3: Bedrock Geology Map[63]

9.3.5 Aquifer Classification

The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the areal extent (km^2), well yield (m^3/d), specific capacity ($m^3/d/m$) and groundwater throughput (mm^3/d). There are three main classifications:

- regionally important;
- locally important; and
- poor aquifers.

[63] GSI (2020).

Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). Similarly, poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu).

The bedrock aquifer underlying the Site of the proposed Project according to the GSI[64] National Draft Bedrock Aquifer Map is classified as a *Locally Important Aquifer* (Ll) which is described as *Bedrock which is Generally Moderately Productive* only in local zones, see Figure 9.4.

Figure 9.4: Aquifer Classification Map[65]

The Site of the proposed Project is underlain by the Dublin Groundwater Body (EU code: IE_EA_G_008) which has been investigated by the GSI and its groundwater flow is primarily along fractures, joints and major faults. In general permeability in these rock units are likely to be low (1-10m^2/day). General transmissivity values between 10 and 150m^2/day have also been recorded. There is a distinct reduction in the permeability of these

[64] Available at: www.gsi.ie/mapping
[65] GSI (2020).

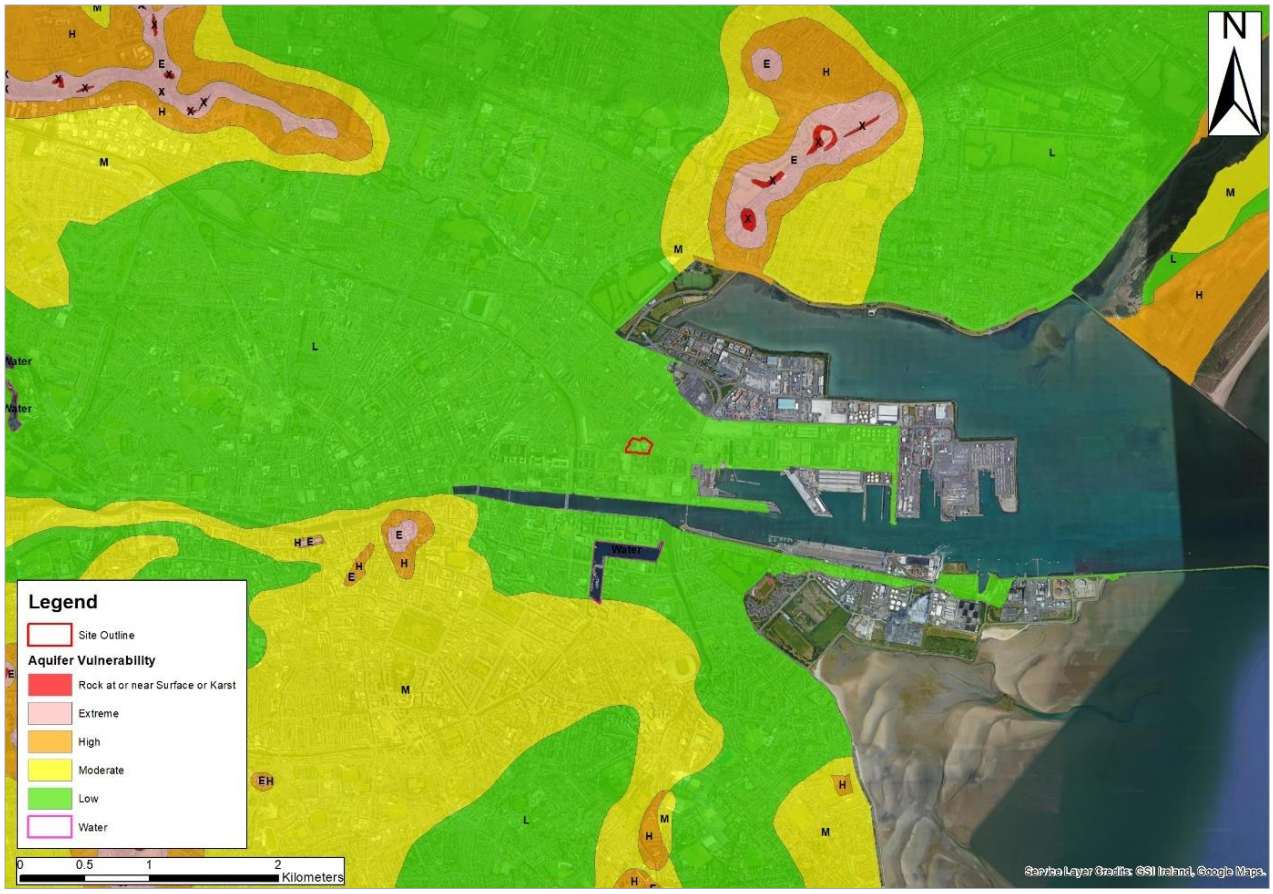
rocks with depth (up to 1 order of magnitude for each five metres of depth in limestone). Most groundwater flows will take place close to the surface with additional isolated flow along fractures and fissures.

9.3.6 Aquifer Vulnerability

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures/fractures, the main feature that protects groundwater from contamination, and therefore the most important feature in the protection of groundwater, is the subsoil (which can consist solely of/or of mixtures of peat, sand, gravel, glacial till, clays or silts).

The GSI currently classifies the bedrock aquifer in the region of the Site primarily as having (L) - *Low Vulnerability* status indicating >10 m of low permeability soil, see Figure 9.5 below. This was confirmed by the Site investigations undertaken in October 2018 to January 2019 and March 2018 immediately to the north of the Site of the proposed Project[66]. Borehole drilling confirmed bedrock depth >30mbgl. Bedrock was not proved during the October 2018 to January 2019 investigations at the Site of the proposed Project.

Figure 9.5: Aquifer Vulnerability Map[67]



[66] BSM (2019).
[67] GSI (2020).

9.3.7 Groundwater Wells and Flow Direction

There are no recorded groundwater resource protection zones in the area of the Site*, i.e*. zones surrounding a groundwater abstraction area. The closest can be seen c. 21km to the northwest, see Figure 9.6 below.

The GSI Well Card Index is a record of wells drilled in Ireland, water supply and Site investigation boreholes. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in the Republic of Ireland. This current index, however, shows a number of groundwater monitoring and abstraction wells within a 3km radius of the Site. The closest recorded well is at Sheriff Street Upper c. 250m southwest of the Site. Borehole depth was recorded at c. 7m but there were no well construction details listed on the GSI website and was likely installed as a geotechnical borehole. As the area is served by public mains, it is unlikely that there are any boreholes in the area used for potable water supply. Figure 9.7 shows the possible known location radius of local wells in the area. No wells were reported in the Site investigation report from GII in June 2018.

The flow direction in overburden generally follows no fixed pattern or trend. Flows of this nature are typical of cohesive clay strata with intermittent fill areas, where often the water level dipped represents pore water seepages into the monitoring well rather than a true perched water table. Boreholes installed onsite show standing water levels ranging from 2.4mbgl at BH08 to 4.8mbgl at BH12. Ingress was not recoded at the slit trenches to the south west of the site during the additional investigations of February 2019. Site investigations show a high perched water table at a site directly to the north. Water inflow was recorded between 0.33 and 1.2mbgl at a number of borehole locations[68]. There are no records of groundwater level measurement being undertaken at the site following initial site investigation to measure SWL at the installed wells (BH08, BH1 & BH14) but due to the measurements taken during the Site investigation and the Site's location (<3km west of the Irish Sea and 360m north of the River Liffey/Estuary), it can be assumed bedrock groundwater flow direction it south/southeast.

[68] BSM (2019).

Figure 9.6: Regional Source Protection Areas[69]

Figure 9.7: GSI Wells Search[69]

[69] GSI (2020).

9.3.8 Geological Heritage

The Geological Survey of Ireland (GSI) Public Viewer was reviewed to identify sites of geological heritage for the Site and surrounding area. There is no evidence of any site which could be considered suitable for protection under this programme or recorded in the *Dublin City Development Plan 2016-2022.*

9.3.9 Economic Geology

The Extractive Industry Register[70] and the GSI mineral database was consulted to determine whether there were any mineral sites close to the proposed Project. There are no active quarries located in the immediate vicinity with the nearest notable quarry located c. 10km to the northwest (Huntstown Quarry).

9.3.10 Geo Hazards

There are no expected geohazards at this location. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff and falls lead to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The GSI landslide database was consulted and the nearest landslide to the proposed Project was 4km to the north, the date and exact details were not available on GSI online database. There have been no recorded landslide events at the Site. Due to the local topography and the underlying strata there is a *negligible risk* of a landslide event occurring at the Site.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics at the Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. However, currently there are five permanent broadband seismic recording stations in Ireland and operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied for local and regional events. Records since 1980 show that the nearest seismic activity to the proposed location was in the Irish Sea (1.0 - 2.0Ml magnitude) and ~26km to the south in the Wicklow Mountains. There is a very low risk of seismic activity to the Site of the proposed Project.

9.3.11 Soil Quality

As part of the October 2018 to January 2019 investigations 31 no. window sample boreholes were installed for collection of samples for waste classification purposes. These locations are shown on Figure 9.8. Additional Site investigations incorporating four window sample boreholes and two slit trenches were completed in February 2019 in the southwest of the Site where the initial investigation indicated the presence of hydrocarbon contamination. This included the installation of four window sample boreholes (WS-201, 202,

[70] Available at: www.epa.ie

203 and 204) and two slit trenches. ST-1 and ST-2, see Figure 9.9. Fifty-four samples of the made ground at varying depths ranging from 0 - 4.5mbgl were collected by GII, placed in laboratory prepared containers and stored in coolers prior to shipment to a UKAS accredited laboratory[71] for analysis. The samples were tested for Total Heavy Metals, Total Organic Carbon (TOC), BTEX (benzene, toluene, ethylbenzene and xylene) aliphatic and aromatic hydrocarbons, Polychlorinated Biphenyls (PCB), Mineral Oil, PAH and asbestos. Leachate generated from the samples was tested for arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, antimony, selenium and zinc, chloride, fluoride, soluble sulphate, phenols, dissolved organic carbon (DOC), total dissolved solids (TDS).

The laboratory results have been compared to:

(i) landfill Waste Acceptance Criteria (WAC) limits for Inert, Non-Hazardous and Hazardous Waste Landfills pursuant to Article 16 of the EU Landfill Directive 1999/31/EC Annex II which establishes criteria and procedures for the acceptance of waste at landfills, and

(ii) Land Quality Management/Chartered Institute of Environmental Health (UK) Suitable for Use Levels – LQM/CIEH S4ULs. The WAC criteria is based on suitability for disposal to landfill and soil is assessed as suitable for an inert, non-hazardous or hazardous landfill based on concentration of chemicals of concern.

The results of the WAC testing are presented in the O'Callaghan Moran & Associates report (refer to Appendix A9.4) which includes for comparative purposes the WAC for Inert, Non Hazardous and Hazardous Waste Landfills pursuant to Article 16 of the EU Landfill Directive 1999/31/EC Annex II. Ten samples meet the inert WAC WS-1(1-2m), WS-2 (1-2m), WS-3 (0.25 – 0.75m), WS-10 (2-3m), WS15 and WS-16, (3-4m), WS-18 (2-3m and 3-4m), WS-23 (0.25-0.75m), WS-30 (3-m). Samples WS-18 (1-2m), WS-23 (1-1.6m), WS-24 (0-1m) and WS-31 (3-4 and 4-5m) only exceed the inert WAC for TOC. For these samples, Dissolved Organic Carbon (DOC) is below the inert WAC and the annex indicates that the Total Organic Carbon (TOC) can be considered to meet the inert WAC where this is the case. The remaining samples exceed the inert WAC.

In the additional investigation (February 2019) two samples were tested for WAC testing (WS-201 and WS203). With the exception of TOC (WS 201), both samples meet the inert WAC. The DOC is not elevated in this sample and the TOC can be considered to be complying with the inert WAC. Asbestos was detected in one out of 54 samples, WS-18 (0.25-0.75m). Quantification analysis indicates that the asbestos level is <0.001%. The complete *Environmental Desk Study and Waste Characterisation Assessment report* compiled by O'Callaghan Moran & Associates (OCM) including all lab results, comparison tables and site investigation locations can be viewed in Appendix A9.4.

[71] Exova Jones

Figure 9.8: GSI Wells Search[72]

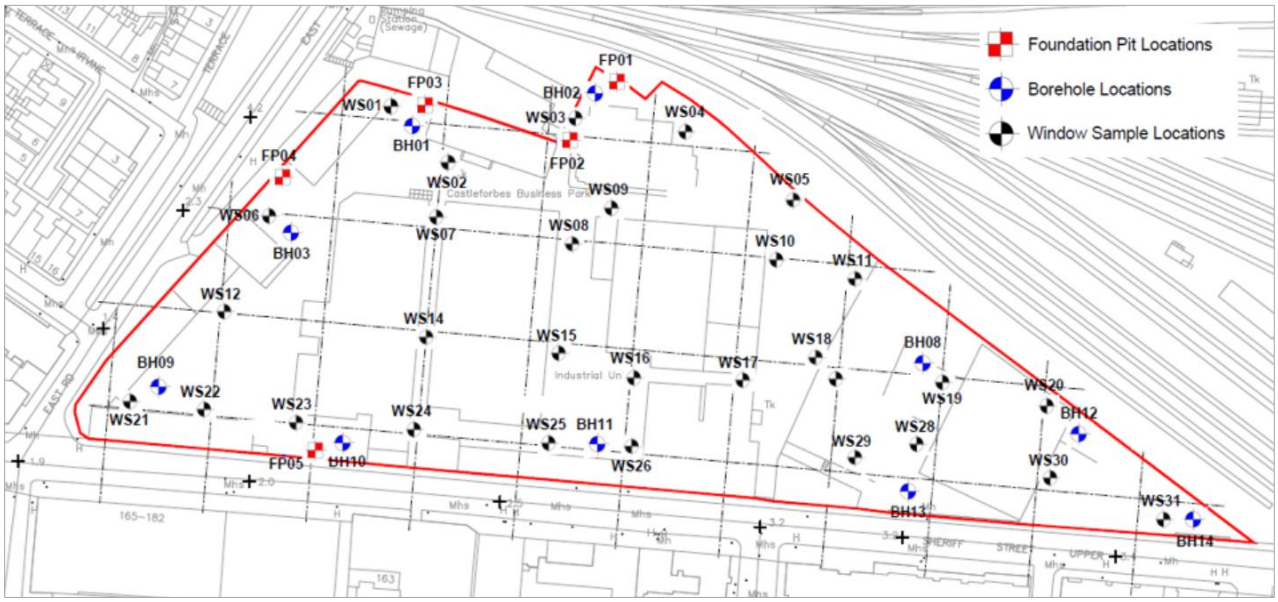
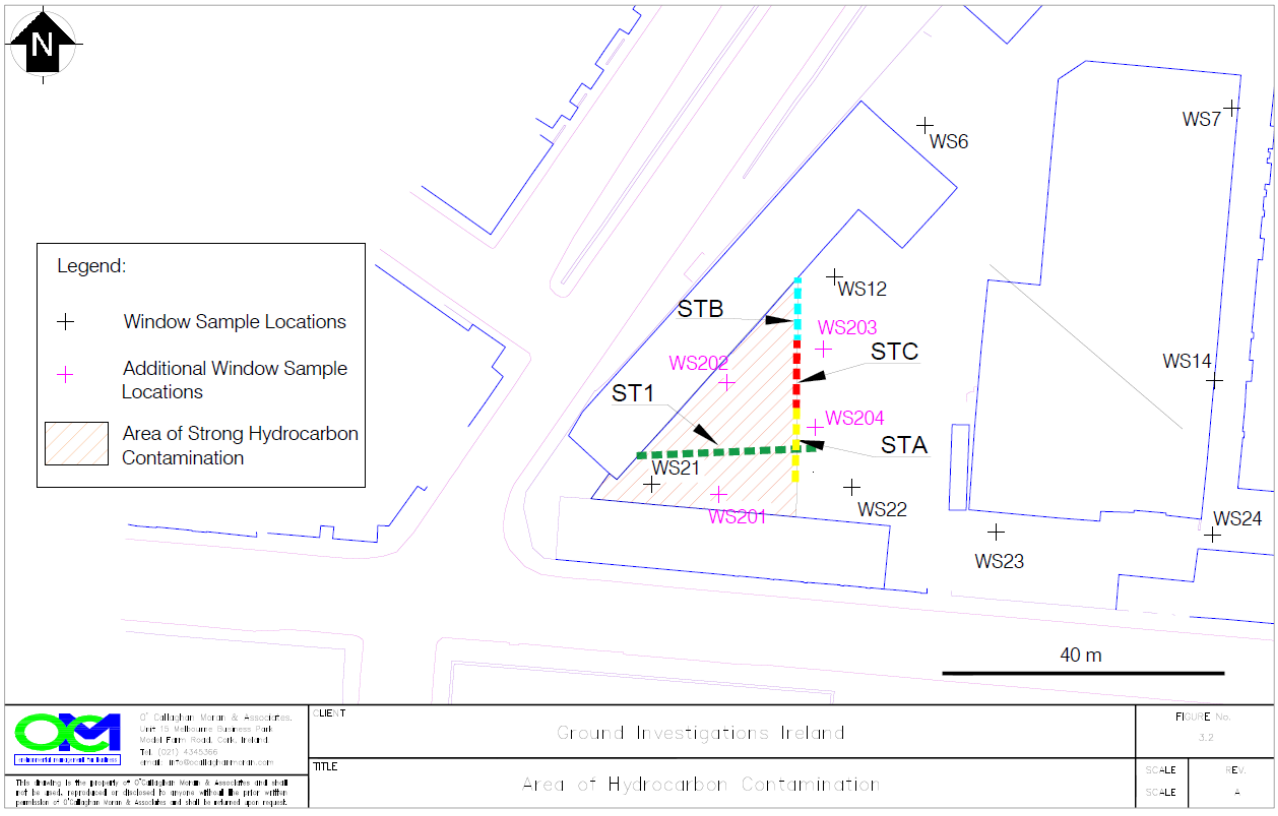


Figure 9.9: GSI Wells Search[72]



[72] O'Callaghan Moran & Associates (2019).

There are no published Generic Assessment Criteria (GACs) for soil contamination in the Republic of Ireland. However, metal and PAH concentrations were compared to *Land Quality Management Ltd* (LQM) and *Chartered Institute of Environmental Health (*CIEH) Suitable for Use levels for residential thresholds (the most conservative scenario. Comparative threshold tables are presented in Tables 3.1, 3.2 & 3.3 of Appendix A9.4. The S4UL for metals was only exceeded for one parameter (arsenic) and in one of fifty-six samples (WS-4 at 1-2m). The S4UL for aliphatic and aromatic hydrocarbons was exceeded in two window sample locations (WS-28 and WS-29) in the initial site investigation. While elevated hydrocarbons were not detected in the laboratory analysis the samples collected from WS-21 a very strong hydrocarbon odour was recorded in the log for this borehole and further investigation in this area confirmed the presence of elevated hydrocarbons. The S4UL for aliphatic and aromatic hydrocarbons was exceeded in six of the slit trench samples. The S4UL for Benzo(b) fluoranthene, which is a PAH, was exceeded in 10 samples (WS-1, 2, 4, 9, 12, 18, 21, 22, 24 and 29) in the initial investigation and in two of the samples in the further investigation in the southwest of the Site at WS-201 and 203. None of the samples exceed S4UL levels for commercial land use[73].

9.3.12 Groundwater Quality

The European Communities Directive 2000/60/EC established a framework for community action in the field of water policy (commonly known as the Water Framework Directive [WFD]). The WFD required *'Good Water Status'* for all European water by 2015, to be achieved through a system of river basin management planning and extensive monitoring. '*Good status'* means both '*Good Ecological Status'* and '*Good Chemical Status'*.

The Groundwater Body (GWB) underlying the Site is the Dublin GWB (EU Groundwater Body Code: IE_EA_G_008). The EPA classified the Dublin GWB as having 'Good Status' from metrics used during the during the 2013-2018 WFD assessment phase, with a WFD risk currently "*not at risk*" meaning the Dublin GWB is not at risk of failing to meet its WFD objectives. Figures 9.10 and 9.11 below present the most recent data from the EPA website.

[73] Chartered Institute of Environmental Health (CIEH) (2015).

Figure 9.10: Dublin GWB Status 2013-2015[74]

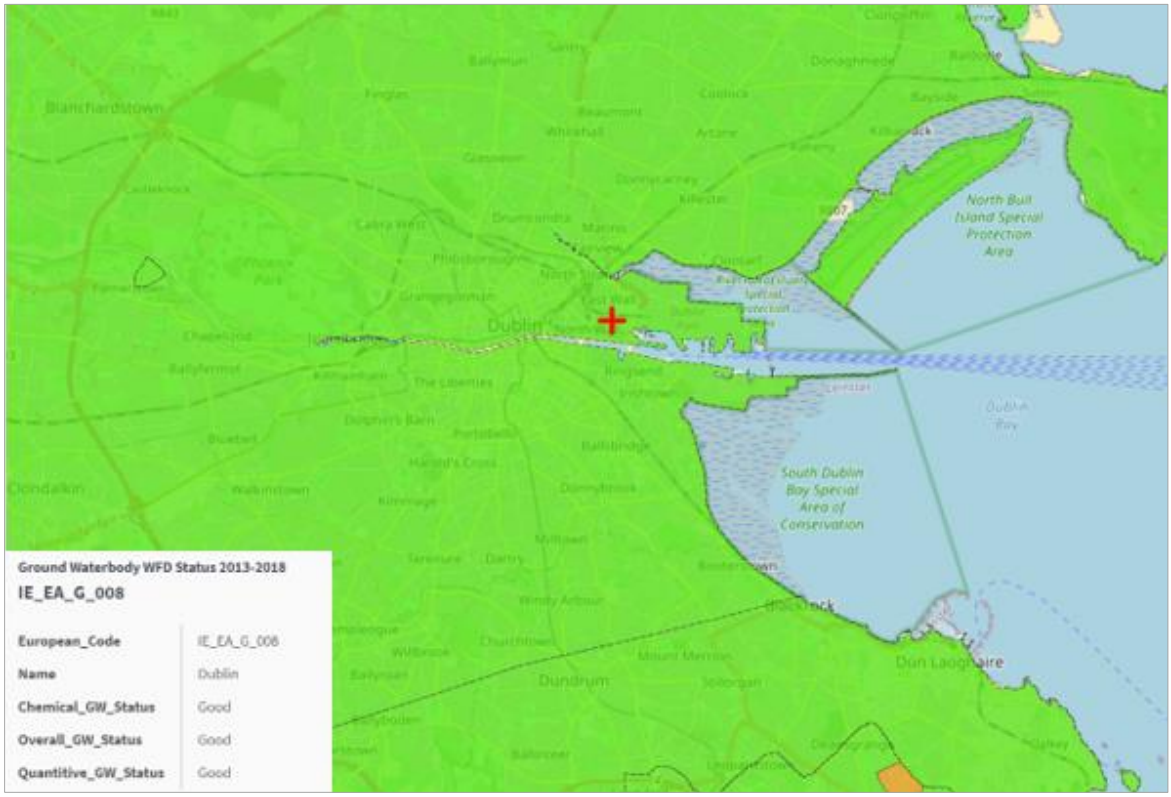
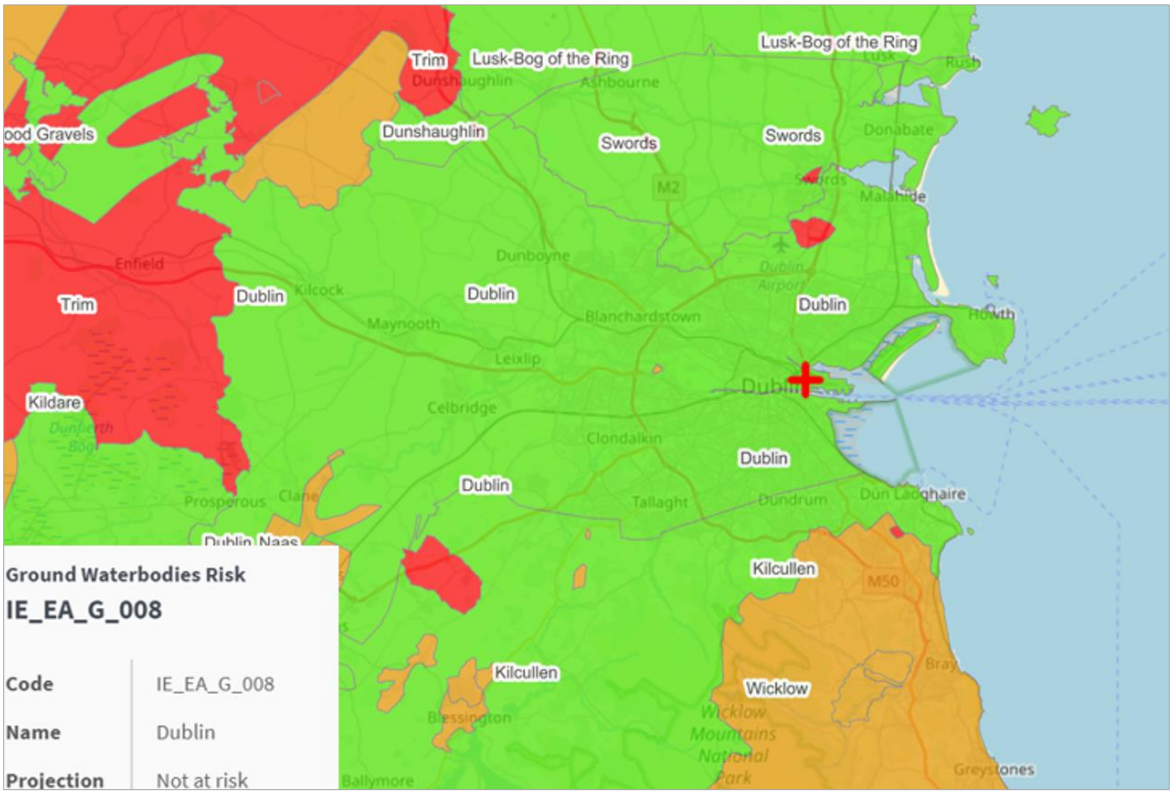


Figure 9.11: Dublin GWB Risk Rating[74]



[74] EPA Maps (2020). Source: *OpenStreet Maps.*

Pore/perched groundwater was recorded during onsite ranging in depths from 2.4mbgl and 4.8mbgl and a relatively high perched water table of 1mbgl was recorded during trial pitting works on a site directly to the north[75]. Some contamination of perched water would be expected in previously industrial areas such as Dublin Port and East Wall should any be encountered.

9.3.13 Hydrological Features

There is no evidence of springs of karstification at the Site of the proposed Project according to the GSI Karst database 2015. There is no evidence of large faults or line features in the study area as per GSI mapping.

9.3.14 Areas of Conservation

The lands in which the proposed Project is located have no formal designations. The nearest designated sites to the proposed Project are the North Dublin Bay Special Area of Conservation (SAC) (site code 000206) at c. 3.4km to the northeast and South Dublin Bay SAC (site code 000210) at c. 2.0m to the southeast of the Site. The South Dublin Bay and River Tolka Estuary Special Protection Areas (SPA) (site code 004024), is c. 950m to the north and c. 2.2km to the southeast.

9.3.15 Rating of Site Importance of Geological and Hydrogeological Features

Based on the NRA methodology[76] (refer to Appendix A9.2), criteria for rating site importance of geological features, the importance of the bedrock and soil features at this Site is rated as low importance with medium quality significance or value on a local scale. There are no extractable minerals or areas of geological heritage and the soils are not suitable for agricultural use.

Based on the NRA/IGI criteria for rating the importance of hydrogeological features (refer to Appendix A9.2), the importance of the hydrogeological features at this site is rated as *Low to Medium Importance*. This is based on the assessment that the attribute has a medium quality significance or value on a local scale. The aquifer beneath the Site is a *locally important (LI) bedrock aquifer*, *Bedrock which is Generally Moderately productive*. It is not used for public water supply or widely used for potable use and is well protected (low vulnerability). In addition, it does not host any groundwater dependent ecosystems (SACs/NHAs).

9.3.16 Conceptual Site Model

Interpretative cross sections have been finalised for the site with views appropriate to the characterisation of the site in terms of the geological (and hydrogeological environment). The inserts below present cross sections for the Site and regional area and indicate the following:

- The profile on-site comprises thin hardstand overlying > 4.5m of Made Ground comprising mostly of sandy gravelly CLAY with fragments of redbrick. Beneath this to c. 7.5m was fine to coarse SANDS

[75] BSM (2019).
[76] National Roads Authority (NRA) (2009).

and SILTS with occasional cobbles and occasional CLAY deposits. Investigations directly to the north of the Site[77] indicate that beneath the made ground is a CLAY horizon to c. 15.6mbgl and the drill logs note this is similar to Dublin Port Clay. An additional layer of GRAVEL & SANDS underly this to c. 17.4mbgl with glacial deposits noted at some. However, stratum depths are not heterogeneous throughout the site with bedrock recorded between 29.30mbgl at BH11 and 34.50mbgl at BH14.

- Depth to bedrock is c. 30m across the Site, with calcareous mudstone and limestone recoded at ranges between 29.30mbgl and 34.50mbgl. Consultation with the GSI mapping showed a number of geotechnical sites with boreholes installed to 30mbgl without reaching the underlying bedrock. This is to be expected in an area close to the Sea/Estuarine Waters
- The topography of the Site of the proposed Project is generally flat with a slight gradient from north to south.
- A shallow perched water table was identified on-site ranging between 2.4mbgl and 4.8mbgl and within the made ground at the Site directly to the north[77] at a number of borehole locations at 0.33-1.2mbgl. There were no deeper water strikes recorded during the Site investigation. There is no likely connectivity with the underlying locally important bedrock aquifer.
- The Site was is currently and previously used for industrial and commercial purposed. Analysis of chemicals of concern confirmed contamination in the fill/shallow overburden underlying the Site and has been shown to be contaminated to varying degrees. Comparison with LQMS/CIEH S4Uls showed 13 no. of the 56 no. samples analysed exceeded levels for residential land use with levels above thresholds also recorded from samples recovered from subsequent slit trenching to the southwest of the Site. All levels were below the corresponding levels for use for commercial development. WAC analysis confirmed that soil (at location where the inert WAC criteria is exceeded) can be disposed of a non-hazardous land fill.

Review of the hydrogeology and geology in the surrounding region indicates that there is no groundwater source protection area in the vicinity of the Site. There are a number of SPA and SAC to the north, south and east of the Site. There is no likely source pathway linkage within the aquifer to these receptors as no need any contaminated soil/water encountered will be removed from Site for licenced disposal. The project does include a basement level. Additional excavation on-site will be undertaken for the installation of piles, ground beams, attenuation, and other associated services, the maximum depth of excavation will be 2.9mbgl. There will be no requirement for dewatering of the underlying aquifer with some temporary dewatering required of the shallow perched water table.

[77] BSM (2019).

Figure 9.12: Local Site Cross Section

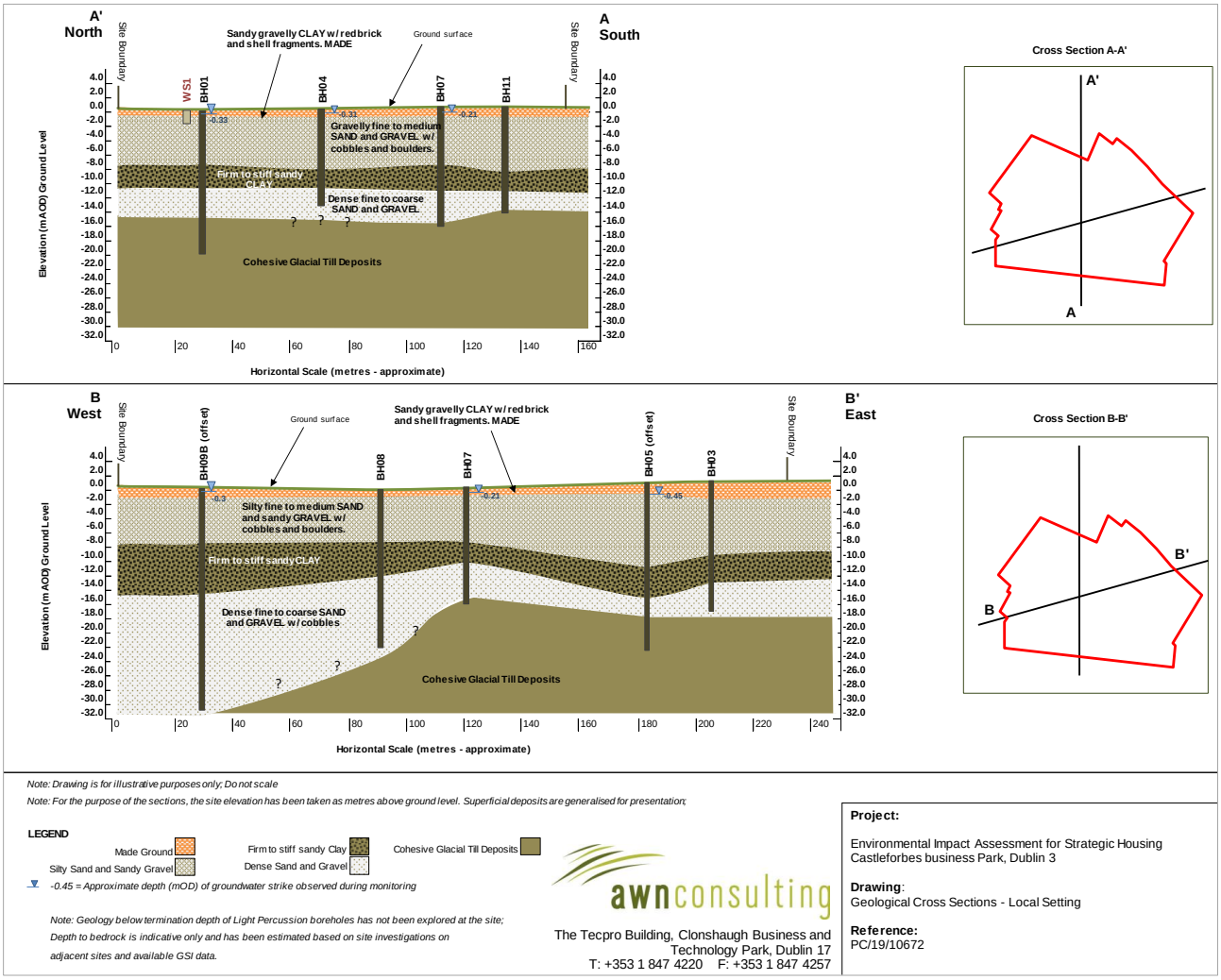
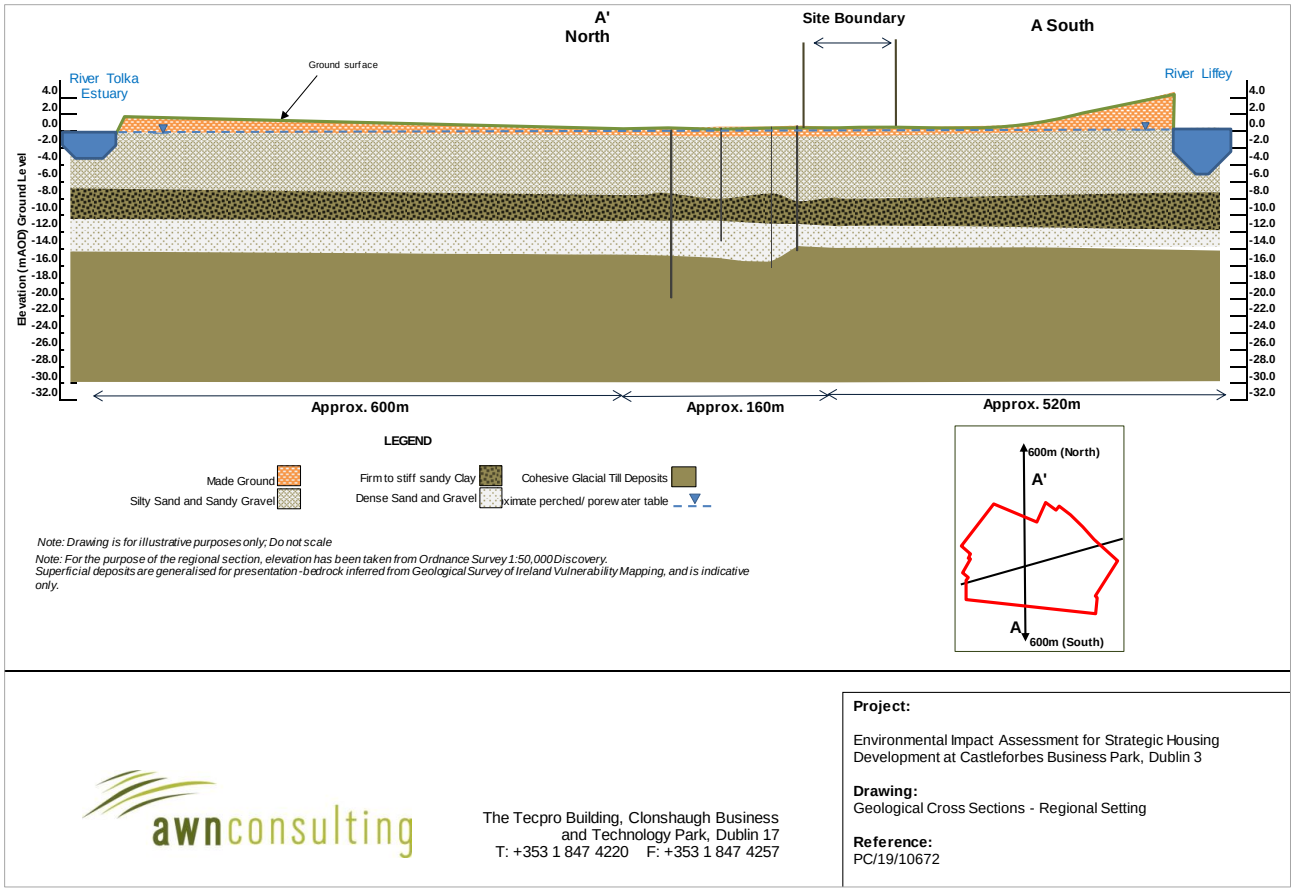


Figure 9.13: Regional Cross Section



9.4 Potential Impact of the Proposed Project

An analysis of the potential impacts of the proposed Project on the land, soils, geology and hydrogeological environment during the Construction and Operational Phases is outlined below.

Due to the inter-relationship between soils, geology and hydrogeology and surface water (hydrology) the following impacts discussed will be considered applicable to both Chapters 9 (Land, Soils, Geology and Hydrogeology) and 10 (Hydrology) of the EIAR.

9.4.1 Construction Phase

9.4.1.1 Excavation and Infilling

Excavation and infilling within the Site of the proposed Project will be required as part of the preliminary site enabling works for pile installation, pile capping and other site services. It is estimated that a maximum of 13,100m^3 of material will be excavated with 2,000m^3 to be reused on-site. Site investigation and laboratory analysis have identified residual contamination throughout the Site. All contaminated soil/water/perched water will be required to be removed by a licensed waste contractor see Chapter 18 (Material Assists -Waste) for more information. The proposed Project will also require importation of clean engineering fill.

9.4.1.2 Accidental Release to Ground

During the Construction Phase of the proposed Project, there is a risk of accidental pollution incidences from the following sources:

- spillage or leakage of temporary oils and fuels stored on-site;
- spillage or leakage of oils and fuels from construction machinery or site vehicles;
- spillage of oil or fuel from refuelling machinery on-site; and
- run-off from concrete and cement works

Accidental spillages which are not mitigated may result in localised contamination of soils and groundwater underlying the Site, should contaminants migrate through the hardstand and impact the underlying groundwater aquifer. Groundwater vulnerability at the Site is classified as *"low"* As such there is significant natural protection to the underlying aquifer from any accidental release. The Site is currently hardstand throughout. The thickness of overburden on the Site (> 30m) and provision of capping of site with impermeable paving and building and associated drainage infrastructure will provide additional protection following construction. It is not believed that the perched water is in hydraulic connection with the underlying locally important aquifer. As such the mostly likely pathway for any leak/spillage is through the existing sewers, with a lower risk of contaminating the underlying shallow water table.

There will be some dewatering of perched/pore water required for the excavation of the basement (and depth 2.9mbgl) and other works at the Site. Should it be required this water will be subject to settlement, treatment (if required) and inspection and where acceptable it will be discharged to the combined foul/storm sewer adjacent to the Site. If required contaminated water will be disposed of to an off-site licenced facility.

9.4.2 Operational Phase

There will be no direct discharges to the ground or abstractions from the bedrock aquifer during the Operational Phase of the proposed Project. The potential impacts of the proposed Project operation in relation to land soils and environment have been assessed under the following headings:

- Accidental Emissions to Ground.
- Minor Change in recharge to Ground.

9.4.2.1 Accidental Emissions to Ground

There will be no direct discharges of contaminated water to groundwater or soil environments during the Operational Phase. As there will be no bulk storage of chemicals and no large-scale bulk oil storage proposed on-site, the likelihood of a potential significant impact on the soil or groundwater quality is *negligible*. Indirect localised discharges could occur from accidental leakages from cars/vehicles in the car parking areas.

9.4.2.2 Minor Change in Recharge to Groundwater

The Site will be predominately hardstanding. As the site is currently 100% hardstand this will not reduce local recharge to the underlying groundwater aquifer and indeed increase infiltration due to deployment of SUDs measures.

9.5 Mitigation Measures

It is important to note that the design of the proposed Project has taken account of the potential impacts on the land, soils and geology environment. Measures have been incorporated into the design to mitigate any potential effects on the surrounding land, soils and geology. These are described in further detail below. Due to the inter-relationship between soils, geology, hydrogeology and hydrology, the following mitigation measures will apply to each of these characteristics of the environment.

9.5.1 Construction Phase

9.5.1.1 Soil Removal and Compaction

Construction works will require the removal of soils/stones (c. 13,100m^3). The aquifer vulnerability is classified as *'Low'* throughout the Site area based on-site investigations with c. 30m of overburden recorded. As it is not proposed to significantly alter the total hardstand at the Site and due to the thickness of the overburden the underlying hydrogeological environment will have significant protection from surface infiltration during construction.

Surface water management in accordance with the design (*e.g.* runoff directed to a settlement tank and through a petrol interceptor prior to discharge) will ensure there is no risk to the underlying aquifer. The temporary storage of soil will be carefully managed to prevent any potential negative impact on the receiving environment. This material will be stored away from the surface water drainage network. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust.

Approximately 2,000m^3 of excavated material will be reused on-site with 11,100m^3 of excavated material being removed off-site. It will be visually assessed for signs of possible contamination such as staining or strong odours. As it has already been determined that some of the soil material underlying the Site exceeded the inert WAC criteria, this will be segregated, classified and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

9.5.1.2 Fuel & Chemical Handling

To minimise any impact on the underlying subsurface strata from material spillages it is proposed that all fuels, oils, solvents and paints used during construction will be stored within temporary bunded areas or will be contained in double skinned tanks in designated areas of the Site away from surface water drains.

Re-fuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place off-site or in a designated area that will be away from any existing surface water drains. The area will be determined by the contractor prior to commencement onsite but is likely to be carried out in a designated area of the contractor's compound. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532)*[78] will be complied with.

9.5.2 Operational Phase

9.5.2.1 Indirect Accidental Emissions

There will be no bulk storage of fuel required for the Operational Phase of the proposed Project. The Site will be predominantly covered in hardstanding. The impermeable surface will minimise the potential influx of any contaminants into soils and underlying groundwater.

Any accidental leaks from cars within the car parking/road areas will be directed through the surface drainage system via an appropriately sized interceptor.

Attenuation will be provided by underground tanks to ensure that the discharge rate is maintained at greenfield runoff rate. The attenuation facility will accommodate rainfall events up to, and including, the 1-in-100-year storm event.

The foul water system discharges to the public sewer and subsequently to the Ringsend WWTP to the east of the Site. Due to the close proximity of the WWTP, there is a very low risk of contamination to ground from leakage from the foul drainage system.

9.6 Residual Impacts

9.6.1 Construction Phase

Following the implementation of mitigation measures detailed in Section 9.5.1, the predicted impact on the land, soils and geology during the Construction Phase (in accordance with EPA Draft Guidelines[79]) is considered to be *short-term, imperceptible* with a *neutra*l effect on quality.

[78] CIRIA (2001).
[79] EPA (2017).

9.6.2 Operational Phase

Following the implementation of the mitigation measures proposed in Section 9.5.2, the predicted impact on land, soils and geology once the proposed Project is constructed and operational (in accordance with EPA Draft Guidelines[80]) is considered to be *long-term, imperceptible* with a *neutral* effect on quality.

9.7 Monitoring

9.7.1 Construction Phase

Regular inspection of surface water run-off and any sediment control measures *e.g.* silt traps will be carried out during the Construction Phase. Regular auditing of construction/mitigation measures will be undertaken *e.g.* concrete pouring, refuelling in designated areas *etc.* Agreement from Irish Water/DCC will be required should these measure be required.

9.7.2 Operational Phase

No future soil or groundwater monitoring is proposed as part of the proposed Project. Petrol interceptor(s) will be maintained and cleaned out in accordance with the manufacturer's instructions. Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.

9.8 Reinstatement

Any reinstatement from the construction activities on-site (excavations associated with ancillary/preparation works) will adhere to the design and architectural specifications presented in this application. All fill material to be used will be graded to Project Engineers' specifications.

9.9 Interactions

9.9.1 Hydrology

As previously stated, there is an inter-relationship between hydrology and soils, geology and hydrogeology. The underlying aquifer is a locally important source in the surrounding catchment areas. There will be no potential cumulative impacts on the bedrock as the aquifer vulnerability is *'Low'* and the aquifer is locally important with little importance regionally.

Surface water run-off may have the limited potential to enter soil and groundwater. Implementation of appropriate mitigation measures as outlined in Chapter 10 (Hydrology) will eliminate the potential for the influx of surface contaminants into the underlying geology and hydrogeology.

[80] EPA (2017).

9.9.2 Material Assets – Waste Management

It has been identified in *O'Callaghan Moran & Associates Report* (refer to Appendix A9.4) that there is an amount of subsurface material which exceeds the WAC inert criteria thresholds. Evidence of non-hazardous and hazardous material have been identified throughout the Site. Approximately 13,100m^3 of material will be required to be removed from Site to facilitate the installation of piles, attenuation measure, oil interceptors, basement excavations *etc*. This material will be removed from Site as a waste and appropriate measure for this are covered in Chapter 18 (Material Assets – Waste).

9.10 Cumulative Impacts

The anticipated cumulative effects of the proposed Project and the other known surrounding developments listed in Chapter 21 (Cumulative Impacts) are summarised below. In relation to the potential cumulative impact on the geological or hydrogeological environment during the Construction Phases, those key engineering works which would have additional impacts above are:

- There will be no increase in hardstanding as the Site is completely cover in hardstanding at present. Capping of significant areas of the sites by hardstand/buildings following construction and installation of drainage will minimise the potential for contamination of groundwater as current.
- Run-off containing large amounts of silt could cause damage to surface water systems and receiving watercourses. Run-off for the proposed Project will therefore need to be managed using the methods described for in Chapter 10 (Hydrology).
- Contamination of soils and groundwater underlying the Site from accidental spillage and leakage from construction traffic and construction materials may occur unless project-specific Construction Management Plans (CMPs) are put in place and complied with. It is proposed that project-specific CMP's will be put in place for the proposed Project.

In relation to the potential cumulative impacts from the Operational Phase, the following would apply:

- Overall increase in hardstanding: Cumulatively this development and others in the area will not result in localised reduced recharge to ground and increase in surface run-off as the majority of the docklands area is already hardstand. The aquifer underlying the site is a locally important aquifer (Li). Based on site specific and regional geological investigations there is c. >30m of overburden overlying the bedrock aquifer classifying it as "Low" vulnerability (GSI classification). As such, the impact is considered to be imperceptible.
- Accidental releases from fuel storage/unloading could contaminate groundwater or soil environments unless mitigated adequately *i.e.* bunded tanks and delivery areas. Localised accidental discharge of hydrocarbons could occur in car parking areas and along roads unless

diverted to surface water drainage system with petrol interceptors. However, all developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislation (primarily the Local Government (Water Pollution) Act, 1977 and 1990 as amended) such that they would be required to manage runoff and fuel leakages.

- There will be no loss of agricultural or greenfield areas locally as part of the proposed Project.

The residual cumulative effect on land, soils, geology and hydrogeology for the Construction and Operational Phases are anticipated to be *long-term, neutral* in terms of quality and *of imperceptible* significance, once the appropriate mitigation measures are put in place for each development.

9.11 'Do-Nothing' Impact

A '*do-nothing'* scenario includes retention of the current Site without the proposed Project in place. Should the proposed Project not proceed the Site would remain in its current state with the only likely impact on the underlying soil and/or aquifer due the historical industrial nature of the Site and the Dublin docklands. The continued use of the Site for commercial/industrial activities is likely to have a *neutral* and *imperceptible* effects on the environment.

9.12 Difficulties Encountered in Compiling the Chapter

No difficulties were encountered in compiling this Chapter of the EIAR.

10 Hydrology - Surface Water

10.1 Introduction

This Chapter of the EIAR was prepared by AWN Consulting Ltd. and assesses and evaluates the potential impacts on the surrounding water and hydrological environment, associated with the proposed Strategic Housing Development (SHD) (referred to as "*the proposed Project*"), located at Sheriff Street Upper and East Road, Dublin 1.

In assessing likely potential and predicted impacts, account is taken of both the importance of the attributes and the predicted scale and duration of the likely impacts.

The proposed Project will consist of the demolition of all structures on the Site and the construction of a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a standalone three storey childcare facility and residential tenant amenity. The proposed Project will also accommodate car parking spaces, bicycle parking, storage, services and plant areas. More details on the background and Site history is provided in Chapter 5 (Description of the Proposed Project).

10.2 Methodology

The methodology used in this assessment follows current European and Irish guidance as outlined in:

- EPA (2017). *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.*
- EPA (2015). *Advice Notes of Current Practice in the Preparation of Environmental Impact Statements* (Draft).
- National Roads Authority (NRA) (2009). *Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*.

The rating of potential environmental impacts on the hydrological environment is based on the quality, significance, duration and type of impact characteristic identified. Consideration is given to both the importance of an attribute and the magnitude of the potential environmental impacts of the proposed activities on that cited attribute. The Draft EIAR Guidelines[81] tables are presented in Appendix A10.1. The NRA criteria for rating the magnitude and significance of impacts at EIA stage on the geological related attributes are also relevant in determining impact assessment and are presented in Appendix A10.1.

[81] EPA (2017).

10.2.1 Sources of Information

This assessment was considered in the context of the available baseline information, potential impacts, consultations with statutory bodies and other parties, and other available relevant information. In collating this information, the following sources of information and references were consulted:

- Latest EPA Maps & Envision water quality monitoring data for watercourses in the area (these data can be accessed at https://gis.epa.ie/EPAMaps/ and www.catchments.ie
- National River Basin Management Plan 2018-2021.
- Department of the Environment, Heritage and Local Government (DEHLG) and the Office of Public Works (OPW) (2009). *The Planning System and Flood Risk Management, Guidelines for Planning Authorities.*
- Office of Public Works (OPW). *Flood mapping data*, accessed at www.floodmaps.ie
- Relevant Eastern Catchment Flood Risk Assessment and Management (CFRAM) Flood Reports.
- Eastern Regional Fisheries Board. *Requirements for the Protection of Fisheries Habitat During Construction and Development Works at River Sites*.
- Dublin City Council (2005). *Greater Dublin Strategic Drainage Study (GDSDS): Technical Documents of Regional Drainage Policies.*
- *Greater Dublin Regional Code of Practice for Drainage Works: Version Draft 6.0* (Wicklow County Council, South Dublin County Council, Meath County Council, Kildare County Council, Fingal County Council, Dún Laoghaire- Rathdown County Council & Dublin City Council).
- Construction Industry Research and Information Association (CIRIA) (2001). *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532)*.

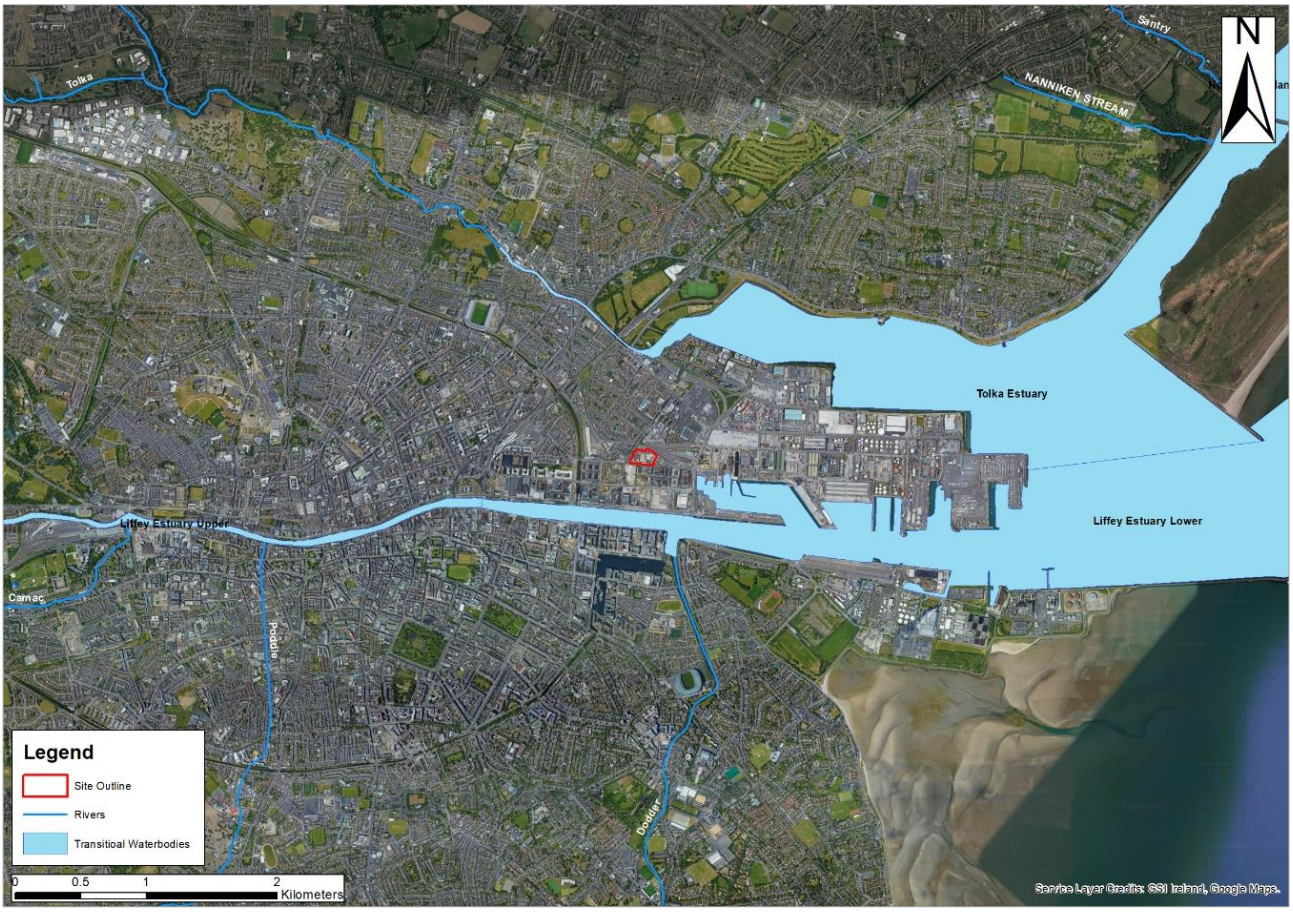
Other relevant documentation consulted as part of this assessment included the following:

- DBFL Consulting Engineers (2020b). *Mixed-use Development, Castleforbes, Sheriff St Upper, Site Specific Flood Risk Assessment*.
- DBFL Consulting Engineers (2020c). *Proposed Mixed Use Development, Castleforbes, Sheriff St Upper Infrastructure Design Report.*

10.3 Baseline Environment

The Site of the proposed Project is located in East Wall Dublin. The area is largely industrial with residential housing to the west and apartments to the south. Rail tracks bound the Site to the north with further rail tracks and rail storage yards to the east. Figure 10.1 below presents the topographic nature and surface water features of the Site and surrounding area.

Figure 10.1: Local Surface Water Environment



10.3.1 Hydrology (Surface Water)

The River Liffey is located c. 360m to the south of the Site of the proposed Project with the River Tolka c. 820m to the north. The River Liffey and River Tolka drain a large catchment of Dublin City and are located in hydrometric area (HA) No. 9[82]. There is no surface water course recorded at or bordering the Site and it is not hydraulically linked (other than through manmade sewers) to the estuarine waters to the north and south. The Site of the proposed Project is serviced by an existing combined foul/surface water sewer located to the south of the Site along Sheriff Street Upper which runs in a westerly direction.

10.3.2 Surface Water Quality

The European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy, commonly known as the Water Framework Directive (WFD).

The WFD requires '*Good Water Status*' for all European waters by 2015, to be achieved through a system of river basin management planning and extensive monitoring. '*Good status*' means both '*Good Ecological Status*' and '*Good Chemical Status*'. In the second cycle River Basin Management Plan published in April 2018 which

[82] EPA (2020).

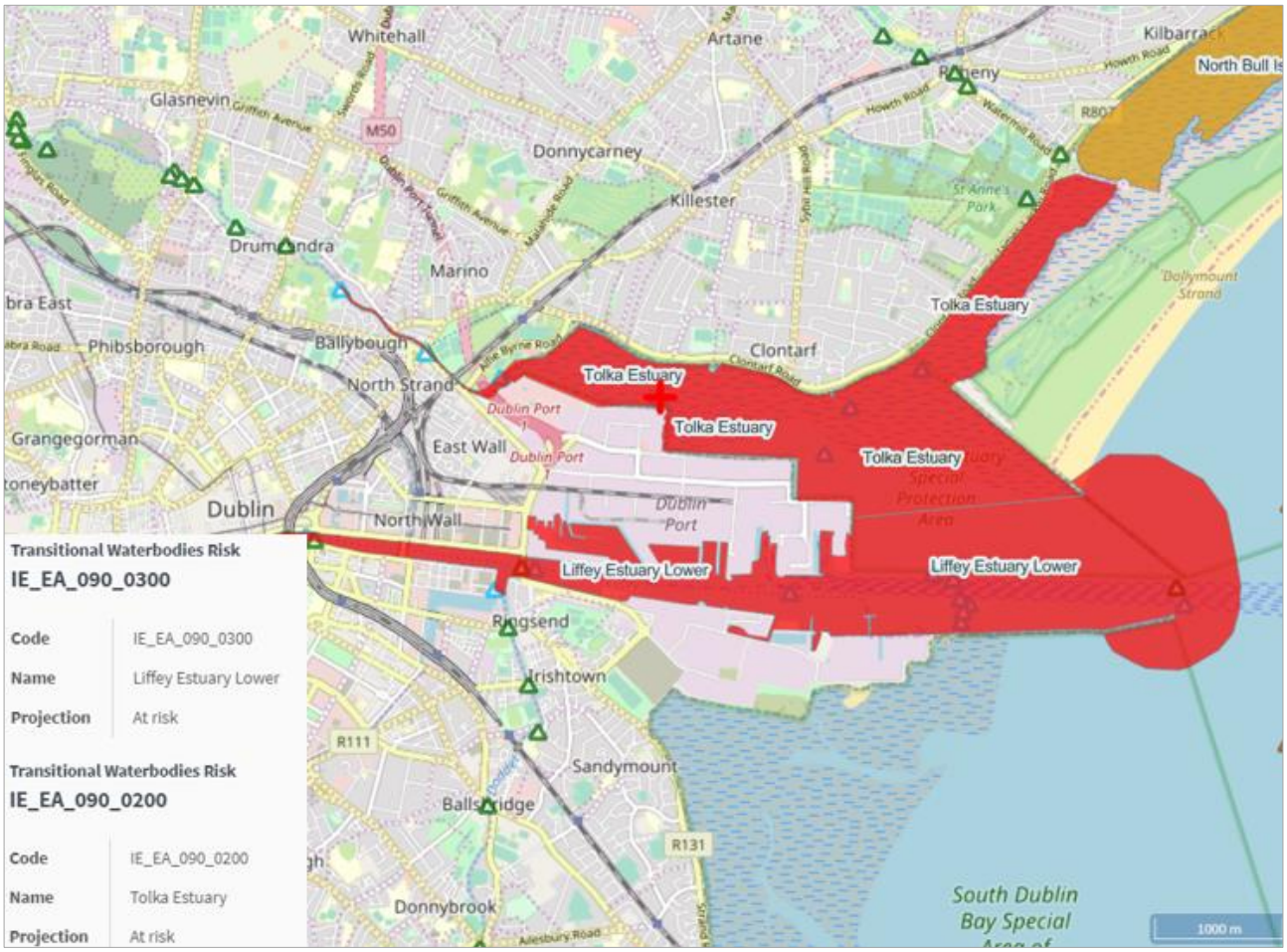
replacing the first cycle river management plans (2009-2015). The impacts of a range of pressures were assessed including diffuse and point pollution, water abstraction and morphological pressures *(e.g*. water regulation structures). The purpose of this exercise was to identify water bodies at risk of failing to meet the objectives of the WFD and include a programme of measures to address and alleviate these pressures.

The strategies and objectives of the WFD in Ireland have influenced a range of national legislation and regulations. These include the following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003).
- European Communities (Drinking Water) Regulations 2014 (S.I. 122 of 2014).
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended by S.I. No. 77 of 2019).
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010 as amended by S.I. No. 366 of 2016).

Figure 10.2 below presents the EPA surface water quality monitoring points in the context of the Site and other regional drainage setting, as well as the waterbodies risk of not achieving good status. The Tolka and Liffey Estuaries (transitional/estuarine waterbodies) are identified as being "*At Risk*" of not meeting their WFD objectives (current assessment). The Tolka Estuary was categorised as having a "*Moderate*" status, while the Liffey Estuary has a "*Good"* status during the 2013-2018 WFD assessment phase.

Figure 10.2: Local Surface Water Environment



10.3.3 Flood Risk Assessment

A Site Specific Flood Risk Assessment (SSFRA) has been prepared by DBFL Consulting Engineers in accordance with the DEHLG/OPW Guidelines[83]. The SSFRA is provided as part of the planning application and supporting information is included in the DBFL *Infrastructure Design Report*[84]. The assessment identifies the existing flood and sets out mitigation measures to ensure there is no likely flooding of the proposed Project or surrounding lands as a result of the proposed Project. It is deemed appropriate for the Site to be located within Flood Zone A.

The proposed type of development for this Site is to be a mixed-use residential development with retail space, a standalone three storey childcare facility and amenities. The retail space, childcare facility and amenities are categorised by the Guidelines as *less vulnerable* development and appropriate to be located within Flood Zone A if the requirements of the Justification Test are met. Apartment units are habitable and are categorised as *highly vulnerable* development and must be located above Flood Zone A.

[83] DEHLG and the OPW (2009). *The Planning System and Flood Risk Management, Guidelines for Planning Authorities.*
[84] DBFL Consulting Engineers (2020c).

The proposed Project passes the Justification Test in accordance with Box 5.1 of the Guidelines and the proposed Project is deemed appropriate to be located within Flood Zone A on the basis that the mitigation measures stipulated within justification are met.

The Site of the proposed Project is within Flood Zone A for tidal flooding according to the Irish Coastal Protection Strategy Study (ICPSS), however, the Site is located in an area that benefits from flood defence measures, therefore the SSFRA has assessed the residual risks associated with breach of these defences. As part of the mitigation measures to reduce the associated Flood risk for site users was by ensuring all 'highly vulnerable' finished floor levels are located above the 0.1% AEP flood level, in addition to a climate change allowance and a conservative freeboard, giving a minimum FFL for this type of development of 4.08m. As part of the proposals all highly vulnerable development (apartment units) will be located at a minimum of 4.10mAOD.

A possible source of flood risk from the surcharging or blockage of the development's drainage system has been identified. This risk is mitigated by suitable design of the drainage network[85], regular maintenance and inspection of the network and establishment of exceedance overland flow routes. The development's drainage design includes for a 20% climate change allowance. The proposed Project will not increase run-off rate when compared with the existing site and satisfies the requirement of the SFRA to reduce flooding and improve water quality.

10.3.4 Areas of Conservation

The nearest designated sites to the proposed Project are the North Dublin Bay Special Area of Conservation (SAC) (site code 000206) at c. 3.4km to the northeast and South Dublin Bay SAC (site code 000210) at c. 2.0m to the southeast of the Site. The South Dublin Bay and River Tolka Estuary Special Protection Areas (SPA) (site code 004024), is c. 950m to the north and c. 2.2km to the southeast.

There are also a number of proposed Natural Heritage Areas (pNHA) in the large Dublin City urban area. The Site of the proposed Project is not hydraulically connected by natural drainage to any of areas of conservation highlighted above. However and indirect connection to these may exist via the stormwater drainage systems in the area.

10.3.5 Rating of Site Importance of Hydrological Features

There are no hydrological features at the Site of the proposed Project. Based on the NRA methodology (refer to Appendix A10.1), for the criteria for rating the importance of hydrological features, the features at this site are rated as *Low Importance*.

[85] DBFL Consulting Engineers (2020b).

10.4 Potential Impact of the Proposed Project

An analysis of the potential impacts of the proposed Project on the hydrological environment during the Construction and Operational Phases is outlined below. Due to the inter-relationship between surface water (hydrology) and soils, geology and hydrogeology the following impacts discussed will be considered applicable to both Chapters 9 (Land, Soils, Geology and Hydrogeology) and 10 (Hydrology) of the EIAR. Waste Management is also considered an interaction.

10.4.1 Construction Phase

10.4.1.1 Increased Run-off and Sediment Loading

Surface water run-off during the Construction Phase may contain increased silt levels or become polluted from construction activities. As there is no open stream or river on or near the Site, there is no potential for a direct water quality impact. There is a potential for blocking of stormwater drainage if run-off is not managed adequately.

10.4.1.2 Contaminated Surface Water Drainage

During the Construction Phase, there is a risk of accidental pollution incidences from the following sources:

- spillage or leakage of oils and fuels stored on site or refuelling on-site;
- spillage or leakage of oils and fuels from construction machinery or site vehicles; and
- the use of wet concrete and cement.

Machinery on-site during the Construction Phase may result in-contamination of the surface water. The potential impacts could derive from accidental spillage of fuels, oils, paints and solvents, which could impact surface water and groundwater quality if allowed to infiltrate to run-off to surface water systems and/or receiving watercourses. There is currently surface water drains onsite which will be maintained and upgraded during construction works.

Concrete operations carried out near surface water drains during construction activities could lead to a discharge of wastewaters to a watercourse. Concrete (specifically, the cement component) is highly alkaline and any spillage to a local watercourse would be detrimental to water quality and local fauna and flora. This scenario is unlikely as the site is not in direct hydraulic connection to any surface water features or protected areas.

10.4.2 Operational Phase

Following construction of the proposed Project the potential impacts in relation to water have been assessed under the following headings:

- increased surface water run-off;

- contamination of surface water;
- foul water; and
- water supply.

10.4.2.1 Surface Water Run-off

Without proper control measures, surface water can ingress into the surrounding environment. Dublin City Council (DCC) requires all new developments to adhere to the practice of Sustainable Urban Drainage Systems (SuDS) for the control of surface water on-site.

10.4.2.2 Contamination of Surface Water

Within the curtilage of the Site there is a potential for minor leaks and spillages due to the vehicle movements, and parked cars. As there is no open water on or adjacent to the Site the source pathway linkage in the event of such a leak/spill *is very low.*

10.4.2.3 Foul Water

The proposed Project will lead to an increase in foul water discharge. The Site is currently serviced by an existing 600mm diameter combined sewer on Sheriff Street Upper which runs from west to east. The design foul flow has been calculated by Project Engineers[86] as 11.27l/s.

All foul effluent will be treated at Ringsend WWTP which operates under licence from the EPA (Licence No. D0034-01) and received planning permission (ABP Reg. Ref.: 301798) in 2019 for upgrade works. Irish Water have confirmed by return of letter, subject to a valid connection agreement, that the proposed Project connection to the Irish Water wastewater network can be facilitated.

10.4.2.4 Water Supply

The connection to mains water will be provided from the existing watermain spur onto site located to the south on Sheriff Street Upper[87]. Overall peak water demand will be 20.54l/s for residential use and 1.71l/s for commercial use. Irish Water have confirmed by return of letter, that the proposed Project connection to the Irish Water network can be facilitated.

10.5 Mitigation Measures

The design of the proposed Project has taken account of the potential impacts of the development and the risks to the water environment local to the area where construction is taking place. Measures have been developed to mitigate the potential effects on the local water environment. These measures seek to avoid or

[86] DBFL Consulting Engineers.
[87] See DBFL Consulting Engineers *Drawing 180159-3101.*

minimise potential effects in the main through the implementation of best practice construction methods and adherence to all relevant legislation.

A preliminary Construction Management Plan (pCMP) has been submitted with this application and a Final CMP will be established and maintained by the contractors during the Construction and Operational Phases of the proposed Project. The Plan will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the Site will be trained in the implementation of the procedures. As a minimum, the CMP will be formulated in accordance with best international practice including but not limited to:

- Construction Industry Research and Information Association (CIRIA) (2001). *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors.*
- CIRIA (2005). *Environmental Good Practice on Site* (C650).
- BPGCS005, *Oil Storage Guidelines*.
- CIRIA (2007). *The SuDS Manual (697).*
- UK Environment Agency (2004). *UK* Pollution *Prevention Guidelines (PPG).*

The Project Engineers[88] have outlined construction design measures for the Site in their Infrastructure Design Report. The following mitigation measures include, but are not limited to, those provided in that report and are designed to address the impacts associated with the Construction and Operational Phase of the proposed Project. Due to the inter-relationship between this section and Chapter 9 (Land, Soils, Geology and Hydrogeology) the following mitigation measures discussed will be considered applicable to both.

10.5.1 Construction Phase

During the Construction Phase, mitigation measures have been applied for potential impacts. The mitigation measures will ensure that no sediment contamination, contaminated run-off or untreated wastewater will enter any on-site surface water drains during the Construction Phase of the proposed Project.

10.5.1.1 Increased Run-off and Sediment Loading

During the Construction Phase any outflows carrying a high sediment load will be diverted through settlement ponds/tanks. The settlement ponds/tanks will be located between the area of construction and the surface water drain. Surface water run-off will not be discharged directly to local watercourses. The following mitigation measures will be adopted:

- silt reduction measures including sit traps and settlement tanks will be employed during construction;

[88] DBFL Consulting Engineers.

- any excavations required will remain open for as little time as possible before the placement of fill. This will help to minimise potential for groundwater ingress into excavations;
- weather conditions will be considered when planning construction activities to minimise risk of run off from the Site;
- distance between topsoil piles etc. and surface water drains will be maintained - to protect from dampening operations; and
- The generation of run-off from stockpiles of soils, excavated during construction, will be prevented from entering surface water drains by diverting run-off to the settlement ponds/tanks on-site, and removing the material off-site as soon as possible to designated storage areas/licenced disposal facility.

10.5.1.2 Contamination of Surface Water Drainage

To minimise any impact on minor drainage channels onsite from material spillages, all oils, solvents, paints and fuels used during construction will be stored within temporary bunded areas and each of these areas will be bunded to a volume of 110% of the capacity of the largest tank/container within it (plus an allowance of 30mm for rainwater ingress). Drainage from the bunded area(s) will be diverted for collection and safe disposal. There is no notable surface water course on-site. The drainage ditch to the south is to be culverted as part of the initial construction works.

Wet concrete operations adjacent to watercourses will be avoided where possible. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated stormwater to groundwater.

The appointed Contractor will be required to make provision for removal of any concrete wash waters, most likely by means of tankering off-site and no such wash waters will be discharged to groundwater. Any effluent generated by temporary on-site sanitary facilities will be taken off-site for appropriate treatment.

Re-fuelling of construction equipment and the addition of hydraulic oil or lubricants to vehicles/equipment will take place in designated bunded areas where possible. Re-fuelling will be avoided in so far as possible at the other work sites but where necessary will take place on hardstand areas and fuel stored in bunded areas.

If it is not possible to bring a machine to the refuelling point, fuel will be delivered in a double skinned mobile fuel bowser. A drip tray will be used beneath the fill point during refuelling operations in order to contain any spillages that may occur. The vehicles and equipment will not be left unattended during refuelling. Spill kits and hydrocarbon absorbent packs will be stored in the cab of each vehicle and operators will be fully trained in the use of this equipment.

10.5.2 Operational Phase

10.5.2.1 Surface Water Run-off

The proposed drainage system for the Site[89] and has been designed in accordance with Greater Dublin Strategic Design System (GDSDS) specifications. The drainage system will employ a number of attenuation methods. The surface water strategy includes one attenuation tank to provide the required volume to ensure the development does not flood in the 1 in 100-year storm event (accounting for a 20% increase with climate change). The main attenuation storage will be located to the east of the development as a geo-cellular tank (waving aqua cell or similar) with a capacity of 889m^3. The outflow to the combined sewer will also be filled with flow control device. As such the design includes improved measures for management of stormwater run-off in relation to flood impact. Additional SUDS measures are also proposed onsite including green roofs, permeable paving, bioswales, raised planters and rain gardens. Information regarding these is included in Project Engineers *Infrastructures Design Report*[89].

10.5.2.2 Contamination of Surface Water

The proposed Project provides treatment of collected run-off by providing a SuDS treatment train approach resulting in a low risk of pollutants entering off-site drainage.

Due to a variety of measures such as the design of the attenuation system with hydrocarbon interception and the design of the wider drainage system (see *Infrastructures Design Report*) in line with SuDS the likelihood of any spills entering the water environment is *negligible.*

All incidental drainage from the car parks will be discharged separately via a Class 1 full retention oil separator (Klargester or similar approve) to the combined sewer.

10.5.2.3 Foul Water

Irish water records show that there is a 990mm combined brick sewer, to the south of the Site of the proposed Project, that drains from east to west along Sheriff Street Upper before turning north onto East Road and eventually discharges into the Irish Water pump station at the north-western corner of the Site. The Irish Water pump station then discharges into a surface water gravity main, via a syphon overflow, that then drains south down Castleforbes Road.

The original rising main from the East Road Pumping Station, which is now disused cuts through the north eastern part of the Site before turning south turning eastwards onto Sheriff Street Upper.

Irish Water records also show a 1000mm combined brick sewer at the south-eastern corner of the Site of the proposed Project that drains south down Castleforbes Road. Irish Water have confirmed by return of letter,

[89] DBFL Consulting Engineers (2020c).

subject to a valid connection agreement, that the proposed Project connection to the Irish Water wastewater network can be facilitated. Full details of the foul sewer design can be found in *Infrastructure Design Report*[90] submitted with this planning application.

10.5.2.4 Water Supply

The water main layout and details including valves, hydrants, metering etc. will be in accordance with Irish Water's *Code of Practice and Standard Details* for water infrastructure.

10.6 Residual Impacts

The proposed Project will have no significant impact on the natural surface water regime either qualitatively or quantitatively.

10.6.1 Construction Phase

Following the implementation of mitigation measures detailed in Section 10.5, the predicted impact on the surface water environment during Construction Phase (in accordance with *EPA Draft Guidelines*[91]) is considered to be likely, *neutral, imperceptible* and *short-term*. This is due to the control measures highlighted in Section 10.5.1.

10.6.2 Operational Phase

Following implementation of the mitigation measures proposed in Section 10.5, the predicted impact on the surface water environment once the proposed Project is constructed and operational (in accordance with *EPA Draft Guidelines*) is considered to be likely, *neutral, imperceptible* and *long-term*. This is due to the mitigation measures highlighted in Section 10.5.2. There will be no impact to the quality of local watercourse and the nearby SAC due to lack of hydraulic conductivity, distance to the SAC's and control measures cited. Overall, the attenuation proposed for the proposed Project and installation of interceptors will improve flood management and water quality.

10.7 Monitoring

10.7.1 Construction Phase

Regular inspection of surface water run-off and any sediment control measures *e.g.* silt traps will be carried out during the Construction Phase. Regular auditing of construction/mitigation measures will be undertaken *e.g.* concrete pouring, refuelling in designated areas etc.

[90] DBFL Consulting Engineers (2020c).
[91] EPA (2017).

10.7.2 Operational Phase

No future surface water monitoring is proposed as part of the proposed Project due to the low hazard potential at the development. Oil interceptor(s) will be maintained and cleaned out in accordance with the manufacturer's instructions. Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.

10.8 Reinstatement

Reinstatement of excavations during the Construction Phase of the proposed Project will meet the design criteria presented in the design specification of this application. All fill material used will be clean and graded to engineers' specifications.

10.9 Interactions

10.9.1 Land, Soils, Geology and Hydrogeology

As previously stated, there is an inter-relationship between hydrology and land, soils, geology and hydrogeology. There will be no potential cumulative impacts on the bedrock as the aquifer vulnerability is *'Low'* (no bedrock was encountered to >30m) and the aquifer is locally important with little importance regionally.

Surface water run-off may have the potential to enter soil and groundwater. Implementation of appropriate mitigation measures as outlined in Chapter 9 (Land, Soils, Geology and Hydrogeology) will eliminate the potential for the influx of surface contaminants into the underlying geology and hydrogeology.

10.10 Cumulative Impacts

The anticipated cumulative effects of the proposed Project and the other known surrounding developments listed in Chapter 21 (Cumulative Impacts) are summarised below. In relation to the potential cumulative impact on hydrology during the Construction Phases, the construction works which would have potential cumulative impacts include:

- Surface water run-off during the Construction Phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses. However, there are no notable surface water features on-site. Stockpiled material will be stored on hardstand away from surface water drains and gulleys will be protected during works to ensure there is no discharge of silt-laden water into the surrounding surface water drainage system.
- Contamination of local water sources from accidental spillage and leakage from construction traffic and construction materials unless project-specific CMPs are put in place for each development and

complied with. As stated, there are no notable surface water features onsite and no direct hydrological pathways to offsite surface waterbodies

Potential cumulative impacts included in the Operational Phase include:

- Increased hard standing areas will reduce local recharge to ground and increase surface water run-off potential if not limited to the green field run-off rate from the Site. As the proposed Project development is situated in an already commercial/industrial area of the Dublin Docklands and is mostly hardstand this development and the surrounding projects will lead to a *negligible* increase in hardstanding in the area.
- Increased risk of accidental releases from fuel storage/delivery unless mitigated adequately *i.e.* bunded tank.
- Increased risk of accidental discharge of hydrocarbons from car parking areas and along roads and unless diverted to surface water system with petrol interceptor.
- Any additional foul discharges should be treated where appropriate and/or diverted to the foul sewer system and not directly to ground.

Similar mitigation measures to those described in Section 10.5 will need to be implemented to protect water quality.

Increase in wastewater loading and water supply requirement is an impact of all development. Each development will require approval from the IW confirming available capacity in the water and wastewater infrastructure. The surface water and foul drainage infrastructure and water supply requirements for the proposed Project has been designed to accommodate the future indicative data storage development and the proposed substation development. Irish Water have confirmed by return of letter, that the proposed Project connection to the Irish Water wastewater and water network can be facilitated.

Development will not result in an increase in hard standing which will not result in localised reduced recharge to ground and increase in run-off rate. Each permitted development is required by the Local Authority and Irish Water to comply with the Greater Dublin Strategic Drainage Strategy (GDSDS) and Local Authority and Irish Water requirements by providing suitable attenuation on site to ensure greenfield run-off rates and ensure that there is no increase in off-site flooding as a result of development.

There is a potential for contamination of watercourses during the Construction and Operational Phases. Mitigation measures are required to manage sediment run-off and fuel leakages during construction and operation. All developments are required to ensure they do not have an impact on the receiving water

environment in accordance with the relevant legislation[92] such that they would be required to manage run-off and fuel leakages.

The residual cumulative impact on water and hydrology for the Construction and Operational Phases is anticipated to *be long-term, neutral* in terms of quality and of *imperceptible significance*, once appropriate mitigation measures to manage water quality run-off in compliance with legislative requirement are put in place for each development.

10.11 'Do-Nothing' Impact

A '*do-nothing'* scenario includes retention of the current Site without the proposed Project in place. The continued use of the Site for commercial/industrial activities is likely to have a *neutral* and *imperceptible* effects on the environment.

10.12 Difficulties Encountered in Compiling the Chapter

No difficulties were encountered in compiling this Chapter of the EIAR.

[92] Local Government (Water Pollution) Act, 1977and 1990 as amended.

11 Air Quality and Climate

11.1 Introduction

This Chapter of the EIAR was prepared by AWN Consulting Ltd. and assesses the likely air quality and climate impacts, if any, associated with the proposed Strategic Housing Development (SHD) (referred to as "*the proposed Project*"), located at Sheriff Street Upper and East Road, Dublin 1.

The proposed Project will consist of the demolition of all structures on the Site and the construction of a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a standalone three storey childcare facility and residential tenant amenity. The proposed Project will also accommodate car parking spaces, bicycle parking, storage, services and plant areas. More details on the background and Site history is provided in Chapter 5 (Description of the Proposed Project).

This Chapter has been prepared with regard to the following guidelines:

- Department of Housing, Planning & Local Government (2018). *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment;*
- European Commission (2017). *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report*; and
- EPA (2017). DRAFT *Guidelines on the Information to be Contained in Environmental Impact Statements*.

11.1.1 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, see Table 11.1 below and Appendix A11.1.

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, which incorporate EU Directive 2008/50/EC, which has set limit values for NO_2, PM_{10}, $PM_{2.5}$, benzene and CO, which are applicable in relation to this project, see Table 11.1. Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions, see Appendix A11.1.

Table 11.1: Air Quality Standards Regulations

Pollutant	Regulation [Note 1]	Limit Type	Value
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200µg/m^3 NO_2
		Annual limit for protection of human health	40µg/m^3 NO_2
		Critical limit for protection of vegetation	30µg/m^3 NO + NO_2
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50µg/m^3 PM_{10}
		Annual limit for protection of human health	40µg/m^3 PM_{10}
$PM_{2.5}$	2008/50/EC	Annual limit for protection of human health	25µg/m^3 $PM_{2.5}$
Benzene	2008/50/EC	Annual limit for protection of human health	5µg/m^3
Carbon Monoxide	2008/50/EC	8-hour limit (on a rolling basis) for protection of human health	10mg/m^3 (8.6 ppm)
Dust Deposition (Non – Hazardous Dust)	TA – Luft as interpreted by DOEHLG (2004)	Average daily dust deposition at the boundary of the site	350mg/(m^2*day)

Note 1 EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

11.1.2 Dust Deposition Guidelines

The concern from a health perspective is focussed on particles of dust which are less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$) and the EU ambient air quality standards outlined in Table 11.1, 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 specific criteria have been stipulated for nuisance dust in respect of this development.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust)[93] sets a maximum permissible emission level for dust deposition of 350mg/(m^2*day) averaged over a one-year

[93] German VDI (2002). *Technical Guidelines on Air Quality Control – TA Luft.*

period at any receptors outside the site boundary. Recommendations from the Department of the Environment, Heritage & Local Government (DEHLG)[94] apply the Bergerhoff limit of 350mg/(m^2*day) to the site boundary of quarries. This limit value can also be implemented with regard to dust impacts from construction of the proposed Project.

11.1.3 Climate Agreements

Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in principle in 1997 and formally in May 2002[95]. For the purposes of the EU burden sharing agreement under Article 4 of the Doha Amendment to the Kyoto Protocol, in December 2012, Ireland agreed to limit the net growth of the six Greenhouse Gases (GHGs) under the Kyoto Protocol to 20% below the 2005 level over the period 2013 to 2020[96]. The UNFCCC is continuing detailed negotiations in relation to GHG reductions and in relation to technical issues such as Emission Trading and burden sharing. The most recent Conference of the Parties to the Convention (COP25) took place in Madrid, Spain from the 2nd to the 13th of December 2019 and focussed on advancing the implementation of the Paris Agreement. The Paris Agreement was established at COP21 in Paris in 2015 and is an important milestone in terms of international climate change agreements. The Paris Agreement is currently ratified by 187 nations and has a stated aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatons as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to greenhouse gas emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made on elevating adaption onto the same level as action to cut and curb emissions.

The EU in 2014, agreed the "*Climate and Energy Policy Framework 2030*"[97]. The European Council endorsed a binding EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The target will be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the ETS and non-ETS sectors amounting to 43% and 30% by 2030 compared to 2005, respectively. Secondly, it was agreed that all Member States will participate in this effort, balancing considerations of fairness and solidarity. The policy also outlines, under "*Renewables and Energy Efficiency*", an EU binding target of at least 27% for the share of renewable energy consumed in the EU in 2030.

[94] DEHLG (2004).
[95] UNFCC (1997) and UNFCC (1999).
[96] UNFCC (2012).
[97] European Commission (2014).

The *Climate Action and Low Carbon Development Act 2015*[98] was developed to provide for the approval of plans by the government in relation to climate change and to enable achievement of the national transition objective of achieving decarbonisation by 2050. Under this Act the *National Mitigation Plan* and the *National Adaptation Framework*[99] were established. The National Mitigation Plan sets out objectives for achieving a reduction in GHG emissions and transitioning the four key sectors (power generation, built environment, transport and agriculture) to decarbonisation, while the National Adaptation Framework aims to reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts. With the implementation of the *Climate Action and Low Carbon Development Act 2*015, Ireland has implemented a number of strategies to reduce GHG emissions in future years, with a number of other strategies currently being proposed. As a result of this, moving forward, GHG emissions should be lowered in future years, reducing impacts on climate.

11.1.4 Gothenburg Protocol

In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. The initial objective of the Protocol was to control and reduce emissions of Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_X), Volatile Organic Compounds (VOCs) and Ammonia (NH_3). To achieve the initial targets Ireland was obliged, by 2010, to meet national emission ceilings of 42kt for SO_2 (67% below 2001 levels), 65kt for NO_X (52% reduction), 55kt for VOCs (37% reduction) and 116kt for NH_3 (6% reduction). In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for $PM_{2.5}$.

European Commission Directive 2001/81/EC, the National Emissions Ceiling Directive (NECD), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005[100]. Data available from the EU in 2010 indicated that Ireland complied with the emissions ceilings for SO_2, VOCs and NH_3 but failed to comply with the ceiling for NO_X[101].

Directive (EU) 2016/2284 "*On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC*" was published in December 2016. The Directive will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3, $PM_{2.5}$ and CH_4.

In relation to Ireland, 2020 emission targets are 25kt for SO_2 (65% on 2005 levels), 65kt for NO_X (49% reduction on 2005 levels), 43kt for VOCs (25% reduction on 2005 levels), 108kt for NH_3 (1% reduction on 2005 levels)

[98] Government of Ireland (2015). *Climate Action and Low Carbon Development Act.*
[99] DCCAE (2017) & (2018).
[100] DEHLG (2004) & (2007).
[101] EEA (2012).

and 10kt for $PM_{2.5}$ (18% reduction on 2005 levels). In relation to 2030, Ireland's emission targets are 85% below 2005 levels for SO_2, 69% reduction for NO_x, 32% reduction for VOCs, 5% reduction for NH_3 and 41% reduction for $PM_{2.5}$.

11.1.5 Climate Action Plan

The Dublin City Council *Climate Change Action Plan* published in 2019[102] outlines a number of goals and plans to prepare for and adapt to climate change. There are five key action areas within the plan: energy and buildings, transport, flood resilience, nature-based solutions and resource management. Some of the measures promoted within the Action Plan under the 5 key areas involve building retrofits, energy master-planning, development of segregated cycle routes, the promotion of bike share schemes, development of flood resilient designs, promotion of the use of green infrastructure and water conservation initiatives. The implementation of these measures will enable the Dublin City Council area to adapt to climate change and will assist in bringing Ireland closer to achieving its climate related targets in future years. New developments need to be cognisant of the Action Plan and incorporate climate friendly designs and measures where possible.

11.2 Methodology

11.2.1 Construction Phase

The Institute of Air Quality Management in the UK (IAQM) guidelines[103] outline an assessment method for predicting the impact of dust emissions from demolition, earthworks, construction and haulage 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 the proposed Project in order to predict the likely magnitude of the dust impacts in the absence of mitigation measures.

Construction Phase traffic also has the potential to impact air quality and climate. The U*K Highways Agency guidance LA 105*[104] states the following scoping criteria shall be used to determine whether the air quality impacts of a project can be scoped out or require an assessment based on the changes between the do something traffic (with the proposed Project) compared to the do minimum traffic (without the proposed Project). The Transport Infrastructure Ireland (TII) Guidance[105] was based on the previous version of the UK DMRB Guidance[106] and notes that the TII Guidance should be adapted for any updates to the DMRB (see Section 1.1 of G*uidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes*, 2011).

[102] Dublin City Council & Codema (2019).
[103] IAQM (2014).
[104] UK Highways Agency (2019).
[105] TII (2011).
[106] UK Highways Agency (2007).

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- A change in speed band; and
- A change in carriageway alignment by 5m or greater.

In addition, the impact of construction activities on vehicle movements shall be assessed where construction activities are programmed to last for more than two years[107]. When assessed against the traffic provided by DBFL, none of the impacted road links meet the above scoping criteria and therefore, a detailed assessment is not required as there is no potential for significant impacts.

11.2.2 Operational Phase

11.2.2.1 Air Quality Assessment

The requirement for an air quality assessment has been carried out following procedures described in the publications by the EPA[108] and using the methodology outlined in the guidance documents published by the UK Highways Agency (2019) and UK Department of Environment Food and Rural Affairs (DEFRA)[109]. TII reference the use of the UK Highways Agency and DEFRA guidance and methodology in their document *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011). This approach is considered best practice in the absence of Irish guidance.

In 2019 the UK Highways Agency DMRB air quality guidance was revised with *LA 105 Air Quality* replacing a number of key pieces of guidance (HA 207/07, IAN 170/12, IAN 174/13, IAN 175/13, part of IAN 185/15). This revised document outlines a number of changes for air quality assessments in relation to road schemes and residential/mixed-use developments. Previously the DMRB air quality spreadsheet was used for the majority of assessments in Ireland with detailed modelling only required if this screening tool indicated compliance issues with the EU air quality standards. Guidance from TII[110] recommends the use of the UK Highways Agency DMRB spreadsheet tool for assessing the air quality impacts from road schemes and residential/mixed-use developments. However, the DMRB spreadsheet tool was last revised in 2007 and accounts for modelled years up to 2025. Vehicle emission standards up to Euro V are included but since 2017, Euro 6d standards are applicable for the new fleet. In addition, the model does not account for electric or hybrid vehicle use. Therefore, this a somewhat outdated assessment tool. The *LA 105 guidance* document states that the DMRB spreadsheet tool may still be used for simple air quality assessments where there is unlikely to be a breach of the air quality standards. Due to its use of a "dirtier" fleet, vehicle emissions would be considered to be higher

[107] UK Highways Agency (2019).
[108] EPA (2015) & EPA (2017).
[109] UK DEFRA (2016) & (2018).
[110] TII (2011).

than more modern models and therefore any results will be conservative in nature and will provide a worst-case assessment.

The 2019 UK Highways Agency DMRB air quality guidance was revised with *LA 105 Air Quality* stating that modelling should be conducted for NO_2 for the base, opening and design years for both the do minimum (do nothing) and do something scenarios. Modelling of PM_{10} is only required for the base year to demonstrate that the air quality limit values in relation to PM_{10} are not breached. Where the air quality modelling indicates exceedances of the PM_{10} air quality limits in the base year then PM_{10} should be included in the air quality model in the do minimum and do something scenarios. Modelling of $PM_{2.5}$ is not required as there are currently no issues with compliance with regard to this pollutant. The modelling of PM_{10} can be used to show that the project does not impact on the $PM_{2.5}$ limit value as if compliance with the PM_{10} limit is achieved then compliance with the $PM_{2.5}$ limit will also be achieved. Historically modelling of carbon monoxide (CO) and benzene (Bz) was required however, this is no longer needed as concentrations of these pollutants have been monitored to be significantly below their air quality limit values in recent years, even in urban centres[111].

The *UK Highways Agency Guidance LA 105*[112] scoping criteria outlined for the Construction Phase assessment was also used to determine the road links required for inclusion in the modelling assessment for the Operational Phase. The proposed Project will not increase traffic volume (AADT or HGVs), speeds or change the road alignment by an amount greater than the scoping criteria. There was a maximum change in AADT of 855 on Sheriff Street Upper. Therefore, no road links impacted by the proposed Project satisfy the above mentioned criteria and a quantitative assessment of the impact of traffic emissions on ambient air quality is not necessary as there is no potential for significant impacts to local air quality.

11.2.2.2 Climate Assessment

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments *LA 114 Climate*[112]. The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed Project during the Operational Phase. If one or more road links meets the below criteria, then further assessment is required.

- a change of more than 10% in AADT;
- a change of more than 10% to the number of heavy duty vehicles; and
- a change in daily average speed of more than 20km/hr.

None of the road links impacted by the proposed Project meet the above criteria and therefore a detailed assessment is not required as there is no potential for significant impacts to climate.

[111] EPA (2020c). *Air Quality Monitoring Report 2019* (& previous annual reports).
[112] UK Highways Agency (2019).

11.3 Baseline Environment

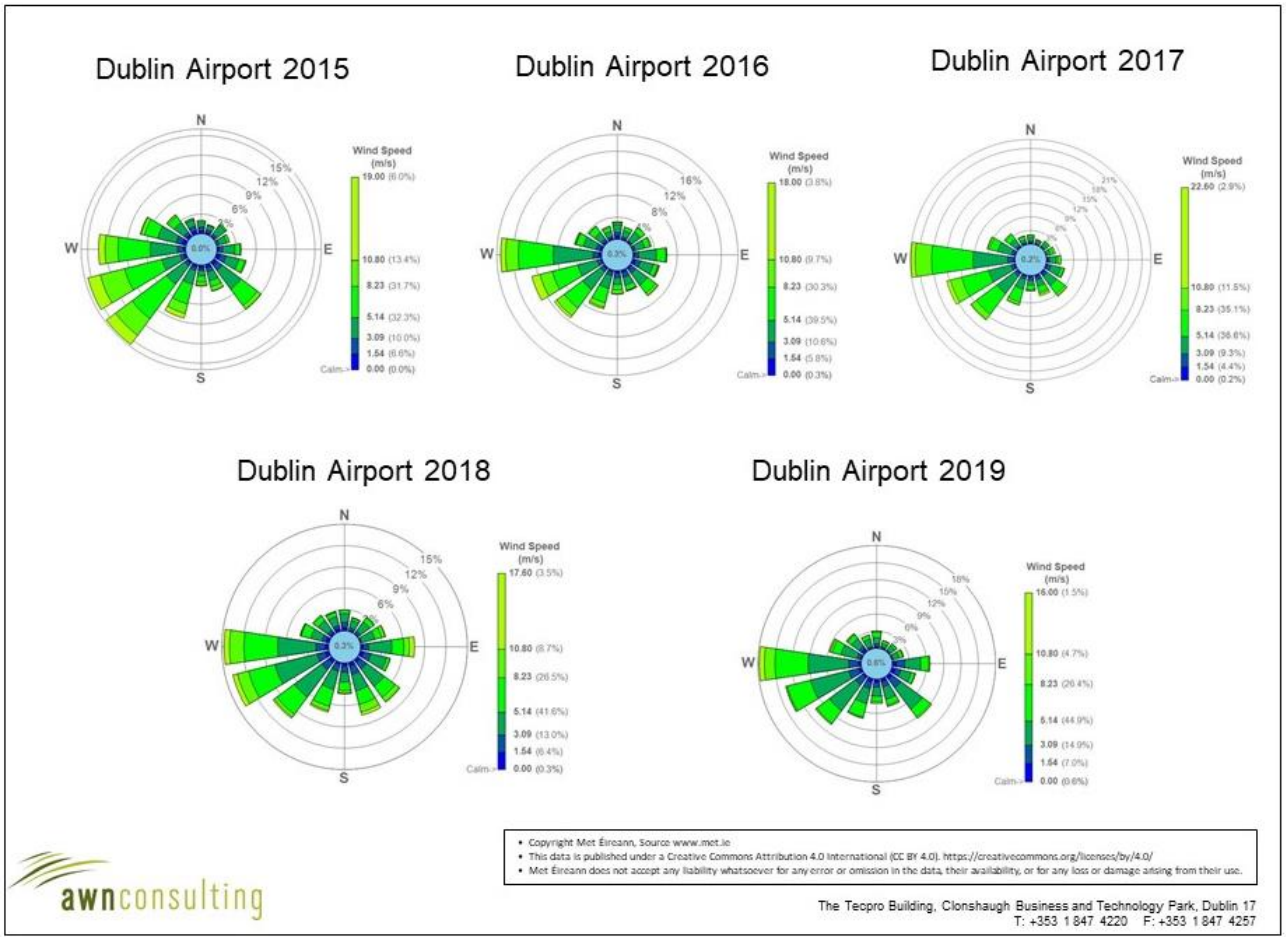
11.3.1 Meteorological Data

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)[113]. 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 most representative weather station collating detailed weather records is Dublin Airport, which is located c. 13km north of the Site of the proposed Project. Dublin Airport met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period, see Figure 11.1 below. For data collated during five representative years (2015-2019), the predominant wind direction is south-westerly. The average wind speed over the period 1981-2010 is approximately 5.3m/s[114].

[113] World Health Organisation (2006).
[114] Met Éireann (2020).

Figure 11.1: Dublin Airport Windrose 2015 - 2019



11.3.2 Baseline Air Quality - Review of Available Background Data

The Site of the proposed Project is located within EPA air quality monitoring Zone A, which includes Dublin City and its environs. Data from the most recent air quality monitoring report published by the EPA '*Air Quality in Ireland 2019*[115]' and historical data from previous years of monitoring has been reviewed in order to determine the current air quality in the region of the proposed Project. The key pollutants which are reviewed are: nitrogen dioxide (NO_2), particulate matter less than 10 microns (PM_{10}) and particulate matter less than 2.5 microns ($PM_{2.5}$), carbon monoxide (CO) and benzene.

Long-term NO_2 monitoring was carried out at the Zone A urban sites of Winetavern Street, Rathmines, Dún Laoighaire, Ringsend and Ballyfermot for the period 2015 - 2019[115]. The NO_2 annual average for this five-year period suggests an upper limit of no more than 30µg/m^3 (see Table 11.2 below) for the urban traffic locations and 19µg/m^3 (see Table 11.2) for the background locations. Long-term average concentrations are significantly below the annual average limit of 40µg/m^3.

[115] EPA (2020c).

Based on the above information and keeping regard for the distance from the City centre in comparison to the Winetavern site, a conservative estimate of the current background NO_2 concentration for the region of the proposed Project is 20µg/m^3.

Table 11.2: Trends In Zone 'A' Air Quality - Nitrogen Dioxide (NO_2)

Year	Rathmines	Ringsend	Winetavern Street	Ballyfermot
2014	17	-	31	16
2015	18	-	31	16
2016	20	-	37	17
2017	17	22	27	17
2018	20	27	29	17
Average	**18**	**24**	**31**	**17**

Note 1 Annual average limit value - 40µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Continuous PM_{10} monitoring was carried out at a number of Zone A locations from 2015 - 2019, including Rathmines, Ringsend, Winetavern Street and Phoenix Park. These showed an upper average limit of no more than 20µg/m^3, see Table 11.3. Levels range from 9-20µg/m^3 over the five-year period with at most 5 exceedances (in Rathmines) of the 24-hour limit value of 50µg/m^3 in 2019 (35 exceedances are permitted per year)[116]. Based on the EPA data, a conservative estimate of the current background PM_{10} concentration in the region of the proposed Project is 17µg/m^3.

Table 11.3: Trends In Zone 'A' Air Quality - PM_{10}

Year	Rathmines	Ringsend	Winetavern Street	Phoenix Park
2014	14	-	14	12
2015	15	-	14	12
2016	15	-	14	11
2017	13	13	13	9
2018	15	20	14	11
Average	**14**	**17**	**14**	**11**

Note1 Annual average limit value - 40µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Average $PM_{2.5}$ levels in Rathmines over the period 2015 - 2019 ranged from 8-11µg/m^3, with a $PM_{2.5}/PM_{10}$ ratio ranging from 0.60 - 0.6[116]. Based on this information, a conservative ratio of 0.7 was used to generate an existing $PM_{2.5}$ concentration in the region of the proposed Project of 11.9µg/m^3.

[116] EPA (2020c).

In terms of **benzene**, the annual mean concentration in the Zone A monitoring location of Rathmines for 2019 was 0.26µg/m^3. This is well below the limit value of 5µg/m^3. Between 2015 - 2019 annual mean concentrations at the Zone A site ranged from 0.326-1.01µg/m^3. Based on this EPA data a conservative estimate of the current background benzene concentration in the region of the proposed Project is 1.0µg/m^3.

Locations of Winetavern Street and Coleraine Street over the 2015 - 2019 were monitored for **CO**. The only monitoring station in operation in 2019 was Winetavern Street. Annual average concentrations are low, peaking at 3% of the limit value of 10mg/m^3 [117]. Based on this EPA data, a conservative estimate of the current background CO concentration in the region of the proposed Project is 0.3mg/m^3.

11.3.3 Climate Baseline

Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details emissions up to 2018[117]. Agriculture was the largest contributor in 2018 at 33.9% of the total, with the transport sector accounting for 20.1% of emissions of CO_2 [117]. 2018 is the sixth year where compliance with the European Union's Effort Sharing Decision "*EU 2020 Strategy*" (Decision 406/2009/EC) was assessed. Ireland had total GHG emissions of 60.93Mt CO_2eq in 2018. This is 5.59Mt CO_2eq higher than Ireland's annual target for emissions in 2018[117]. Emissions are predicted to continue to exceed the targets in future years, therefore, reduction measures are required in all sectors.

The EPA 2019 *GHG Emissions Projections Report for 2018 – 2040* notes that there is a long-term projected decrease in GHG emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018. Implementation of these are classed as a "With Additional Measures scenario" for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2013-2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 10Mt CO_2eq under the "With Existing Measures" scenario and 9Mt CO_2eq under the "With Additional Measures" scenario[118].

Greenhouse gas emissions from the transport sector increased by 1.6% or 0.20Mt CO_2eq in 2018. This is the fifth year out of the last six with increased emissions in transport. Private Diesel cars increased by 7.7% in 2018 while the number of passenger petrol cars decreased by 4.5%. Road transportation accounted for 12,225kt CO_2eq which is 20.1% of the total 2018 emissions and an increase of 1.6% on 2017.

[117] EPA (2020c).
[118] EPA (2019).

11.3.4 Sensitivity of the Receiving Environment

In line with the IAQM Guidance document[119] prior to assessing the impact of dust from a proposed development the sensitivity of the area must first 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.

In terms of receptor sensitivity to dust soiling, there is an apartment complex (high sensitivity receptors) located within 20m of the Site of the proposed Project with a number of other new apartment complexes being constructed within the vicinity. Based on the IAQM criteria outlined in Table 11.4, the worst case sensitivity of the area to dust soiling is considered to be **high**.

Table 11.4: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from source (m)			
		<20	<50	<100	<350
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

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 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 Project is estimated to be 17µg/m^3 and there is an apartment complex (high sensitivity receptors) located within 20m of the proposed works, with further complexes currently under construction however it is predicted that there will continue to be less than 100 units within 20m of the construction site. Based on the IAQM criteria outlined in Table 11.5, the worst case sensitivity of the area to human health is considered to be **low.**

[119] IAQM (2014).

Table 11.5: 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	<200
High	< 24µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	< 24µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	< 24µg/m^3	>1	Low	Low	Low	Low

11.4 Potential Impact of the Proposed Project

11.4.1 Construction Phase

11.4.1.1 Air Quality

The greatest potential impact on air quality during the Construction Phase of the proposed Project is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 350m of a construction site, the majority of the deposition occurs within the first 50m. 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.

It is important to note that the potential impacts associated with the Construction Phase of the proposed Project are *short-term* in nature. When the dust minimisation measures detailed in Appendix A11.2 of this section are implemented, fugitive emissions of dust from the Site will not be significant and will pose no nuisance at nearby receptors.

In order 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 previously established sensitivity of the area (see Section 11.3.4). The major dust generating activities are divided into four types within the IAQM Guidance to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (movement of heavy vehicles).

Demolition

Dust emission magnitude from demolition can be classified as small, medium or large and are described below.

- **Large:** Total building volume >50,000m^3, potentially dusty construction material (*e.g.* concrete), on-site crushing and screening, demolition activities >20m above ground level;
- **Medium:** Total building volume 20,000m^3-50,000m^3, potentially dusty construction material, demolition activities 10-20m above ground level; and
- **Small:** Total building volume 20,000m^3, construction material with low potential for dust release, demolition activities <10m above ground, demolition occurring during wetter months.

The dust emission magnitude for the proposed demolition activities can be classified as large due to volume of buildings to be demolished however the materials involved generally have a low dust emitting potential. The sensitivity of the area, as determined in Section 11.3.4, is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 11.6, this results in an overall high risk of *temporary* dust soiling impacts and low risk for *temporary* human health impacts as a result of the proposed earthworks activities.

Table 11.6: Risk of Dust Impacts - Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Earthworks

Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM Guidance as transcribed below:

- **Large:** Total site area > 10,000m^2, potentially dusty soil type (*e.g.* clay which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds > 8m in height, total material moved >100,000 tonnes;
- **Medium:** Total site area 2,500 m^2 - 10,000m^2, moderately dusty soil type (*e.g.* silt), 5 -10 heavy earth moving vehicles active at any one time, formation of bunds 4-8m in height, total material moved 20,000 - 100,000 tonnes;

- **Small:** Total site area < 2,500m^2, soil type with large grain size (*e.g.* sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4m in height, total material moved < 20,000 tonnes, earthworks during wetter months.

The dust emission magnitude for the proposed earthwork activities can be classified as large as the total Site area will be above 10,000m^2. The sensitivity of the area, as determined in Section 11.3.4, is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 11.7, this results in an overall high risk of *temporary* dust soiling impacts and low risk for temporary human health impacts as a result of the proposed Project earthworks activities.

Table 11.7: Risk of Dust Impacts - Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Construction

Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM Guidance as transcribed below:

- **Large:** Total building volume > 100,000m^3, on-site concrete batching, sandblasting;
- **Medium:** Total building volume 25,000m^3-100,000m^3, potentially dusty construction material (*e.g.* concrete), on-site concrete batching; and
- **Small:** Total building volume < 25,000m^3, construction material with low potential for dust release (*e.g*. metal cladding or timber).

The dust emission magnitude for the proposed Project construction activities can be classified as large as a worst-case as the total volume of the new buildings will be greater than 100,000m^3, but there is unlikely to be any on-site concrete batching or sandblasting.

The sensitivity of the area is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 11.8, this results in an overall high risk of *temporary* dust soiling impacts and an overall low risk to human health impacts as a result of the proposed Project construction activities.

Table 11.8: Risk of Dust Impacts - Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Trackout

Factors which determine the dust emission magnitude are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM Guidance as transcribed below:

- **Large:** > 50 HGV (> 3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100m;
- **Medium:** 10 - 50 HGV (> 3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100m; and
- **Small**: < 10 HGV (> 3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50m.

The dust emission magnitude for the proposed Project trackout can be classified as medium as worst-case as there are predicted to be less than 50 outward HGV movements per day.

The sensitivity of the area is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 11.9, this results in an overall medium risk of *temporary* dust soiling impacts and a low risk of *temporary* human health impacts as a result of the proposed Project trackout activities.

Table 11.9: Risk of Dust Impacts - Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Summary of Dust Emission Risk

The risk of dust impacts as a result of the proposed Project are summarised in Table 11.10 for each activity. The magnitude of risk determined is used to prescribe the level of site specific mitigation required for each activity in order to prevent significant impacts occurring.

Overall, in order to ensure that no dust nuisance occurs during the construction and trackout activities, a range of dust mitigation measures associated with a high risk of dust impacts must be implemented. When the dust mitigation measures detailed in Appendix A11.2 are implemented, fugitive emissions of dust from the Site will be *insignificant* and pose no nuisance at nearby receptors.

Table 11.10: Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Magnitude			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High Risk	High Risk	High Risk	Medium Risk
Human Health	Low Risk	Low Risk	Low Risk	Low Risk

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 Phase traffic has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the proposed Project satisfy the DMRB assessment criteria in Section 11.2 and referenced below.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- A change in speed band; and
- A change in carriageway alignment by 5m or greater.

It can therefore be determined that the Construction Phase traffic will have a *neutral, imperceptible and short-term* impact on air quality due to the minor increase in site related traffic as a result of the proposed Project.

11.4.1.2 Climate

There is the potential for a number of greenhouse gas emissions to atmosphere during the Construction Phase of the proposed Project. Construction vehicles, generators *etc.,* may give rise to CO_2 and N_2O emissions.

11.4.1.3 Human Health

Construction Phase related dust emissions have the potential to impact human health. As determined above, the likely risk of human health impacts as a result of all relevant construction activities is considered *low.*

11.4.2 Operational Phase

11.4.2.1 Air Quality

There is the potential for a number of emissions to the atmosphere during the Operational Phase of the proposed Project. In particular, the traffic-related air emissions may generate quantities of air pollutants such as NO_2, CO, benzene, $PM_{2.5}$ and PM_{10}.

11.4.2.2 Climate

There is the potential for a number of greenhouse gas emissions to atmosphere during the Operational Phase of the proposed Project. Road traffic and space heating of buildings may give rise to CO_2 and N_2O emissions.

11.4.2.3 Human Health

Traffic related air emissions have the potential to impact human health if they do not comply with the ambient Air Quality Standards detailed in Table 11.1.

11.5 Mitigation Measures

11.5.1 Construction Phase

11.5.1.1 Air Quality

The greatest potential impact on air quality during the Construction Phase of the proposed Project is from Construction Phase dust emissions and the potential for nuisance dust.

The dust minimisation measures specified in Appendix A11.2 of this Chapter will be implemented during the Construction Phase of the proposed Project and thus fugitive emissions of dust from the Site will be *insignificant* and pose no nuisance at nearby receptors.

11.5.1.2 Climate

CO_2 and N_2O emissions during the Construction Phase will have an *imperceptible* impact on climate therefore no mitigation measures are required.

11.5.2 Operational Phase

The impact of the proposed Project on air quality and climate will be *imperceptible*. Thus, no site-specific mitigation measures are required.

11.6 Residual Impacts

11.6.1 Construction Phase

11.6.1.1 Air Quality

Once the dust minimisation measures specified in Appendix A11.2 of this Chapter are implemented, fugitive emissions of dust from the Site will be *short-term* and *insignificant* and pose no nuisance at nearby receptors. Construction Phase vehicles, generators etc., will also give rise to some exhaust emissions. However, due to the size and nature of the construction activities, exhaust emissions during the Construction Phase will have an *imperceptible* impact on local air quality.

11.6.1.2 Climate

There is the potential for a number of greenhouse gas emissions to atmosphere during the Construction Phase of the proposed Project. Construction Phase vehicles, generators etc., may give rise to CO_2 and N_2O emissions. The Institute of Air Quality Management document *Guidance on the Assessment of Dust from Demolition and Construction*[120] states that site traffic and plant is unlikely to make a significant impact on climate. Therefore, the impact on climate is assessed to be *neutral, imperceptible* and *short term*.

The *European Energy Performance of Buildings Directive Recast* (EPBD) requires all new buildings to be Nearly Zero - Energy Buildings (NZEB) by 31st March 2020. Technical Guidance Document Part L 2019 - Conservation of Fuel and Energy - Dwellings (public consultation edition)' (referred to in this document as "Part L or NZEB") stipulates requirements on, minimum fabric and air permeability requirements, maximum primary energy use and carbon dioxide (CO_2) emissions as calculated using the DEAP (Domestic Energy Assessment Procedure) methodology. This is a national standard and compliance is compulsory for all new dwellings. The strategies adopted for the Castleforbes SHD are outlined below and detailed in the Sustainability Report associated with the application:

- U-values for floor and roof will exceed the building regulation backstops.
- Using Glazing U-Value target.
- Better performance air permeability than the backstop, adding to building air tightness.
- High performance thermal bridging.
- Mechanical Extract Ventilation with Heat Recovery via heat pump.
- Exhaust Air Source Heat Pump to provide Space Heating (via radiators) and Domestic Hot Water.

11.6.1.3 Human Health

Best practice mitigation measures are proposed for the Construction Phase of the proposed Project 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 the Construction Phase of the proposed Project will ensure that the impact of the proposed Project 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 Project is likely to be *short-term* and *imperceptible* with respect to human health.

11.6.2 Operational Phase

There is the potential for a number of emissions to the atmosphere during the Operational Phase of the proposed Project. In particular, the traffic-related air emissions may generate quantities of air pollutants such as NO_2, PM_{10} and $PM_{2.5}$. However, impacts from these emissions have been screened out using the UK DMRB

[120] IAQM (2014).

guidance[121], on which the TII Guidance[122] was based. None of the road links impacted by the proposed Project satisfy the screening criteria (see Section 11.2) and an assessment of the impact of traffic emissions on ambient air quality is not necessary as there is no potential for significant impacts. The proposed Project will increase traffic flows on the existing road network by at most 782 no. AADT on the Sheriff Street Upper. Where such information was available cumulative traffic data associated with other existing and permitted developments in the vicinity of the proposed Project were also included in the calculations. It can therefore be determined that the impact to air quality from traffic emissions during the Operational Phase is neutral, local, *long-term* and *imperceptible.*

11.6.2.1 Climate

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. Adequate attenuation and drainage have been provided for to account for increased rainfall in future years as part of the design of this development. Therefore, the impact will be *long-term, neutral* and *imperceptible.*

There is also the potential for increased traffic volumes to impact climate. The change in AADT values is not of the magnitude to require a detailed climate assessment as per the DMRB screening criteria[121]. It can therefore be determined that traffic related CO_2 and N_2O emissions during the Operational Phase are *long-term, neutral* and *imperceptible.*

11.6.2.2 Human Health

Traffic related air emissions have the potential to impact human health if they do not comply with the ambient Air Quality Standards detailed in Table 11.1. However, as the traffic generated by the proposed Project does not satisfy the assessment criteria to require an air modelling assessment and therefore there is no potential for significant impacts. It can be determined that the impact to human health during the Operational Phase is *neutral, local, long-term* but overall *imperceptible.*

11.7 Monitoring

In order to ensure that any dust nuisance is minimised, a series of mitigation measures have been listed in Appendix A11.2. The Construction Phase Contractor will adhere to good working practices and implement dust mitigation measures, the levels of dust generated are assessed to be minimal and are unlikely to cause an environmental nuisance. Monitoring of construction dust deposition at nearby sensitive receptors (residential dwellings) during the Construction Phase of the proposed Project is recommended to ensure mitigation measures are working satisfactorily.

[121] UK Highways Agency (2019).
[122] TII (2011).

Operational Phase impacts are predicted to be *imperceptible* therefore monitoring is not required.

11.8 Reinstatement

There are no reinstatement requirements with respect to air quality and climate.

11.9 Interactions

Air Quality does not have a significant number of interactions with other parameters. The most important interaction is between **air quality** and **human health**. Interactions between **air quality** and **traffic** also have the potential to be significant.

Construction Phase dust emissions have the potential to impact **human health**, however, it was determined that the risk to human health is low for all relevant construction activities. Best practice dust mitigation measures will be implemented on-site and as such impacts to human health are predicted to be *imperceptible* and *short-term.*

Traffic related emissions have the potential to impact air quality, however, none of the road links impacted by the proposed Project satisfied the assessment criteria and it was therefore determined that the impact to air quality is *imperceptible* for the *long* and *short-term.*

11.10 Cumulative Impacts

According to the IAQM Guidance[123], should the Construction Phase of the proposed Project coincide with the construction of any other permitted developments within 350m of the Site then there is the potential for cumulative dust impacts to nearby sensitive receptors. Implementation of the mitigation measures detailed in Appendix A11.2 throughout the Construction Phase of the proposed Project will avoid any significant off-site cumulative dust impacts. Therefore, the potential for *short-term* cumulative impacts is considered low and cumulative dust related impacts are predicted to be *short-term* and *not significant.*

The cumulative impact associated with the Operational Phase of the proposed Project would be as a result of increased traffic volumes on the nearby road network. The proposed Project will increase traffic flows on the existing road network by at most 782 no. AADT on the Sheriff Street Upper and as such the potential impact is considered *imperceptible.* The impact to air quality as a result of increased traffic flows as a result of the proposed Project was found to be *negligible* and therefore, the overall cumulative impact is considered *imperceptible, long-term and not significant*. The cumulative impact of increased traffic volumes associated with the proposed Project in conjunction with other permitted developments in the vicinity of the Site was

[123] IAQM (2014).

considered in the traffic impact assessment by DBFL for future opening and design years and the increase was considered *imperceptible* with regards to air quality.

11.11 'Do-Nothing' Impact

A *'do-nothing'* scenario includes retention of the current Site without the proposed Project in place. Therefore, ambient air quality at the Site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc.).

11.12 Difficulties Encountered in Compiling the Chapter

No difficulties were encountered in compiling this Chapter of the EIAR.

12 Noise and Vibration

12.1 Introduction

This Chapter of the EIAR was prepared by AWN Consulting Ltd. to assess the noise and vibration impact of the proposed Strategic Housing Development (SHD) (referred to as "*the proposed Project*"), located at Sheriff Street Upper and East Road, Dublin 1.

This Chapter includes a description of the receiving ambient noise climate in the vicinity of the Site of the proposed Project and an assessment of the potential noise and vibration impacts associated with the proposed Project during both the short-term Construction Phase and the long-term Operational Phase on its surrounding environment. The assessment of direct, indirect and cumulative noise and vibration impacts on the surrounding environment have been considered as part of the assessment.

Mitigation measures are included, where relevant, to ensure the proposed Project is constructed and operated in an environmentally sustainable manner in order to ensure minimal impact on the receiving environment.

The proposed Project will consist of the demolition of all structures on the Site and the construction of a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a standalone three storey childcare facility and residential tenant amenity. The proposed Project will also accommodate car parking spaces, bicycle parking, storage, services and plant areas. More details on the background and Site history is provided in Chapter 5 (Description of the Proposed Project).

The assessment has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out within the relevant sections of this Chapter and included in the references section. In addition to specific noise guidance documents, the following guidelines were considered and consulted for the purposes of this Chapter:

- EPA (2017). *Draft Guidelines on the Information to be Contained in EIARs*; and
- EPA (2015). *Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* (2015);

12.2 Methodology

This assessment has been undertaken using the following methodology:

- Detailed baseline noise monitoring has been undertaken in the vicinity of the nearest noise sensitive locations to determine the range of noise levels in the existing environment.

- 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 Project, this is summarised in the following sections.
- Where necessary, a schedule of mitigation measures has been proposed to control the noise and vibration emissions associated with both the Construction and Operational Phases of the proposed Project.

12.2.1 Construction Phase - Noise Criteria

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the Construction Phase of a project. Local Authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard BS 5228-1:2009+A1:2014 *Code of Practice For Noise And Vibration Control On Construction And Open Sites – Noise*.

BS5228-1:2009+A1 gives several examples of acceptable limits for construction or demolition noise, the most simplistic being based upon the exceedance of fixed noise limits. For example paragraph E.2 states:

> *"Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut."*

Paragraph E.2 goes on to state:

> *"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".*

Note that a typical planning condition in relation to construction noise issued by Dublin City Council (DCC) refer also to compliance with BS 5228 Part 1 as a means of controlling impacts to the surrounding environment.

BS 5228, has therefore been used to inform the assessment approach for construction noise in line with DCC practice.

For residential properties it is considered appropriate to adopt the 75dB(A) during the day.

12.2.2 Construction Phase - Vibration Criteria

Vibration standards address two aspects: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. For the purpose of this scheme, the range of relevant criteria used for

surface construction works for both building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

12.2.2.1 Building Damage

Guidance relevant to acceptable vibration in order to avoid damage to buildings is contained within BS 7385-2 (1993). The guidance values contained within BS 7385 are reproduced also in British Standard BS 5228-2 (2009).

These standards differentiate between transient and continuous vibration. Surface construction activities are considered to be transient in nature as they occur for a limited period of time at a given location. The standards note that the risk of cosmetic damage to residential buildings starts at a Peak Particle Velocity (PPV) of 15mm/s at 4Hz. The standard also notes that below 12.5mm/s PPV the risk of damage tends to zero. Both standards note that important buildings that are difficult to repair might require special consideration on a case by case basis but building of historical importance should not (unless it is structurally unsound) be assumed to be more sensitive. If a building is in a very unstable state, then it will tend to be more vulnerable to the possibility of damage arising from vibration or any other ground borne disturbance.

Table 12.1 summarises the proposed vibration criteria below which there is no risk of damage to buildings. These limits apply to vibration frequencies below 15Hz where the most conservative limits are required. If there are any protected buildings near the works there is a greater potential for these to be more vulnerable than other adjacent modern structures. Therefore, on a precautionary basis, the guidance values for structurally sound buildings are reduced by 50% in line with the guidance documents referred to above.

Table 12.1: Transient Vibration Impact Criteria for Buildings (Conservative Criteria below which there is No Risk of Cosmetic Damage)

Category of Building	Heading Threshold of potential significant effect (Peak Particle Velocity - PPV - at building foundation) for Transient Vibration
Structurally sound and non-protected buildings	12mm/s

12.2.2.2 Human Perception

It is acknowledged that humans are sensitive to vibration stimuli and that perception of vibration at high magnitudes may lead to concern. Vibration typically becomes perceptible at around 0.15 to 0.3mm/s and may become disturbing or annoying at higher magnitudes. However, 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. For example, piling can typically be tolerated at vibration levels up to 6mm/s

respectively if adequate public relations are in place. These values refer to the day and evening time periods only.

During certain construction works (piling, demolition etc.) the vibration limits set within Table 12.1 will be perceptible to building occupants and have the potential to cause subjective impacts. The level of impact is, however, greatly reduced when the origin and time frame of the works are known and limit values relating to structural integrity are adequately communicated. In this regard, the use of clear communication and information circulars relating to planned works and their duration can significantly reduce vibration impacts to the neighbouring properties.

Expected vibration levels from the construction works will be discussed further in Section 12.5.2.

12.2.3 Operational Phase - Noise Criteria

12.2.3.1 Mechanical Plant

In relation to day to day Operational Phase noise impacts on offsite residential locations, DCC would typically apply the following condition to a development of this nature:

> *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.*
>
> *Reason: In order to ensure a satisfactory standard of development, in the interests of residential amenity.*

This wording is most relevant to the noise emissions from mechanical plant serving the proposed Project and careful consideration will be given to this issue as part of the detailed assessment.

Guidance from DCC on noise emissions from mechanical plant items typically makes reference to the British Standard BS 4142: 2014*: Methods for Rating and Assessing Industrial and Commercial Sound.* This document is the industry standard method for analysing building services plant noise emissions to residential receptors and is the document typically used by DCC in their standard planning conditions and also in complaint investigations.

BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

For an appropriate BS 4142 assessment it is necessary to compare the measured external background noise level *(i.e.* the $L_{A90,T}$ level measured in the absence of plant items) to the rating level ($L_{Ar,T}$) of the various plant items, when operational. Where noise emissions are found to be tonal, impulsive in nature or irregular enough to attract attention, BS 4142 also advises that a penalty be applied to the specific level to arrive at the rating level.

The subjective method for applying a penalty for tonal noise characteristics outlined in BS 4142 recommends the application of a 2dB penalty for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible.

The following definitions as discussed in BS 4142 as summarised in Table 12.2.

Table 12.2: BS 4142 Tonal Noise Characteristics

Noise	Description
ambient noise level, $L_{Aeq,T}$	is the noise level produced by all sources including the sources of concern, i.e. the residual noise level plus the specific noise of mechanical plant, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T].
residual noise level, $L_{Aeq,T}$	is the noise level produced by all sources excluding the sources of concern, i.e. the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T].
specific noise level, $L_{Aeq,T}$	is the sound level associated with the sources of concern, i.e. noise emissions solely from the mechanical plant, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T].
rating level, $L_{Ar,T}$	is the specific sound level plus any adjustments for the characteristic features of the sound (e.g. tonal, impulsive or irregular components).
background noise level, $L_{A90,T}$	is the sound pressure level of the residual noise that is exceeded for 90% of the time period T.

If the rated plant noise level is +10dB or more above the pre-existing background noise level then this indicates that complaints are likely to occur and that there will be a significant adverse impact. A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

The existing prevailing background noise level measured during the noise survey is on average 48 dB L_{A90} during the most sensitive night-time period. Making the assumption that certain items of mechanical plant serving

the proposed Project will operate 24/7 the mechanical plant noise emissions must be designed to achieve the BS4142 requirements during the night-time period. During the daytime the prevailing background noise levels were of the order of 58 dB L_{A90}.

Making the assumption that certain items of mechanical plant serving the proposed Project will operate 24/7 the mechanical plant noise emissions must be designed to achieve the BS4142 requirements during the night-time period.

Therefore, in order to limit the noise impact of mechanical plant serving the proposed Project, during the detailed design of the proposed Project the specific plant noise levels will be designed to be equal or lower to the prevailing background noise level at the nearest off-site noise sensitive locations.

Due to the fact that there is the potential for short periods of noise to cause a greater disturbance at night-time, a shorter assessment time period (T) is adopted. Appropriate periods are 1hr for daytime (07:00 to 23:00 hours) and 15 minutes for night-time (23:00 to 07:00 hours).

Noise criteria have been derived from measured background noise levels for various noise sensitive receivers surrounding and within the proposed Project itself. This is discussed and presented in Section 12.5.3.1.

12.2.3.2 Traffic Noise

Given that traffic to and from the proposed Project will make use of existing roads already carrying traffic volumes, it is appropriate to consider the increase in traffic noise level that arises as a result of vehicular movements associated with the proposed Project.

In order to assist with the interpretation of the noise associated with vehicular traffic on public roads, Table 12.3 offers guidance as to the likely impact associated with any particular change in traffic noise level[124]. It shows that small changes in noise levels are not normally noticeable, whereas an increase of 10dB would be described as a doubling of loudness. In summary the assessment looks at the impact with and without development at the nearest noise sensitive locations.

[124] UK Highways Agency (2019).

Table 12.3: Significance in Change in Noise Level

Change in Sound Level (dB L_{A10})	Subjective Reaction	DMRB magnitude of Impact	EPA Classification Magnitude of Impact
0	Inaudible	No Change	Neutral
0.1 – 2.9	Barely Perceptible	Negligible	Imperceptible
3 – 4.9	Perceptible	Minor	Slight
5 – 9.9	Up to a doubling of loudness	Moderate	Moderate

12.2.3.3 Inward Noise Impact

The *Professional Guidance on Planning & Noise*[125] (ProPG) document was published in May 2017. The document was prepared by a working group comprising members of the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH). Although not a government document, since its adoption it has been generally considered as a best practice guidance and has been widely adopted in the absence of equivalent Irish guidance.

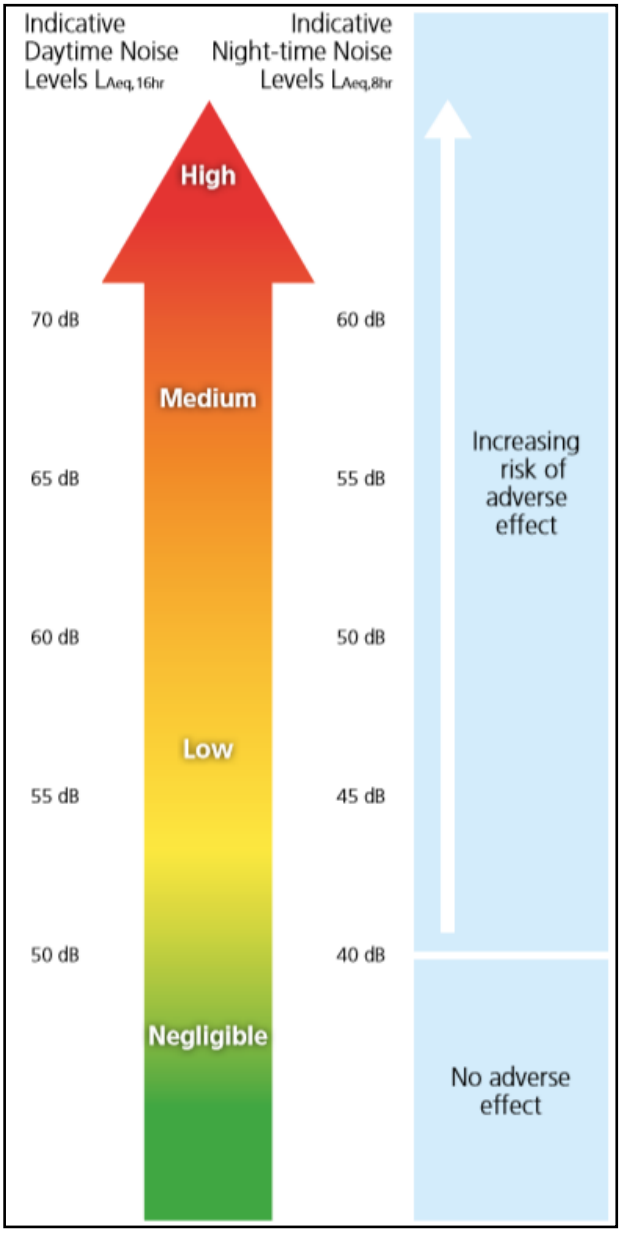
The ProPG outlines a systematic risk based two Stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows:

1. **Stage 1 -** Comprises a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels.
2. **Stage 2 -** Involves a full detailed appraisal of the proposed Project covering four "key elements" that include:
    - **Element 1 -** Good Acoustic Design Process.
    - **Element 2 -** Noise Level Guidelines.
    - **Element 3 -** External Amenity Area Noise Assessment.
    - **Element 4 -** Other Relevant Issues.

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the Site as a *negligible, low, medium or high risk* based on the pre-existing noise environment. Figure 12.1 presents the basis of the initial noise risk assessment, it provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on-site.

[125] Institute of Acoustics (IOA) (2017).

Figure 12.1: ProPG Stage 1 - Initial Noise Risk Assessment



It should be noted that a site should not be considered a negligible risk if more than 10L_{AFmax} events exceed 60dB during the night period and the Site should be considered a high risk if the L_{AFmax} events exceed 80dB more than 20 times a night.

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233 (2014). The recommended indoor ambient noise levels are set out in Table 12.4 and are based on annual average data, that is to say they omit occasional events where higher intermittent noisy events may occur.

Table 12.4: ProPG Internal Noise Levels

Activity	Location	Day (07:00 to 23:00hrs) dB $L_{Aeq,16hr}$	Night (23:00 to 07:00hrs) dB $L_{Aeq,8hr}$
Resting	Living room	35dB $L_{Aeq,16hr}$	-
Dining	Dining room/area	40dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hr}$	30dB $L_{Aeq,8hr}$ 45dB $L_{Amax,T}$*

*Note The document comments that the internal $L_{AFmax,T}$ noise level may be exceeded no more than 10 times per night without a significant impact occurring.

In addition to these absolute internal noise levels ProPG provides guidance on flexibility of these internal noise level targets. For instance, in cases where the development is considered necessary or desirable, and noise levels exceed the external noise guidelines, then a relaxation of the internal L_{Aeq} values by up to 5dB can still provide reasonable internal conditions.

ProPG provides the following advice with regards to external noise levels for amenity areas in the development:

> *"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."*

12.2.4 Operational Phase - Vibration

Taking into account the expected activities associated with the Operational Phase of the proposed Project, it is not anticipated that there will be any impact associated with vibration.

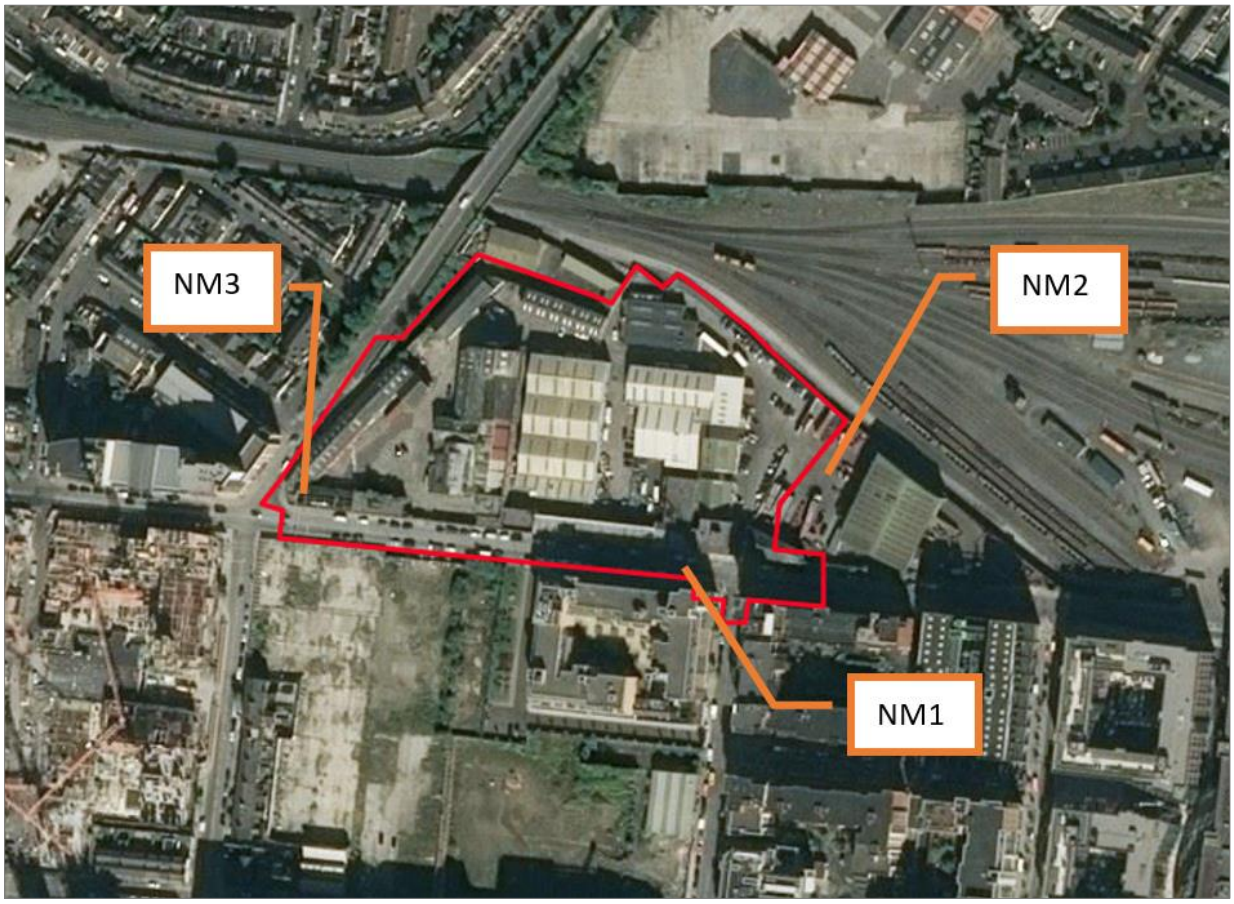
12.3 Baseline Environment

12.3.1 Baseline Noise Survey

An environmental noise survey has been conducted at the Site of the proposed Project in order to quantify the existing noise environment. The survey was conducted in general accordance with *ISO 1996: 2017: Acoustics – Description, Measurement and Assessment of Environmental Noise*. Specific details are set out below.

Three measurement locations were selected as shown in Figure 12.2 and described below.

Figure 12.2: Noise Survey Locations and Site Context



Noise survey locations:

- NM1 – at façade level on building on Sheriff Street Upper.
- NM2 – at ~2m off ground level on the northern site boundary.
- NM3 – roof level of one storey building at junction of East Road and Sheriff Street Upper.

12.3.1.1 Survey Periods

Noise measurements were conducted over the period of 12-19 February 2019 and 19-22 February 2019. The weather during the survey period was generally dry and calm although there were occasional showers and winds were occasionally elevated. For the purpose of this assessment, daytime is taken to be between 07:00hrs and 23:00hrs, whilst night-time is between 23:00hrs and 07:00hrs.

12.3.1.2 Personnel and Instrumentation

AWN installed and removed the noise monitoring equipment. RION model NL-52 Class 1 sound level meters were used for the unattended measurements. Before and after the survey the measurement instruments were check calibrated using a Brüel and Kjær Type 4231 Sound Level Calibrator. No significant drift was observed.

The noise 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} The maximum A-weighted sound pressure level occurring within a specified time period. Measured using the "Fast" time weighting.

L_{AF90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

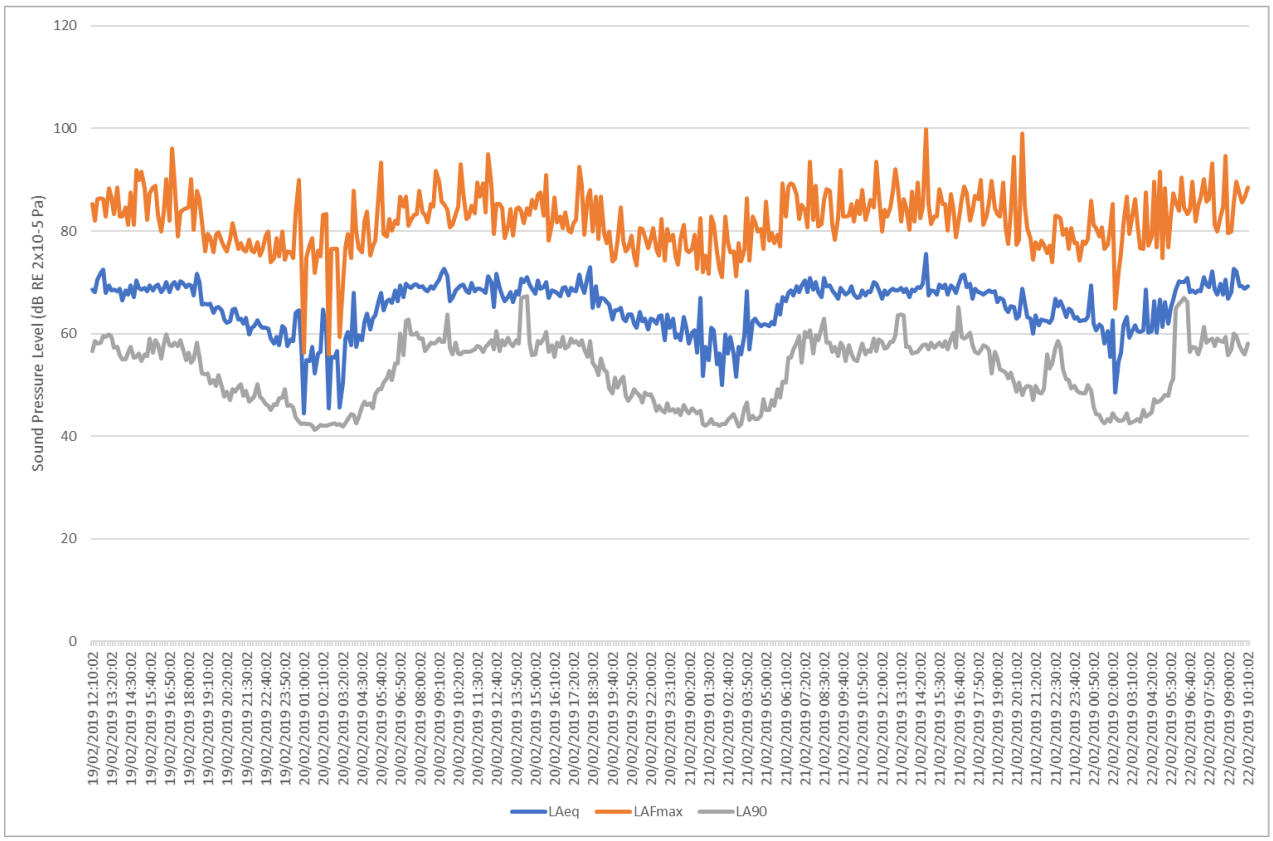
The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to 2x10-5 Pa.

12.3.1.3 Results and Discussion

Unattended Survey Location NM1

The survey results for Location NM1 over the monitoring period are summarised in Figure 12.3.

Figure 12.3: Location NM1 Survey Results



During the installation, it was noted that the dominant noise source was localised road traffic on Sheriff Street Upper. A summary of the measured values over the survey period is presented in Table 12.4.

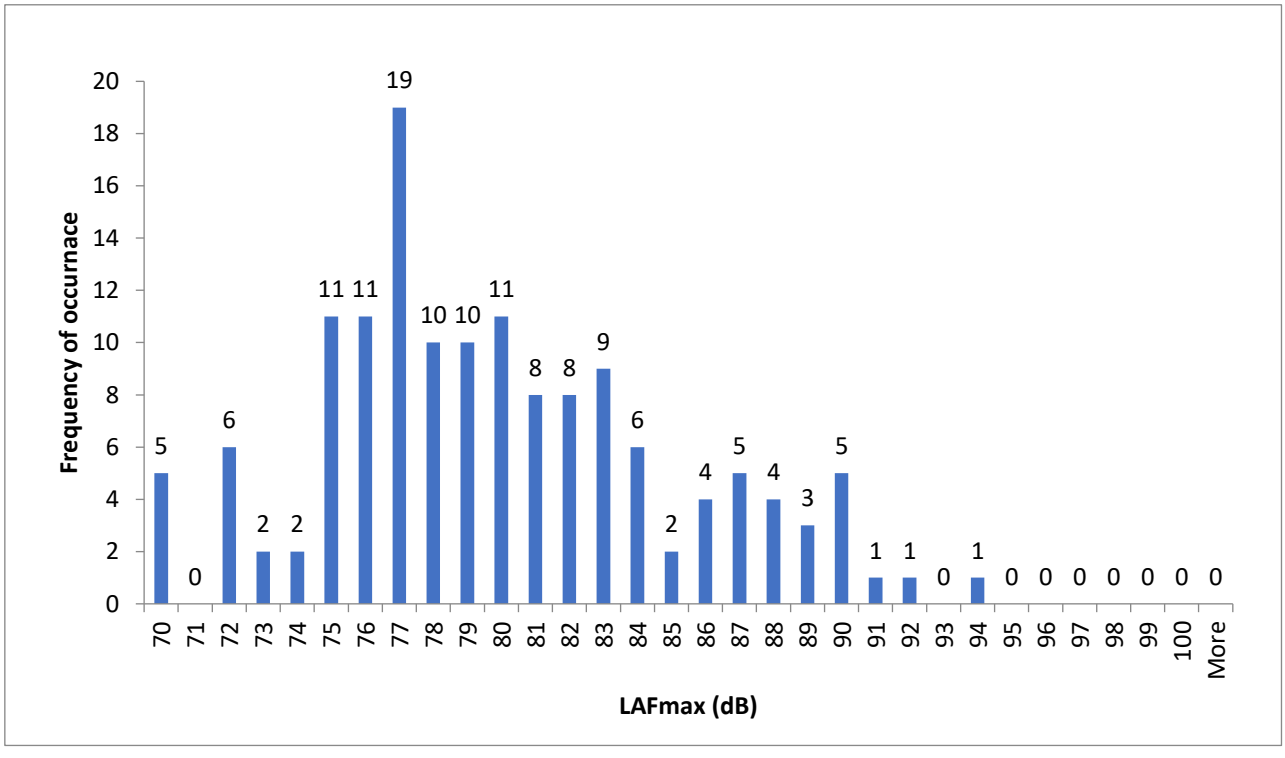
Table 12.4: Summary of Survey Results – Location NM1

Date	Period	12.3.1.4 Sound Pressure Levels (dB re. $2x10^{-5}$ Pa)					
		Daytime (07:00 to 23:00 hrs)			Night-time (07:00 to 23:00 hrs)		
		L_{Aeq}[126]	L_{AFMax}	L_{A90}[127]	L_{Aeq}[126]	L_{AFMax}	L_{A90}[127]
19/02/2019	Tuesday	68	96	56	63	93	48
20/02/2019	Wednesday	68	95	58	63	89	48
21/02/2019	Thursday	68	100	58	65	92	57
22/02/2019	Friday	70	95	58	--	--	--

The results suggest that average daytime noise levels range from 68 to 70dB $L_{Aeq,16hour}$ whilst night-time noise levels range from 63 to 65dB $L_{Aeq,8hour}$.

Figure 12.4 presents the distribution of the magnitude of $L_{AF,max}$ events during the night period at location NM1.

Figure 12.4: Location NM1 Measured L_{max}



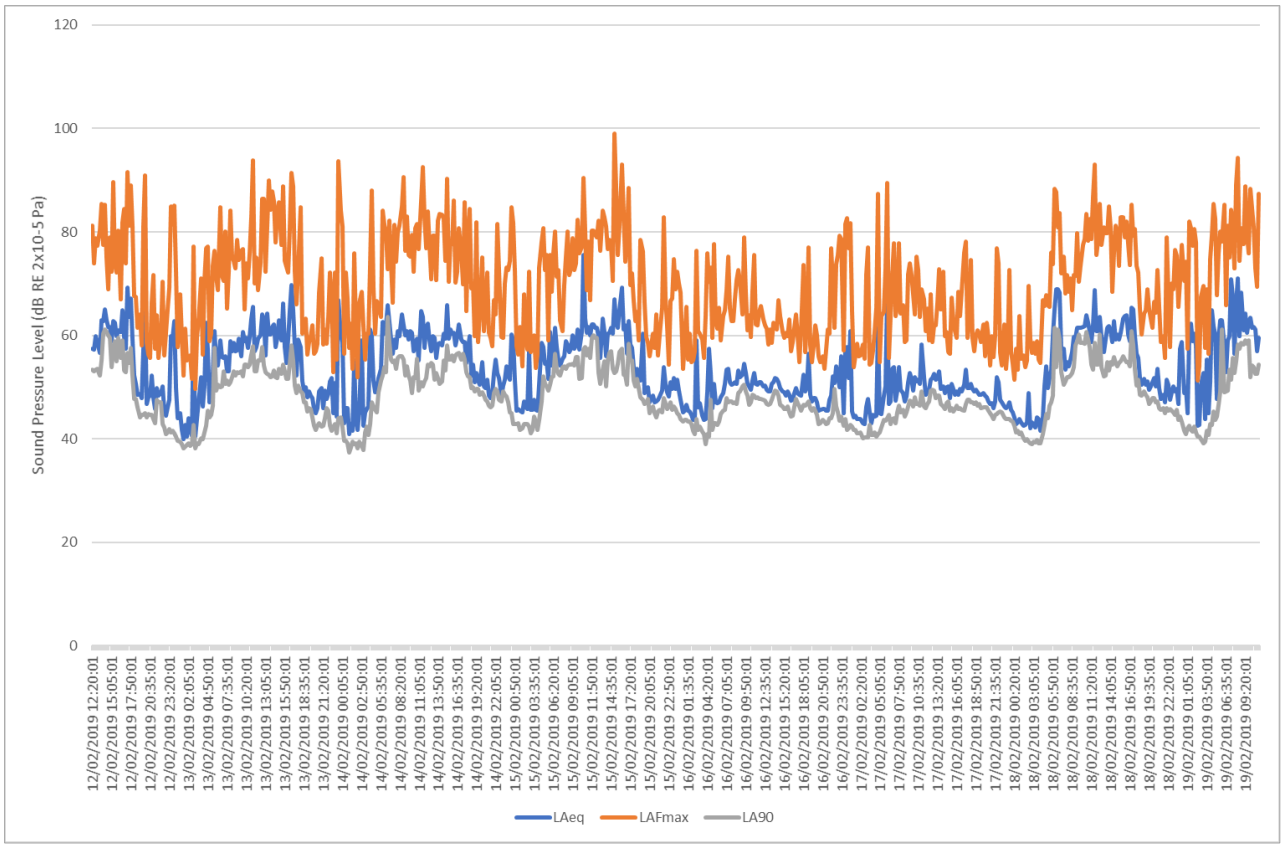
Review of night-time $L_{AF,max}$ events overall the indicates that the level of 84dB $L_{AF,max}$ is not regularly exceeded on an individual night.

[126] Logarithmically averaged values
[127] Arithmetically averaged values

Unattended Survey Location NM2

The survey results for Location NM2 over the monitoring period are summarised in Figure 12.5.

Figure 12.5: Location NM2 Survey Results



During the installation, it was noted that the dominant noise source was road traffic on Sheriff Street Upper, activity within the haulage operation on-site and some activity within the rail yard.

Table 12.5: Summary of Survey Results - Location NM2

Date	Period	Sound Pressure Levels (dB re. $2x10^{-5}$ Pa)					
		Daytime (07:00 to 23:00 hrs)			Night-time (07:00 to 23:00 hrs)		
		L_{Aeq}[128]	L_{AFMax}	L_{A90}[129]	L_{Aeq}[128]	L_{AFMax}	L_{A90}[129]
12/02/2019	Tuesday	61	92	55	56	85	46
13/02/2019	Wednesday	60	94	52	58	94	51
14/02/2019	Thursday	59	93	53	55	85	48
15/02/2019	Friday	62	99	54	50	78	44
16/02/2019	Saturday	51	79	47	56	90	42
17/02/2019	Sunday	50	78	46	59	88	51
18/02/2019	Monday	60	93	55	58	85	48

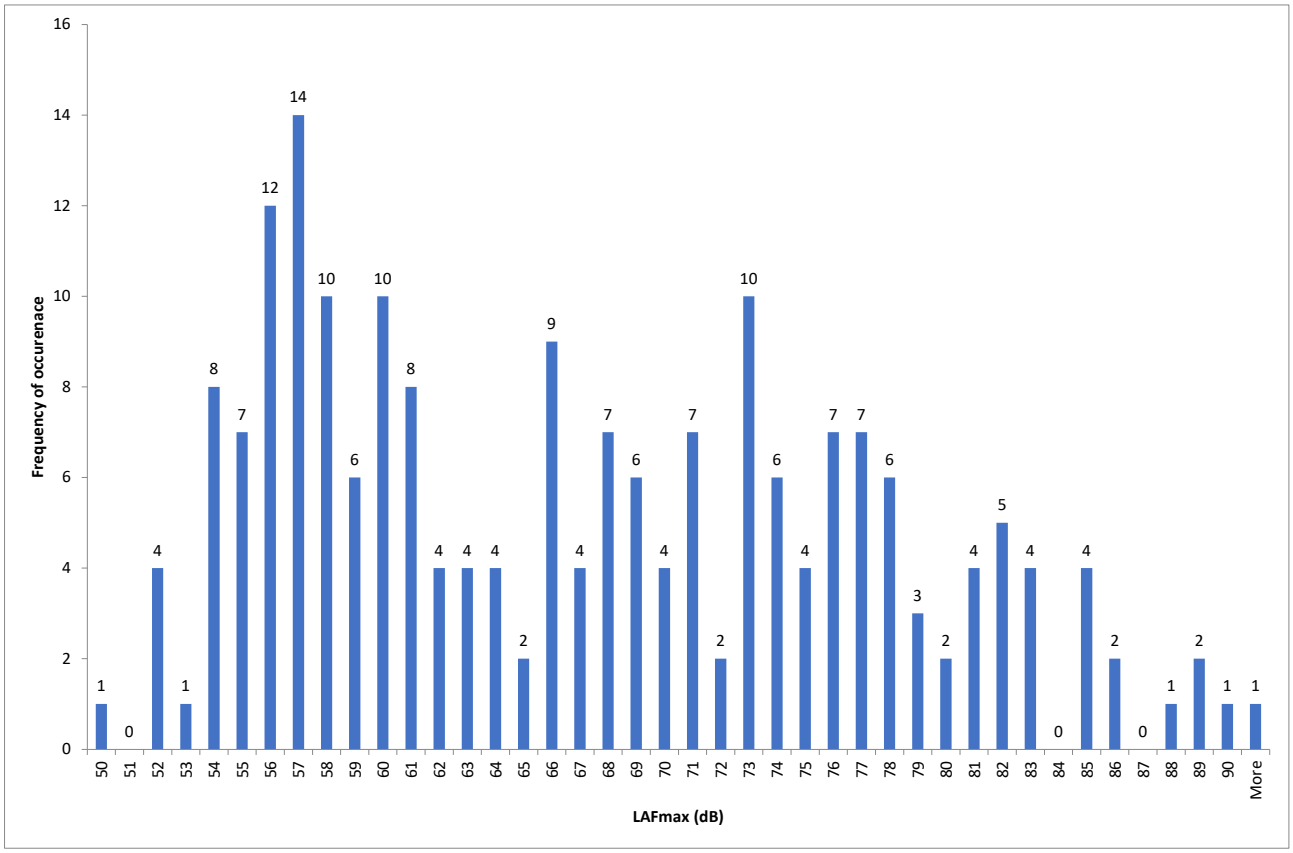
[128] Logarithmically averaged values
[129] Arithmetically averaged values

Date	Period	Sound Pressure Levels (dB re. $2x10^{-5}$ Pa)					
		Daytime (07:00 to 23:00 hrs)			Night-time (07:00 to 23:00 hrs)		
		L_{Aeq}[128]	L_{AFMax}	L_{A90}[129]	L_{Aeq}[128]	L_{AFMax}	L_{A90}[129]
19/02/2019	Tuesday	65	94	56	--	--	--

The results suggest that average daytime noise levels range from 50 to 65dB $L_{Aeq,16hour}$ whilst night-time noise levels range from 50 to 59dB $L_{Aeq,8hour}$.

Figure 12.6 presents the distribution of the magnitude of $L_{AF,max}$ events during the night period at location NM2.

Figure 12.6: Location NM2 Measured L_{max}

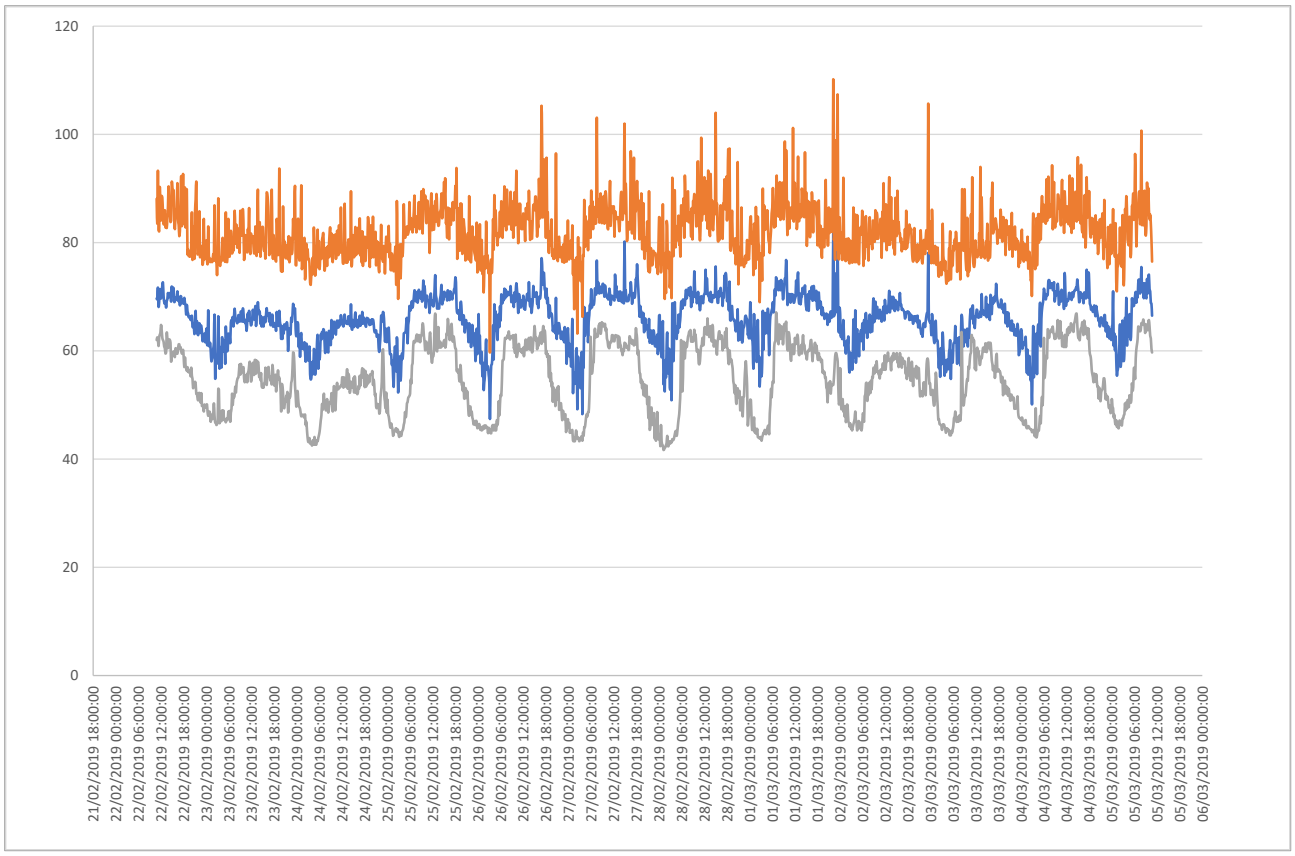


Review of night-time $L_{AF,max}$ events indicates that the level of 73dB $L_{AF,max}$ is not regularly exceeded more than 10 no. times on a given night.

Unattended Survey Location NM3

The survey results for Location NM3 over the monitoring period are summarised in Figure 12.7.

Figure 12.7: Location NM3 Survey Results



During the installation, it was noted that the dominant noise source was road traffic on Sheriff Street Upper.

Table 12.6: Summary of Survey Results - Location NM3

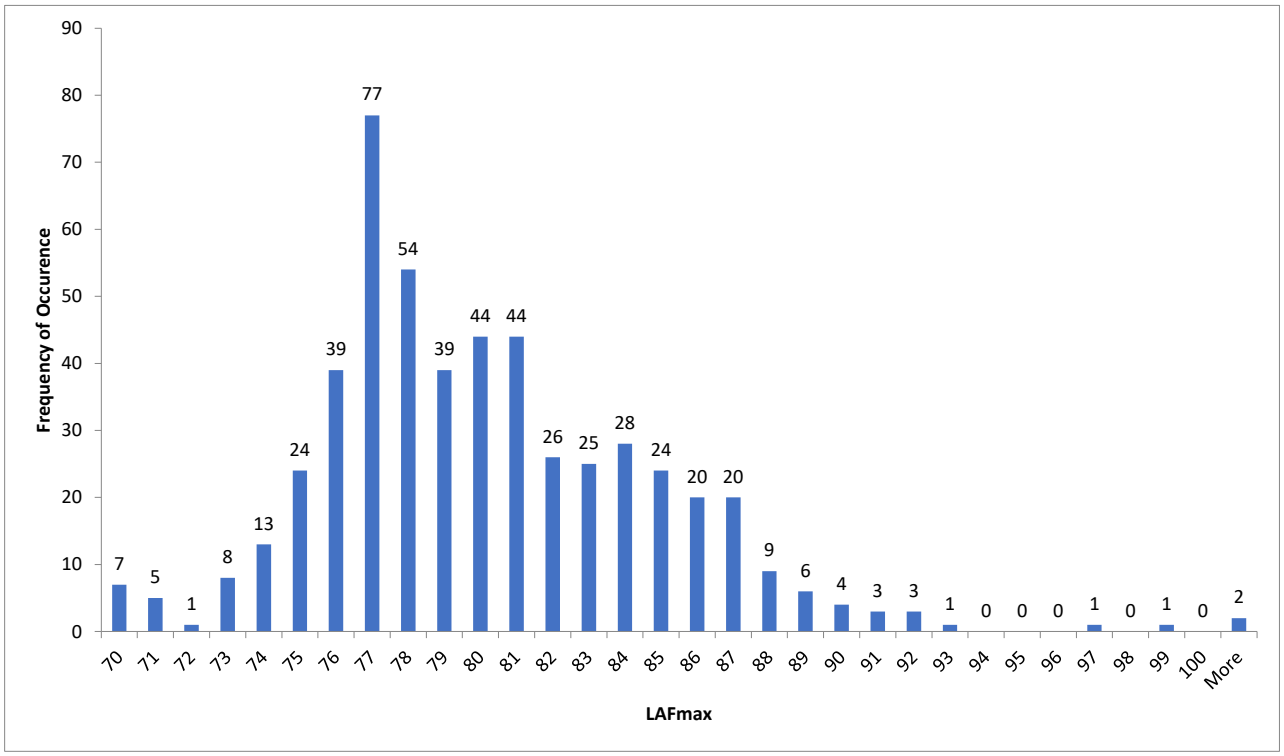
Date	Period	Sound Pressure Levels (dB re. $2x10^{-5}$ Pa)					
		Daytime (07:00 to 23:00 hrs)			Night-time (07:00 to 23:00 hrs)		
		L_{Aeq}[130]	L_{AFMax}	L_{A90}[131]	L_{Aeq}[130]	L_{AFMax}	L_{A90}[131]
22/02/2019	Friday	69	84	58	62	79	48
23/02/2019	Saturday	66	81	55	62	79	47
24/02/2019	Sunday	65	79	53	64	80	49
25/02/2019	Monday	69	84	59	64	79	47
26/02/2019	Tuesday	70	84	59	64	79	48
27/02/2019	Wednesday	71	85	59	64	80	46
28/02/2019	Thursday	71	86	62	66	81	53

[130] Logarithmically averaged values
[131] Arithmetically averaged values

The results suggest that average daytime noise levels range from 65 to 71dB $L_{Aeq,16hour}$ whilst night-time noise levels range from 62 to 66dB $L_{Aeq,8hour}$.

Figure 12.8 presents the distribution of the magnitude of $L_{AF,max}$ events during the night period at location NM3.

Figure 12.8: Location NM3 Measured L_{max}



Review of night-time $L_{AF,max}$ events indicates that the level of 86 dB $L_{AF,max}$ is not regularly exceeded more than 10 no. times on a given night.

12.4 Potential Impact of the Proposed Project

12.4.1 Construction Phase - Noise

Taking into account the characteristics of the proposed Project, there is the potential for noise and vibration impacts during the short-term Construction Phase associated with construction activities and mobile plant, etc. During the long term Operational Phase of the proposed Project there is a potential impact associated with noise emissions from mechanical plant items and from an increase in traffic coming to and from the Site of the proposed Project.

The proposed general construction hours are 08:00 to 19:00, Monday to Friday and 08:00 to 14:00 on Saturdays. Due to the nature of daytime activities undertaken on a construction site of this nature, there is potential for generation of significant levels of noise.

The Construction Phase programme has been established in outline form only, therefore it is difficult to calculate the actual magnitude of noise emissions to the local environment. However, it is possible to predict typical noise levels using guidance set out in BS5228-1:2009+A1:2014. Table 12.7 outlines typical plant items and associated noise levels that are anticipated for various phases of the construction programme at a standard reference distance of 10m from the various plant items.

Table 12.7: Typical Construction Noise Emission Levels

Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref.)	Construction Noise Level at 10m Distance (dB L_{Aeq})
Site Preparation	Wheeled Loader Lorry (D3 1)	75
	Track Excavator (C2 22)	72
	Dozer (C2.13)	78
	Dump Truck (C4.2)	78
Demolition	Pulveriser on Tracked Excavator (C1.5)	72
	Tracked Crusher (C1.14)	82
	Breaker Mounted on Backhoe (C1.2)	92
	Dump Truck (C4.2)	78
Foundations	Tracked Excavator (C3.24)	74
	Concrete Pump (C3.25)	78
	Compressor (D7 6)	77
	Poker Vibrator (C4 33)	78
General Construction	Hand tools	81
	Tower Crane (C4.48)	76
	Pneumatic Circular Saw (D7.79)	75
	Internal fit – out	70
Landscaping	Dozer (C2.13)	78
	Dump Truck (C4.2)	78
	Surfacing (D8.25)	68
	Wheeled Loader Lorry (D3 1)	75

For the purposes of the assessment we have assumed that standard good practice measures for the control of noise from construction sites will be implemented. These issues are commented upon in further detail in the mitigation section of this Chapter.

The predicted daytime noise levels from an indicative construction period on site at the nearest offsite receptor have been calculated. Note construction noise sources for Site are assumed to be running 66% of the time over soft ground. The predictions have been prepared at various distances to provide an overview of how construction works will effect noise sensitive at various locations across the Site. The nearest noise sensitive locations to the proposed Project have been identified and are illustrated in Figure 12.9.

NSL 1 The Northbank Apartments on Sheriff Street Upper, some 15m from the southern Site boundary.

NSL 2 Apartments at Canon Hall off East Road, some 40m from the south western Site boundary.

NSL 3 Houses on Irvine Court, some 30m from the western Site boundary.

NSL 4 1-3 East Road Development, some 90m to the north of Site.

Figure 12.9: Nearest Noise Sensitive Receivers

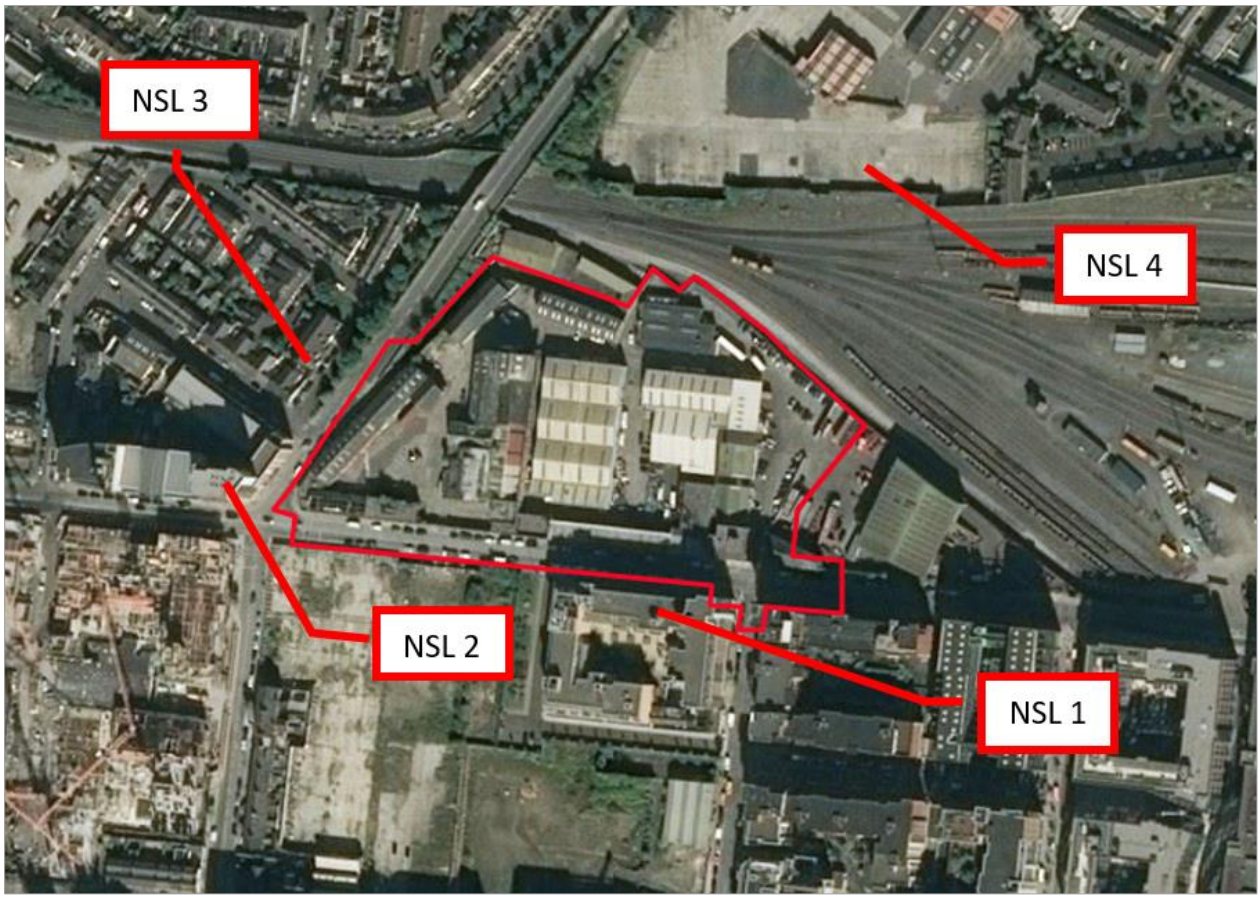


Table 12.8 presents the predicted daytime noise levels associated with construction activity.

Table 12.8: Typical Construction Noise Emission Levels

Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref.)	Construction Noise Level at Distance (dB L_{Aeq})			
		15m (NSL1)	35m (NSL3)	40m (NSL2)	90m (NSL4)
Site Preparation	Wheeled Loader Lorry (D3 1)	65	57	56	49
	Track Excavator (C2 22)	62	54	53	46
	Dozer (C2.13)	68	60	59	52
	Dump Truck (C4.2)	68	60	59	52
Site Preparation Total		72	**65**	64	**57**
Demolition	Pulveriser on Tracked Excavator (C1.5)	62	54	53	46
	Tracked Crusher (C1.14)	72	64	63	56
	Breaker Mounted on Backhoe (C1.2)	66	58	57	50
	Dump Truck (C4.2)	68	60	59	52
Demolition Total		74	**67**	66	**59**
Foundations	Tracked Excavator (C3.24)	64	56	55	48
	Concrete Pump (C3.25)	68	60	59	52
	Compressor (D7 6)	67	65	58	51
	Poker Vibrator (C4 33)	68	63	59	52
Foundations Total		73	**58**	64	**57**
General Construction	Hand tools	71	57	62	55
	Tower Crane (C4.48)	66	52	57	50
	Pneumatic Circular Saw (D7.79)	65	57	56	49
	Internal fit – out	60	52	51	44
General Construction Total		73	**66**	64	**57**
Landscaping	Dozer (C2.13)	68	60	59	52
	Dump Truck (C4.2)	68	60	59	52
	Surfacing (D8.25)	58	50	49	42
	Wheeled Loader Lorry (D3 1)	71	64	63	56
Landscaping Total		74	**67**	66	**59**

Construction Phase predictions indicate that at 15m distance from areas of major works, the predicted construction noise levels for all anticipated activities are below the construction noise threshold, therefore the associated noise impact is *moderate.*

The vast majority of the construction works will take place at distances from the receptors where predicted noise levels are several decibels below the construction threshold and so *no significant impacts* are predicted.

12.4.2 Construction Phase - Vibration

The main potential source of vibration during the Construction Phase is associated with piling and excavation activities depending on the methodologies used.

In order to assess potential vibration impacts at the closest sensitive buildings to the site works, a range of typical level of vibration during augured piling have been determined through reference to published empirical data within BS 5228 – Part 2. The following vibration magnitudes associated with rotary bored piling using a 600mm pile diameter for bored piling into soft ground over rock are summarised below:

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

The residential dwellings situated on Sheriff Street Upper, across from the southern perimeter of the Site of the proposed Project are located at the closest distances to the Site, situated some 15-20m from areas of piling or excavation. Considering the low vibration levels at very close distances to augured piling rigs, vibration levels at the nearest receptors are not expected to pose any significance in terms of cosmetic or structural damage. At further distances from the works vibration magnitudes will dissipate further resulting in lower vibration levels to those noted above and hence are orders of magnitude below the limit values in Table 12.1 for structurally sound buildings. In addition, the range of vibration levels is typically below a level which would cause any disturbance to occupants of the closest buildings along southern perimeter of the Site.

During ground breaking in the Excavation Phase, there is also potential for vibration to propagate through the ground. Empirical data for this activity is not provided in the BS 5228- 2:2009+A1:2014 standard, however the likely levels of vibration from this activity is expected to be significantly below the vibration criteria for building damage on experience from other sites. AWN Consulting have previously conducted vibration measurements under controlled conditions, during trial construction works, on a sample site where concrete slab breaking was carried out. The trial construction works consisted of the use of the following plant and equipment when measured at various distances:

- 3 tonne hydraulic breaker on small CAT tracked excavator; and
- 6 tonne hydraulic breaker on large Liebherr tracked excavator.

Vibration measurements were conducted during various staged activities and at various distances. Peak vibration levels during staged activities using the 3 Tonne Breaker ranged from 0.48 to 0.25 PPV (mm/s) at

distances of 10 to 50m respectively from the breaking activities. Using a 6 Tonne Breaker, measured vibration levels ranged between 1.49 to 0.24 PPV (mm/s) at distances of 10 to 50m respectively.

The range of values recorded provides some context in relation typical ranges of vibration generated by construction breaking activity likely required on the Site of the proposed Project. The range of vibration magnitudes indicate vibration levels at the closest neighbouring buildings noted in Figure 12.6 are likely to be below the limits set out in Table 12.1 to avoid any cosmetic damage to buildings.

In terms of disturbance to building occupants, works undertaken within close proximity to the residential receptors on the Site perimeter have the potential to emit perceptible vibration levels.

Notwithstanding the above, any construction activities undertaken on the Site of the proposed Project will be required to operate below the recommended vibration criteria set out in Table 12.1 during all activities. Further discussion on mitigation measures during this phase are discussed in Section 12.6.1.

12.4.3 Operational Phase - Outward Noise Impact

12.4.3.1 Mechanical Plant and Services

Once operational, building services plant items will be required to serve the commercial, amenity and residential aspect of the proposed Project. The cumulative operational noise level at the nearest noise sensitive location within the proposed Project (*e.g.* apartments, etc.) will be designed/attenuated to meet the relevant BS 4142 noise criteria for day and night-time periods.

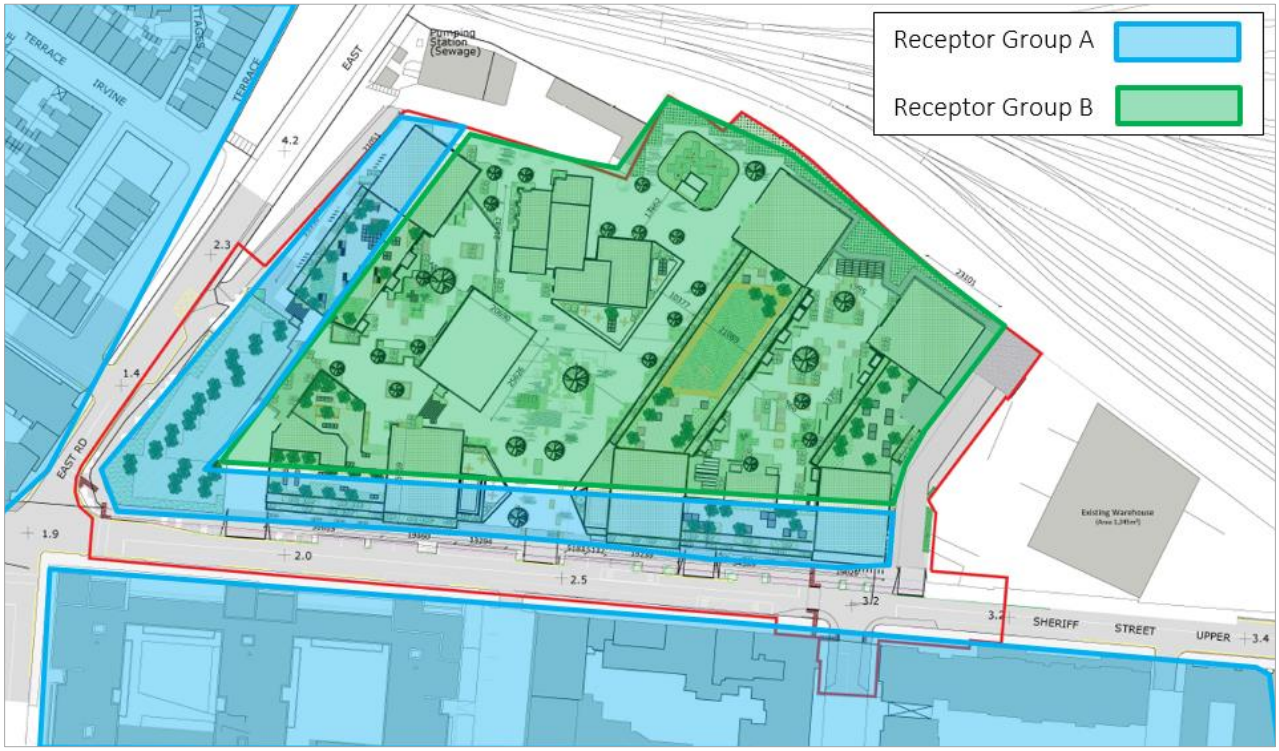
Given the baseline noise levels measured and presented in Section 12.3, appropriate criteria for plant noise levels at the nearest sensitive noise receptors have been derived. Based on the varying baseline noise levels across the site the following apply:

Table 12.9: Proposed Noise Criteria for Plant Noise

Receptor	Day, dB $L_{Aeq,1hr}$	Night, dB $L_{Aeq,15min}$
A	57	48
B	52	46

The receptor references are illustrated in Figure 12.10.

Figure 12.10: Receptor References for Plant Noise Criteria



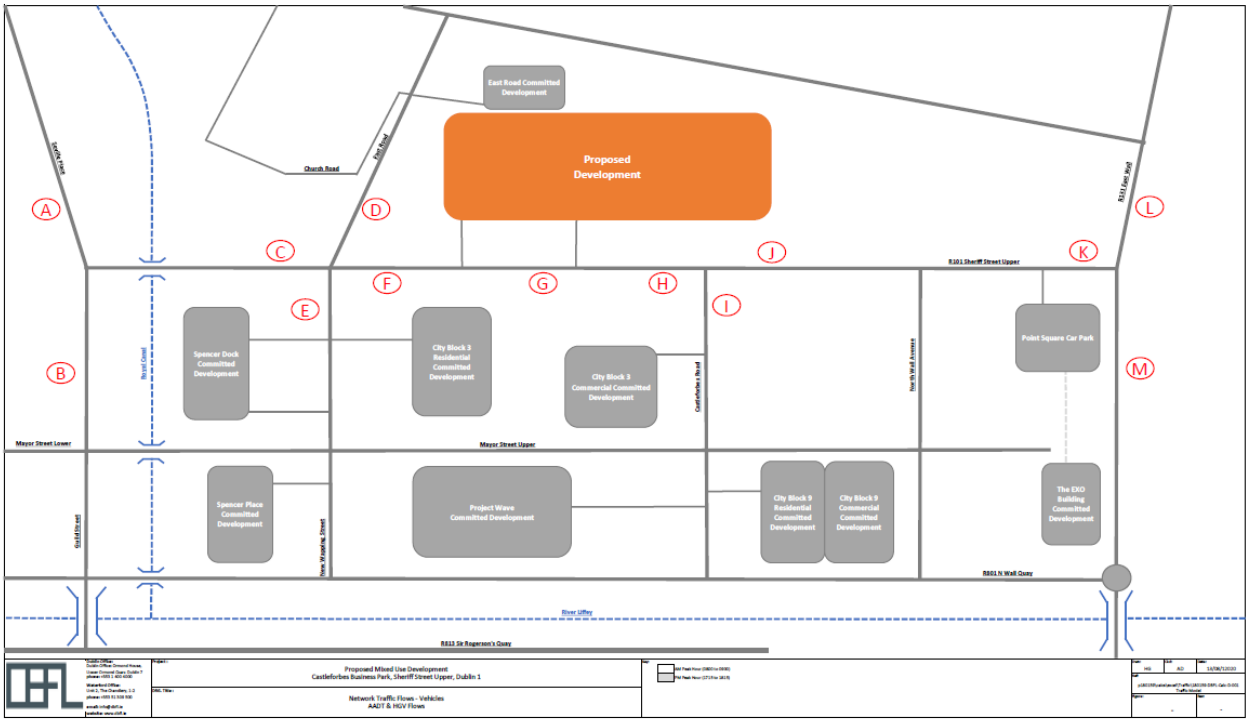
The majority of plant items are expected to be housed internally in plant rooms or at basement level, whereby noise breakout is expected to be minimal. Items of plant with the potential for noise impact include smoke shaft fans located at roof level, outdoor commercial plant enclosures for installation of plant items in future, and AHU and condenser units to be located on the cultural centre roof. It is recommended that these condenser units are operated in quiet mode during night-time periods.

12.4.3.2 Additional Traffic on Local Roads

It is anticipated that the proposed Project will attract visitors and enterprise workers. There is also provision of some 204 no. resident parking spaces.

Figure 12.11 below from the *Traffic and Transport Assessment (TTA)* illustrates the road links in the vicinity of the Site of the proposed Project. The traffic flows on these road links have been provided by DBFL Traffic Consultants in the form of Annual Average Daily Traffic (AADT).

Figure 12.11: Traffic Assessment - Road Links



The predicted changes in noise level have been calculated based on the change in traffic flows that have been provided for the various scenarios considered, i.e. *Do-Nothing* and *Do-Something*. These are presented in the Table 12.10 and Table 12.11 below. This assessment considers the worst-case cumulative impact of the proposed Project as well as permitted nearby developments.

Table 12.10: Predicted Change in Traffic Noise Levels - 2022

Road Link	Traffic Flows – AADT		
	Do Nothing – 2022 (Without development)	Do Something – 2022 (With Development)	Predicted Change in Noise Level (dB)
A	18016	18454	0.1
B	14694	14681	0.0
C	7588	8044	0.3
D	11785	11861	0.0
E	10021	10249	0.1
F	8062	8821	0.4
G	8623	9405	0.4
H	8623	9168	0.3
I	3761	3925	0.0
J	7109	7850	0.4
K	7346	7893	0.3
L	31129	31551	0.1
M	27001	27126	0.0

Table 12.11: Predicted Change in Traffic Noise Levels - 2037

Road Link	Traffic Flows – AADT		
	Do Nothing – 2037 (Without development)	Do Something – 2037 (With Development)	Predicted Change in Noise Level (dB)
A	20835	21272	0.1
B	17043	17075	0.0
C	8655	9111	0.2
D	13571	13647	0.0
E	11487	11715	0.1
F	9121	9880	0.3
G	9767	10549	0.3
H	9767	10272	0.2
I	4055	4207	0.2
J	8401	8823	0.2
K	8325	8872	0.3
L	36055	36477	0.1
M	31439	31564	0.0

At all external road links under consideration the predicted changes in noise levels are in the range of 0.0 to 0.4dB. With reference to Table 12.2 the corresponding impact is *negligible*. The overall impact is determined to be *neutral, imperceptible* and *long-term*.

12.4.3.3 Noise Breakout from Childcare facility

Measurement of noise levels generated by children playing outdoors at several childcare facilities and kindergartens indicate typical noise levels in the order of 56dB $L_{Aeq,1hr}$ at distance of 5m. The nearest noise sensitive windows are located within the proposed Project at ground floor level, approximately 8m from the childcare facility. Considering the usage of the childcare facility area (*e.g.* external areas are only expected to be in use for a portion of the 16 hour daytime period) and the standard noise insulation of the façade, it is predicted that the internal criteria in Table 12.3 will be met in all apartments and the resultant noise impact due to the childcare facility is *not significant.*

12.4.4 Operational Phase - Inward Noise Impact

The Site of the proposed Project in question are bound to the north by a rail line, to the west by East Road and to the south by Sheriff Street Upper, which dominate noise levels along these boundaries.

In order to establish noise levels across the Site an acoustic noise model was developed and calibrated against noise levels measured during the baseline study.

12.4.4.1 Noise Model of Study Area

Proprietary noise calculation software was used for the purposes of establishing the prevailing noise levels on the Site of the proposed Project. The selected software, Brüel & Kjær Type 7810 Predictor, calculates noise levels in accordance with the Calculation of Road Traffic Noise (CRTN - ISBN 0 11 550847 3) issued by the UK in 1988[132]. This is the standard recognised for the prediction of road traffic noise by Transport Infrastructure Ireland (TII) and the *Environmental Noise Regulations 2006 SI/140 2006*.

The following information was included in the model:

- Site layout drawings of proposed Project;
- OS mapping of surrounding environment; and
- Annual Average Daily Traffic (AADT) along adjacent roads estimated from site calibration results.

[132] Department of Transport Welsh Office (1988).

12.4.4.2 Noise Model Validation

Noise levels recorded during the unattended survey were used to calibrate the noise model to within 1dB of the calculated values. This is regarded as very strong correlation in respect of predicted noise levels. Noise levels are calculated over daytime periods, i.e. 07:00 to 23:00hrs and night-time periods, 23:00 to 07:00 hrs.

Table 12.12: Calculated and Measured Noise Levels at the Site

Location	Time Period	Measured Noise Level (dB)	Calculated Noise Level (dB)
NM1	Daytime, $L_{Aeq,16hr}$	69	69
	Night-time, $L_{Aeq,8hr}$	64	64
NM3	Daytime, $L_{Aeq,16hr}$	70	70
	Night-time, $L_{Aeq,8hr}$	64	64

Figures 12.12 and 12.13 display the calculated noise contours across the Site for day and night-time periods at a height of 4m above ground, i.e. the typical height of a first floor window.

The results of the modelling exercise demonstrate that highest noise levels are experienced along the west and south of the Site in proximity to the road edges and reduce considerably by more than 10dB towards the central part of the Site, in the absence of any development buildings.

Figure 12.12: ProPg Stage 1 – Initial Noise Risk Assessment – Daytime

Figure 12.13: ProPg Stage 1 – Initial Noise Risk Assessment – Night-time

Giving consideration to the noise levels presented in the previous sections the initial site noise risk assessment has concluded that the level of risk across the Site lies within the low to medium noise risk categories. ProPG states the following with respect to medium and high risks areas:

Medium Risk As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.

High Risk High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice.

Given the above it can be concluded that the Site of the proposed Project may be categorised as *Medium to High Risk* and as such the Acoustic Design Statement (following here and also in Section 12.6.2) is required to demonstrate that suitable care and attention has been applied in mitigating and minimising noise impact to such an extent that an adverse noise impacts will be avoided in the final development.

It should be noted that ProPG states the following with regard to how the initial site noise risk is to be used,

> *"2.12 It is important that the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker. The recommended approach is intended to give the developer, the noise practitioner, and the decision maker an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of the acoustic issues that would be faced. Thus, a site considered to be high risk will be recognised as presenting more acoustic challenges than a site considered as low risk. A site considered as negligible risk is likely to be acceptable from a noise perspective and need not normally be delayed on noise grounds. A potentially problematical site will be flagged at the earliest possible stage, with an increasing risk indicating the increasing importance of good acoustic design."*

Following the guidance contained in ProPG, therefore, it does not preclude residential development on sites that are identified as having medium or high noise levels. It merely identifies the fact that a more considered approach will be required to ensure the developments on the higher risk sites are suitable designed to mitigate the noise levels. The primary goal of the approach outlined in ProPG is to ensure that the best possible acoustic outcome is achieved for a particular site.

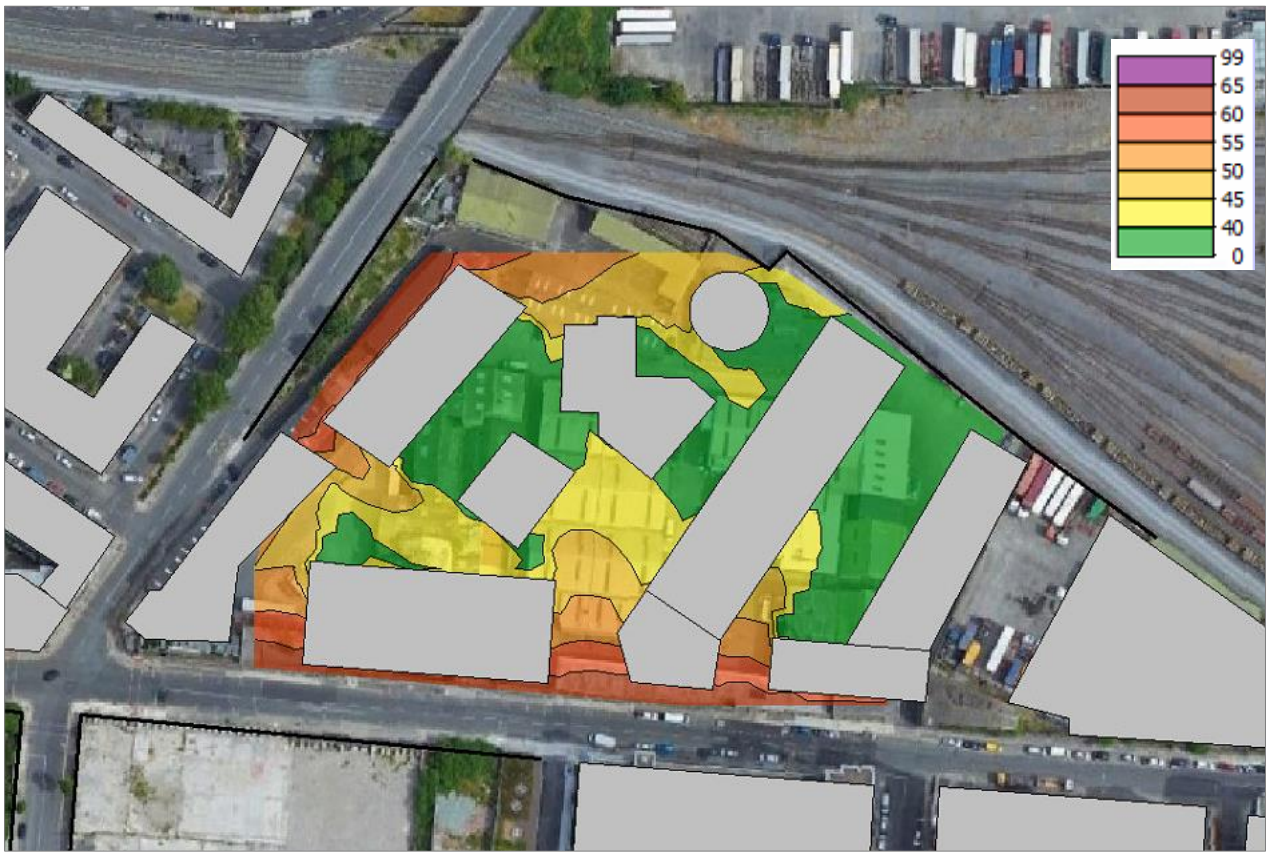
12.4.4.3 Acoustic Design Statement – Part 1

Façade Noise Levels

Noise levels have been predicted across the Site of the proposed Project during day and night-time periods using the noise model developed to include the development buildings. Figures 12.14 and 12.15 illustrate the predicted traffic noise levels for daytime and night-time.

Figure 12.14: ProPg Stage 2 – Predicted Noise Levels – Daytime

Figure 12.15: ProPg Stage 2 – Predicted Noise Levels – Night-time



Where façade noise levels are less than 55dB $L_{Aeq,16hr}$ during the day and 50dB $L_{Aeq,8hr}$ at night it is possible to achieve reasonable internal noise levels while also ventilating the dwellings with open windows. Therefore, for those properties where the façade noise levels are less than 55dB $L_{Aeq,16hr}$ during the day and 50dB $L_{Aeq,8hr}$ at night no further mitigation is required.

Where façade levels are above these levels the sound insulation performance of the building façade becomes important and a minimum sound insulation performance specification is required for windows to ensure that when windows are closed the internal noise criteria are achieved.

Predicted noise levels on several facades are above a level whereby internal noise levels are achieved with standard double glazing and therefore mitigation in the form of enhanced glazing will be required. The specification of this enhanced façade is discussed in Section 12.6.2.

These facades include

- Block A1 (southern façade);
- Block A2 (southern façade); and
- Block C1 (western façade).

Review of historic noise measurements in the area determined that there are high maximum values associated with activity in the rail yard. An external assessment level of 78dB L_{AFmax} has been assumed in the noise

intrusion calculations. Further assessment in this regard is recommended during the detail design stage of the proposed Project.

External Noise Levels

Figure 12.16 presents the calculated day time noise levels across the Site with the proposed Project buildings in place. The contours are calculated for a height of 1.5m.

External noise levels within the vast majority of communal open spaces across the Site are within the recommended range of noise levels from ProPG of between 50 - 55dB $L_{Aeq,16hr}$ as illustrated in Figure 12.16. It is considered that the objectives of achieving suitable external noise levels is achieved within the overall Site, therefore no further mitigation is required to control external noise levels across amenity areas.

Figure 12.16: Predicted Noise Levels across External Areas (1.5m above ground)

12.5 Mitigation Measures

12.5.1 Construction Phase

12.5.1.1 Noise

With regard to Construction Phase activities, best practice control measures from construction sites within *BS 5228 (2009 +A1 2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2* will be used to control noise and vibration impacts. The appointed Contractor will ensure that all best practice noise and vibration control methods will be used as necessary in order to ensure impacts to nearby

residential noise sensitive locations are *not significant*. This will be particularly important during demolition, foundation construction including piling works which are likely to be the activities to have the highest potential noise and vibration impact.

Noise-related mitigation methods are described below and will be implemented for the project in accordance with best practice. These methods include:

- no plant used on-site will be permitted to cause an ongoing public nuisance due to noise;
- the best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on-site operations;
- all vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract;
- compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers;
- machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use;
- during construction, the appointed Contractor will manage the works to comply with noise limits outlined in *BS 5228-1:2009+A1 2014. Part 1 – Noise;*
- 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;
- limiting the hours during which Site activities which are likely to create high levels of noise or vibration are permitted; and
- monitoring levels of noise and vibration during critical periods and at sensitive locations.

Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These may include:

- selection of plant with low inherent potential for generation of noise and/or vibration;
- erection of good quality site hoarding to the site perimeters which will act as a noise barrier to general construction activity at ground level;
- erection of barriers as necessary around items such as generators or high duty compressors; and
- situate any noisy plant as far away from sensitive properties as permitted by site constraints.

12.5.1.2 Vibration

With respect to vibration management, it is recommended that the appointed Contractor is proactive in engaging with local sensitive receptors and should notify them of any works forecast to generate appreciable levels of vibration, explaining the nature and duration of the works. This will be of particular importance during periods of demolition or piling activities.

12.5.2 Operational Phase

12.5.2.1 Mechanical Plant Noise and Services

As part of the detailed design of the proposed Project, plant items with appropriate noise ratings and, where necessary, appropriately selected remedial measures (e.g. enclosures, silencers etc.) will be specified in order that the adopted plant noise criteria is achieved at the façades of noise sensitive properties, including those within the development itself.

The assessment outlined earlier in this Chapter has specified cumulative plant noise limits at the nearest noise sensitive properties that must be achieved in order to ensure the impact is acceptable. To achieve these noise limits consideration will be given, at the detailed design stage, to a variety of mitigation measures and forms of noise control techniques. Some example of these measures are as follows:

- reduced/quiet modes;
- duct mounted attenuators on the atmosphere side of air moving plant;
- splitter attenuators or acoustic louvres providing free ventilation to internal plant areas;
- solid barriers screening any external plant; and
- anti-vibration mounts on reciprocating plant.

In addition to the above, it is proposed that the following practices are adopted to minimise potential noise disturbance for neighbours.

- all mechanical plant items e.g. motors, pumps etc. shall be regularly maintained to ensure that excessive noise generated any worn or rattling components is minimised; and
- any new or replacement mechanical plant items, including plant located inside new or existing buildings, shall be designed so that all noise emissions from site do not exceed the noise limits outlined in this document.

12.5.2.2 Inward Noise Impact - Acoustic Design Statement Part 2

As is the case in most buildings, the glazed elements and ventilation paths of the building envelope are typically the weakest element from a sound insulation perspective. In general, all wall constructions (i.*e.* block work or concrete and spandrel elements) offer a high degree of sound insulation, much greater than that offered by the glazing systems. Therefore, noise intrusion via the wall construction will be minimal.

In this instance the façades highlighted in Figure 12.17 will be provided with glazing and ventilation that achieves the minimum sound insulation performance as set out in Table 12.13 and Table 12.14. Other façades in the proposed Project have no minimum requirement for sound insulation.

Table 12.13: Sound Insulation Performance Requirements for Glazing, SRI (dB)

Façade	Octave Band Centre Frequency (Hz)						R_w
	125	250	500	1000	2000	4000	
Red	24	26	36	43	41	50	39
Blue	24	20	25	35	38	35	33

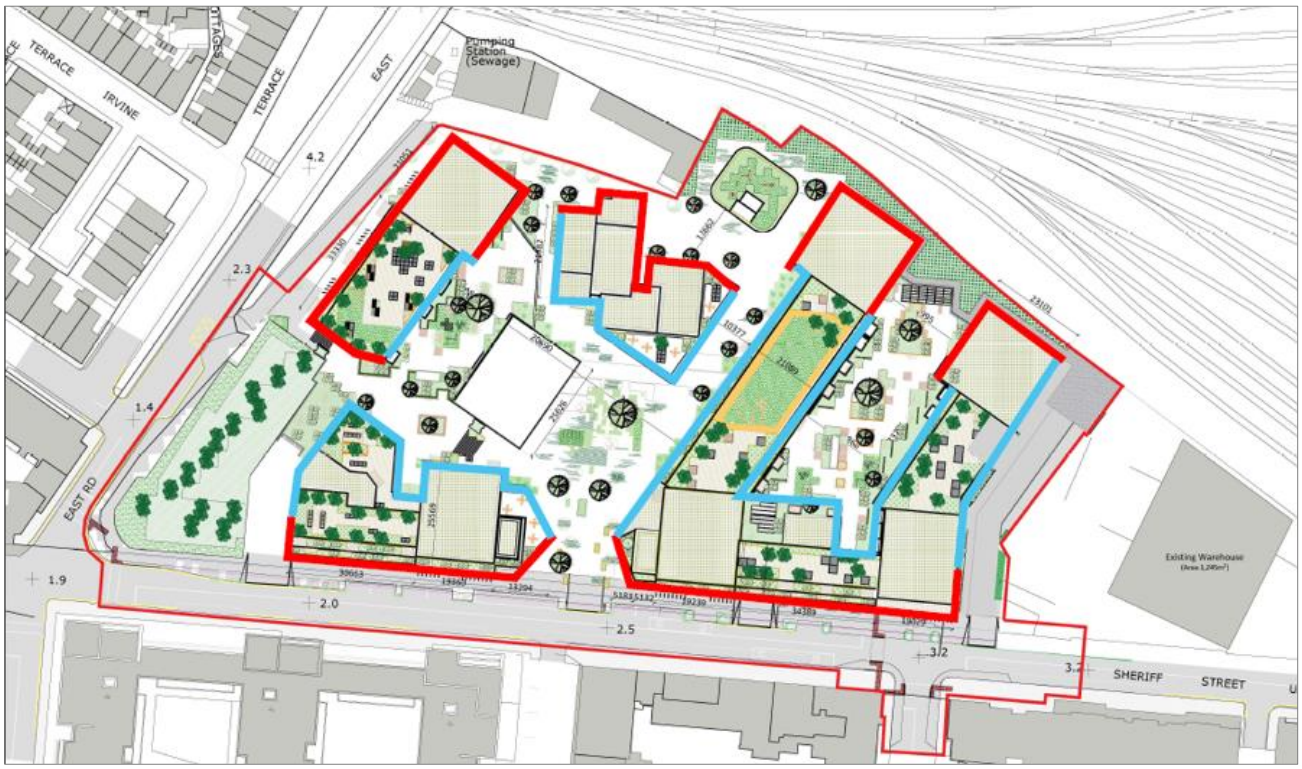
The overall R_w and $D_{ne,w}$ outlined in this section are provided for information purposes only. The over-riding requirement is the Octave Band sound insulation performance values which may also be achieved using alternative glazing and ventilation configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Tables 12.13 and 12.14 or greater.

The following performance requirements apply to all ventilation paths from outside the building. This can be achieved by passive acoustic wall or window vents or via mechanical ventilation systems.

Table 12.14: Sound Insulation Performance Requirements for Ventilation, $D_{n,e,w}$(dB)

Façade	Octave Band Centre Frequency (Hz)						$D_{n,e,w}$
	125	250	500	1000	2000	4000	
Red	31	33	42	43	39	44	42
Blue	30	33	38	37	36	30	38

Figure 12.17: ProPg Stage 1 - Façade Incident Noise Levels for Assessment



It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing and ventilation systems. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

The assessment has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. The calculated glazing and ventilation specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage. Consequently, these may be subject to change as the project progresses.

There is no acoustic requirement relating to the childcare facility façade. Appropriate internal noise levels are predicted to be achieved with standard double glazing and ventilators.

12.6 Residual Impacts

12.6.1 Construction Phase

12.6.1.1 Noise

Demolition and piling activities are predicted to exceed the noise threshold for potential significant effect when they occur at the closest proximity to the dwellings located on the boundary of the Site. However, it should be noted that the assessment can be considered worst case and it is unlikely that all items of plant assessed will be in operational simultaneously. Additionally, the predictions only indicate a potential significant

effect (based on a worst-case scenario) when working at the closest location to the dwellings, with lesser impacts predicted at all other locations across Site.

Residual impacts associated with construction activities undertaken on-site are categorised as:

Quality	Significance	Duration
Negative	*Moderate*	*Temporary*

12.6.1.2 Vibration

It is possible that vibration from Construction Phase activities will be perceptible at receptor locations, but not of the magnitude that would cause disturbance. The impacts are predicted to be as follows:

Quality	Significance	Duration
Negative	*Not significant*	*Short-term*

12.6.2 Operational Phase

12.6.2.1 Mechanical Plant and Services Noise

Once cumulative plant noise emissions from the proposed Project are designed to achieve the appropriate noise criteria the residual noise impact is as follows:

Quality	Significance	Duration
Negative	*Imperceptible*	*Permanent*

12.6.2.2 Additional Traffic on Local Roads

All impacts are predicted to be as follows:

Quality	Significance	Duration
Negative	*Imperceptible*	*Permanent*

12.6.2.3 Operational Inward Noise Impact

With respect to inward noise impacts, the specification of noise mitigation has been recommended so that the internal noise criterion will be met. With mitigation measures in place the impacts are categorised as follows:

Quality	Significance	Duration
Negative	*Not significant*	*Permanent*

12.7 Monitoring

12.7.1 Construction Phase

The appointed Contractor will be required to ensure construction activities operate within the noise and vibration limits set out within this assessment. The appointed Contractor will be required to undertake regular noise and vibration monitoring at locations representative of the closest sensitive locations to ensure the relevant criteria are not exceeded.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics – Description, Measurement and Assessment of Environmental Noise*.

Vibration monitoring should be conducted in accordance with BS 6472 for *Human Disturbance* and BS ISO 4866: 2010 for *Building Damage*.

12.7.2 Operational Phase

Noise or vibration monitoring is not required once the proposed Project is operational.

12.8 Reinstatement

There are no reinstatement requirements with respect to noise and vibration.

12.9 Interactions

The potential interaction between Noise and Vibration and other Sections in the EIAR is primarily limited to Population and Human Health and Traffic and Transportation. This Noise & Vibration Section has been prepared in consideration of and in conjunction with the relevant outputs of these sections.

There is potential for impact on human health from noise associated with construction activities and inward traffic noise.

Construction traffic has the potential to have an impact in terms of noise and vibration. The Noise and Vibration chapter has been prepared in close consultation with the traffic consultant. A Construction Traffic Management Plan (CTMP) for construction traffic will also be agreed with the Local Authority to establish appropriate access routes, times of access, and any occasional or temporary traffic management requirements at the interface of the Site and either East Road or Sheriff Street Upper.

12.10 Cumulative Impacts

In terms of construction noise, it is noted that construction works at the 1-3 East Road site may be ongoing simultaneously to the proposed Project. Due to where the nearest NSLs to both sites are located, there is a possibility that elevated Construction Phase noise emissions due to cumulative noise could possibly occur at receptor locations equidistant to both sites, *i.e.* receptors bounding the west boundary of the Site. These

locations represent a limited number of receptors and cumulative impacts in this regard would be *short-term* in nature.

Cumulative impacts will need to be considered and managed during the Construction Phase. It is recommended that liaison between both construction sites is on-going throughout the duration of the Construction Phase. Contractors should schedule work in a co-operative effort to limit the duration and magnitude of potential cumulative impacts on nearby sensitive receptors. Cumulative construction noise impacts are expected to be *negative, significant* and *short-term*.

There are several committed developments in relative proximity to the Site of the proposed Project. During the Construction Phase of the proposed Project, construction noise on-site will be localised and will therefore likely be the primary noise source at the nearest noise sensitive receivers. In the event that construction activities associated with other committed developments occur simultaneous to the proposed Project, they are at sufficient distances such that the cumulative noise levels will remain dominated by the localised works referred to in Table 12.8.

Permitted developments are included in the traffic impact and therefore the potential for a cumulative impact has already been assessed. Future projects of any future currently unpermitted large scale would need to conduct an EIA to ensure that no significant impacts resulting from noise and vibration will occur as a result of those developments.

12.11 'Do-Nothing' Impact

In the absence of the proposed Project being constructed, the noise environment at the nearest noise sensitive locations and across the Site of the proposed Project itself will remain largely unchanged. The noise levels measured and noted during the baseline studies are considered representative of the '*do-nothing'* scenario. The '*do-nothing'* scenario is therefore considered *neutra*l impact.

12.12 Difficulties Encountered in Compiling the Chapter

No difficulties were encountered in compiling this Chapter of the EIAR.

13 Landscape (Townscape) and Visual

13.1 Introduction

This Chapter of the EIAR was prepared by Brady Shipman Martin and describes the likely significant effects of the proposed Strategic Housing Development (SHD) (referred to as "*the proposed Project*"), on the landscape and visual aspects of the receiving environment. The Site of the proposed Project is located at Sheriff Street Upper and East Road, Dublin 1.

The proposed Project will consist of the demolition of all structures on the Site and the construction of a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a standalone three storey childcare facility and residential tenant amenity. The proposed Project will also accommodate car parking spaces, bicycle parking, storage, services and plant areas. More details on the background and Site history is provided in Chapter 5 (Description of the Proposed Project).

This Chapter is accompanied by a set of Photomontages of the proposed Project which are included in the planning application pack. Table 13.1 details the aspects which are particularly relevant to the landscape and visual assessment.

Table 13.1: Important Aspects for the Landscape and Visual Assessment

Aspect	Description
Design	Form and massing of the proposed Project.
	Façade on all above ground structures.
	Cognisance of how design elements impact on Views of the proposed Project and any effects on the receiving environment, including landscape character.
Operation	Views of the proposed Project and any effects on the receiving environment, including landscape character.
Construction	Views of the proposed Project and any effects on the receiving environment, including landscape character.
	Loss or change of existing structures that contribute to the receiving environment.

13.2 Methodology

13.2.1 General

The landscape assessment has considered the likely significant effects of the proposed Project on the landscape as an environmental resource and the visual assessment has considered the effect of visual change on receptors. Landscape and visual effects have been considered for the Construction and Operational Phase of the proposed Project.

Further, to support the assessment, a series of photomontages, illustrating the physical and visual appearance of the proposed Project, has been prepared from a range of publicly accessible locations that are representative of the more open views in the surrounding environment. The Photomontage views are included within the planning application pack.

13.2.2 Guidance and Legislation

The assessment has been undertaken with regard to the relevant guidelines for landscape and visual assessment, including:

- EPA (2017). *Draft Guidelines on the Information to be Contained in EIARs.*
- EPA (2015). *Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements.*
- The Landscape Institute/Institute of Environmental Management and Assessment (IEMA) (2013). *Guidelines for Landscape and Visual Impact Assessment* (3rd Edition).
- European Commission (2017). *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report.*
- Government of Ireland (2018). *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*.
- Department of Housing, Planning and Local Government (DHPLG) (2018). *Urban Development and Building Height Guidelines. Guidelines for Planning Authorities.*

The methodology used for the landscape assessment entailed:

- Desktop studies of the Site in relation to its overall context locally, regionally and nationally.
- A Site visit including the environs between June 2018 and October 2020 to assess the following:
    - quality and type of views in the area;
    - the extent of the visual envelope*, i.e.* the potential area of visibility of the Site in the surrounding landscape; and
    - the character and quality of the surrounding landscape in relation to the position of the proposed Project.

13.2.3 Consultation

The proposed Project, from initial concept design through to final design proposal, has been an iterative process, both within the design team, and in consultation with the Planning Department, since early 2019. A full schedule of consultations with the Planning Department is provided in Chapter 6 (Consultation) of this EIAR.

13.2.4 Categorisation of the Baseline Environment

The landscape and visual assessment involved visits to the Site and its environs, from June 2018 to October 2020, to review the nature and scale of existing development both on and surrounding the Site, to identify landscape features, local character and land uses, to identify key views to and from the proposed Project, and to note receptor sensitivity.

This Site based assessment was augmented by reviewing aerial photography, publications and reports and project information included within the application for consent and in this EIAR.

13.2.5 Impact Assessment Methodology

The landscape and visual impact assessment for the proposed Project takes account of the character and nature of the existing Site and its surrounds, the location of sensitive landscapes and visual receptors, the sensitivity and significance of the Site, and its vulnerability to change.

The characteristics of this impact assessment are defined in Table 13.3 to Table 13.5.

Table 13.2 has been derived from guidance from the EPA[133] and the UK Landscape Institute[134] and from the professional experience of the author in carrying out landscape and visual assessments for over 25 years.

Table 13.2: Categorisation of Likely Significant Effects (Matrix derived from the guidance)

Scale / Magnitude		Sensitivity of Receptor			
		High	Medium	Low	Negligible
Character / Magnitude / Duration / Probability / Consequences	High	Profound	Very Significant	Significant / Moderate	Moderate / Slight
	Medium	Very Significant / Significant	Significant / Moderate	Moderate	Slight / Not Significant
	Low	Significant / Moderate	Moderate / Slight	Slight / Not Significant	Not Significant / Imperceptible
	Negligible	Slight / Not Significant	Not Significant	Not Significant / Imperceptible	Imperceptible

[133] EPA (2017).
[134] UK Landscape Institute and IEMA (2013).

The quality of effects, which in nature may be positive, neutral or negative/adverse, are described in Table 13.3.

Table 13.3: Quality of Effects

Quality of Effect	Description of Effect
Positive Effects	A change which improves the quality of the environment (for example, by increasing species diversity or improving the reproductive capacity of an ecosystem; or removing nuisances; or improving amenities).
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing a nuisance.

Table 13.4 outlines the definitions of significance of effects which range from imperceptible to profound effects.

Table 13.4: Definitions of Significance of Effect

Significance of Effects	Description of Significance of Effects
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without noticeable consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.

In terms of duration, effects are considered in Table 13.5.

Table 13.5: Describing Duration of Effects

Duration of Effects	Description of Duration of Effects
Momentary Effects	Effects lasting from seconds to minutes.
Brief Effects	Effects lasting less than a day.
Temporary Effects	Effects lasting less than a year.

Duration of Effects	Description of Duration of Effects
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years.
Permanent Effects	Effects lasting over sixty years.

Further aspects of effects including their **magnitude** (*i.e.* extent, frequency, and context); **probability** (*i.e.* likely, indeterminable, 'worse-case'); and **type** (*i.e.* cumulative, interaction (synergistic), residual, indirect, *etc.*) are also considered in the assessment, where appropriate in accordance with those descriptions outlined in the EPA guidance[135].

The landscape assessment has considered the *likely significant effects* of the proposed Project on the landscape as an environmental resource and the visual assessment has considered the effect of visual change on receptors. Landscape and visual effects have been considered for the Construction and Operational Phase of the proposed Project.

Further, to support the assessment, a series of photomontages, illustrating the physical and visual appearance of the proposed Project, has been prepared from a range of publicly accessible locations that are representative of the more open views in the surrounding environment, which are included in the planning application pack.

13.3 Baseline Environment

13.3.1 Site Context and Description

Castleforbes Business Park, the Site of the proposed Project, is located on the northern edge of the Docklands, between the North Lotts and the East Wall areas of the City. The North Lotts includes the lands between the River Liffey and the southern side of Sheriff Street Upper. The Site lies along the northern side of Sheriff Street Upper, and is bounded to the north by a rail line that in turn forms the southern boundary of the East Wall residential neighbourhood to the immediate north. See Figure 13.1 below.

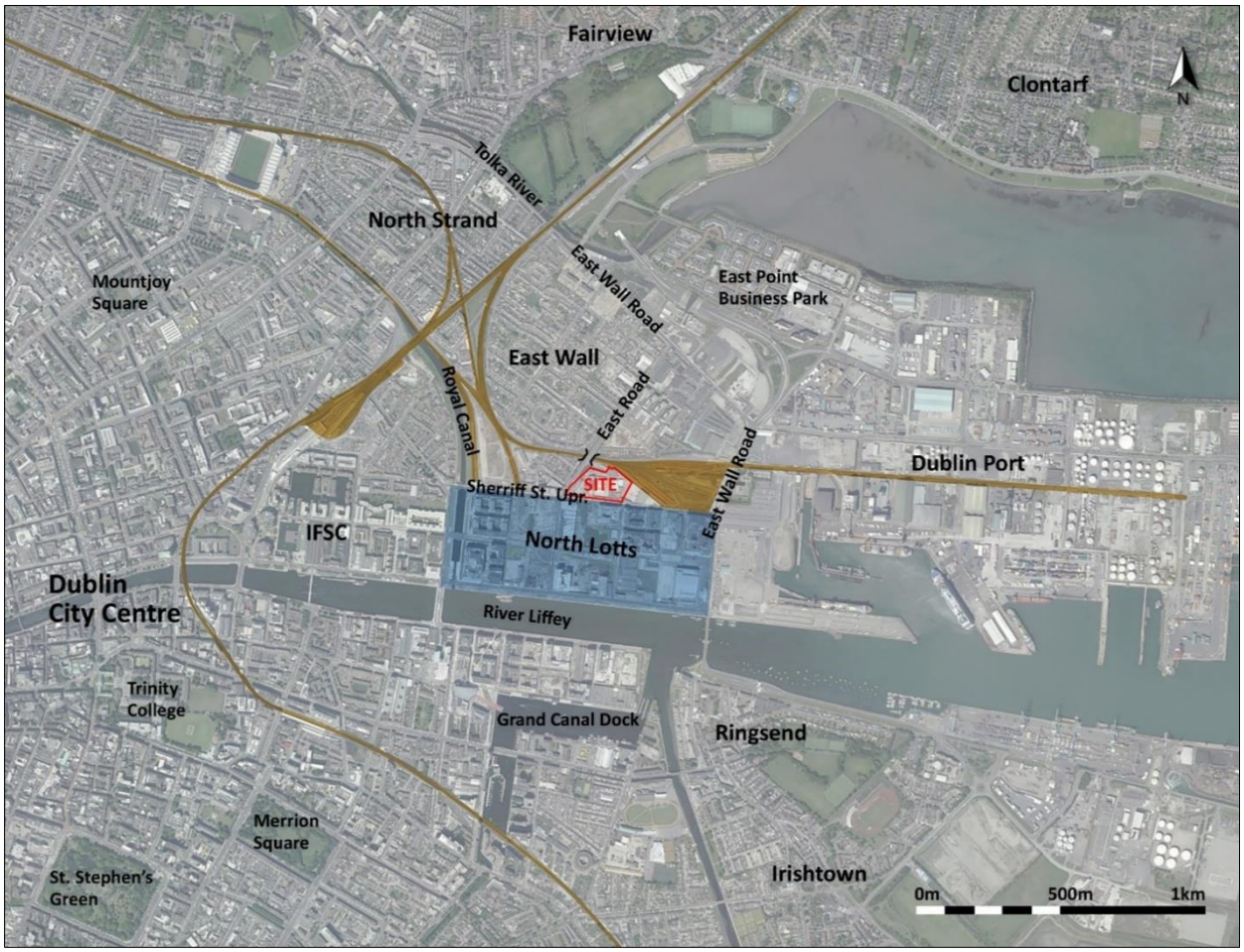
Although the Site is immediately outside of the recognised North Lotts SDZ boundary, it is nonetheless perceived as being part of the north docklands area. This association is due to a number of factors, including:

- the site and the North Lotts define the northern and southern edges of the Sheriff Street Upper streetscape;
- the physical and visual separation of the East Wall and Docklands by virtue of railway line, railway yards, and elevated overbridge at East Road;

[135] EPA (2017).

- the lack of connections between the north docklands and East Wall, other than the East Road bridge; and
- the docklands, industrial and brownfield nature that has been characteristic of the collective lands.

Figure 13.1: Site Context (Site location in red)



13.3.1.1 Historic Context

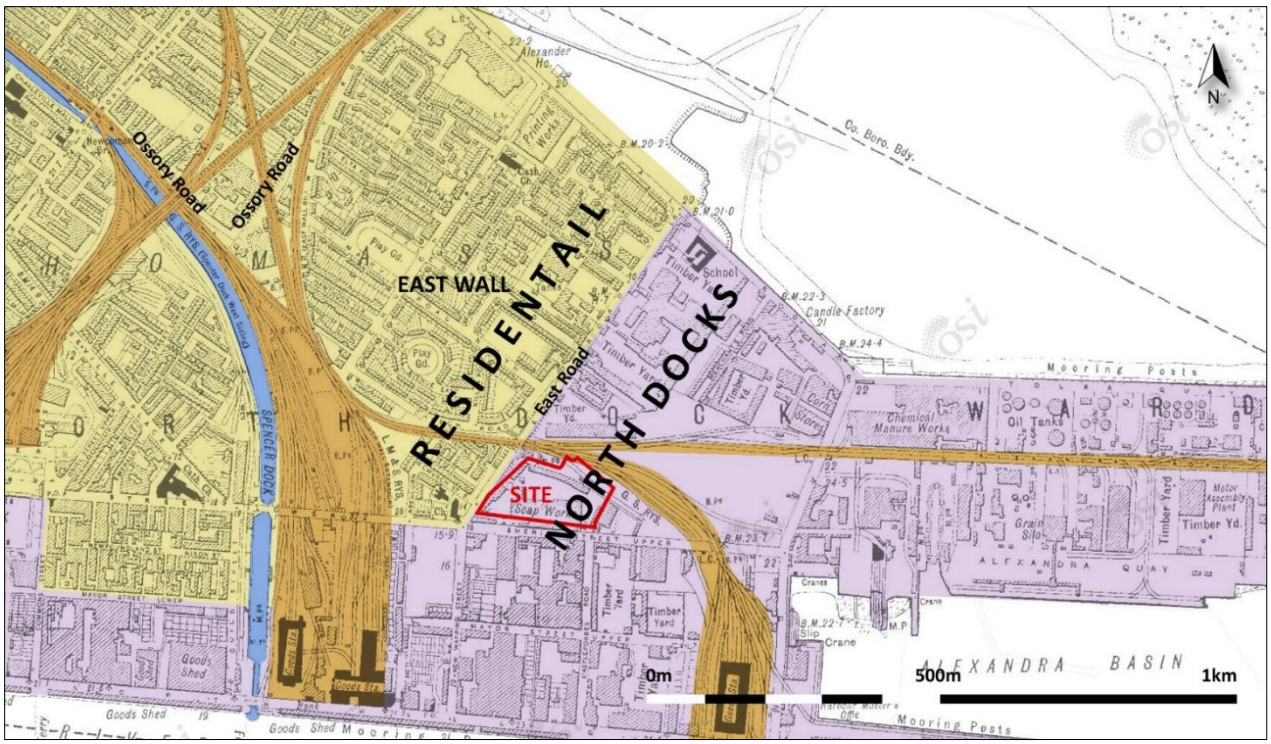
The north Docklands comprises the North Docks and Port area, together with the traditional residential area of the East Wall area which established during the late 18th century. There were strong associations between East Wall and the Docklands and Port, with many of the local population taking up employment in Dublin Port. The small scale of the houses, typically single and two storey, were located in proximity to the larger scale industrial facilities in the North Docks and along North Wall Quay. A network of railway lines, many elevated, brought both passenger and freight trains to Amiens Street and North Wall Stations, and to the Goods Stations along North Wall Quay and into the North Docks.

The elevated railway has always defined the western edge and a sense of enclosure to East Wall. Movement westwards has always been precluded by the railway, with a single railway underpass leading via West Road and Ossory Road towards North Strand. As it approaches the north Docklands and East Road, the railway line

drops to ground level, however, the railway corridor and its enclosing walls extend the sense of enclosure along the southern extent of East Wall. While East Road is mostly flat, it ramps up for c. 130m either side of the railway line to cross the railway. The rising roadway, with parapet walls and embankments, provides a sense of enclosure along the eastern side of East Wall.

Figure 13.2 illustrates the historic relationship between the predominantly residential (in yellow) fine grained area of East Wall and the larger scale industrial and port related buildings at North Docks (in pink). East Road defined the transition from the residential area into the North Docks, and that transition was also apparent to the south at Mayor Street and Sheriff Street Upper. Railway infrastructure extended through the area (shown orange) and was a defining feature of the locality, as goods were brought to and from the North Quays and Dublin Port by rail.

Figure 13.2: Traditional Residential and Industrial land use around the Site (Site location in red)



13.3.1.2 Modern Context

The modern day landscape of the East Wall area retains substantial elements of its origins, and the area has been extended through land reclamation to the north of Dublin Port and East Wall Road. Areas to the south, east and north of East Wall have seen extensive changes in the built environment. Significant areas of redevelopment, with taller buildings than before, now form part of the urban landscape, and define and give identity to the different character areas of the expanding City. The extension of the Dublin Port lands northwards and the opening of the Dublin Port Tunnel also introduced significant changes in the perception of the East Wall Road and Port area. The Dublin Port Tunnel now provides immediate access to the National Road network.

Along the North Wall Quay, the former Goods Sheds, Timber Yards and Station Buildings have been substantially redeveloped or re-purposed to provide a mix of higher density modern commercial, residential, cultural and tourism developments along the River Liffey waterfront. This is illustrated below in Figure 13.3 where yellow and light blue indicate substantially residential and commercial/other urban uses respectively. Dublin Port, shown in pink, has moved east of the East Wall Road, and now extends northwards into newly reclaimed land.

The railway infrastructure, shown in orange, remains characteristic of the area, however, it has been rationalised and curtailed as Goods Sheds and Station Buildings have been redeveloped, and also as the Dublin Port Tunnel now facilitates freight haulage to and from Dublin Port by road. The LUAS red line, shown in red, now brings people to and from this part of the expanded City along Mayor Street for work, living and recreation.

The pattern of expansion of the City into East Wall and the North Lotts, with a mix of residential, commercial and other urban uses, can readily be seen in Figure 13.3 below with defined blocks of residential and commercial/other urban uses illustrating an expanded North Lotts urban riverfront and continuing to redevelop the light industrial blocks, shown in purple, that remain between East Road and the East Wall Road. Hatched purple areas indicate light industrial lands where planning permissions have already been granted for mixed use redevelopment, and clearly illustrate the focus on redevelopment between the North Lotts and East Wall that will connect these two parts of the modern city.

Figure 13.3: Residential and Industrial land use around the Site (Site location in red)

Plates 13.1 - 13.12 provide a pictorial overview of the context of the proposed Project, with areas of low rise and established residential developments to the north of Sheriff Street at East Wall, Seville Place and East Wall Road. The relationship of the locality to the City, the North Lotts, the Docklands and the emerging regeneration within these areas is also apparent.

Plate 13.1: View along Seville Place, with residential and City context

Plate 13.2: View from East Wall Bridge of Docklands context

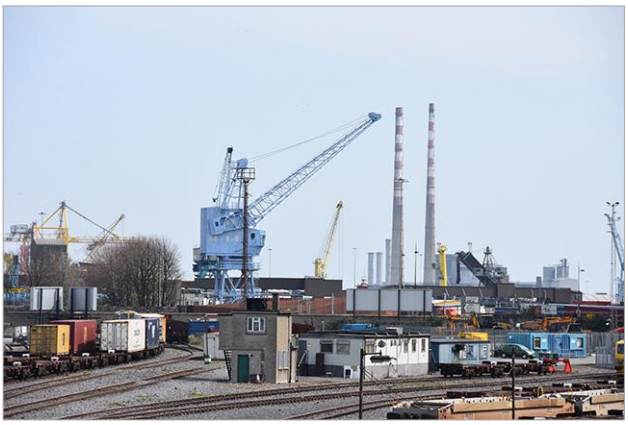


Plate 13.3: View from East Wall Bridge of City and East Wall context

Plate 13.4: View from East Wall Bridge of Docklands and North Lotts context

Plate 13.5: View south from Church Avenue

Plate 13.6: View south from Abercorn Road

Plate 13.7: View south from Shelmalier Road

Plate 13.8: View east from Shelmalier Road at Ravensdale Road

Plate 13.9: View east from Ravensdale Road

Plate 13.10: View west from St. Mary's Road

Plate 13.11: View south from Church Road at St. Mary's Road

Plate 13.12: View west from St. Mary's Road

13.3.2 Character Areas

Sheriff Street Upper is located within a diverse and continually changing urban context and at the interface of a number of distinct character areas that all contribute to the sense of place and to the identity of the wider area:

13.3.2.1 North Docklands

The landscape of the north Docklands is naturally low lying and flat, extending from the North Wall Quay at the River Liffey. While significant characteristics of the earlier Docklands remain, including railway infrastructure, the East Wall residential area, the general street pattern, and elements of the Port, the area of the North Docklands has seen extensive regeneration that has been guided most recently by the North Lotts SDZ. Much of the North Lotts area has either been redeveloped, or is in the process of redevelopment.

The emerging North Lotts is characterised as a new mixed use urban quarter of the City, including commercial, residential, recreation and amenity uses arranged around an urban grid that reflects the original rectilinear road pattern of the Docklands. A hierarchy of street types are defined by contemporary mixed use buildings that typically range in height from six to eight or ten storeys depending on use, and with specific sites delivering local landmark buildings.

The Convention Centre and the 3Arena (former Point Depot) are significant destinations that attract people to the area, and the LUAS Red Line brings people from the City centre directly into the heart of the North Lotts and to Point Village and the 3Arena. The Campshires on North Wall Quay have been upgraded to provide enhanced riverfront public realm along the river frontage of the North Lotts. The Exo building is nearing completion at the eastern end of the North Lotts and includes redevelopment of the public realm at Point Square as a major civic space within the area.

Redevelopment has established a recognised new urban quarter of the City that is distinctive for its river frontage and Docklands context, and for the range, quality and type of buildings and destinations it now presents. Equally, this new urban quarter is apparent from the wider city context, with the taller building forms visible on the City skyline and contributing to the wider legibility of the City.

13.3.2.2 Sheriff Street Upper

Sheriff Street Upper runs in an east-west alignment and defines the northern boundary of the North Lotts, The southern side of the street has been substantially redeveloped as it is within the defined North Lotts SDZ, however, the northern side retains much of the light industrial and railway character of the original Docklands street.

The character of Sheriff Street Upper is diverse, both from east to west, and from north to south. The street retains substantial elements of its original industrial and docklands character, however, it is continually

transitioning towards a more contemporary urban streetscape. Much of the southern side of the street is now defined and characterised by modern mixed-use developments that are part of the new urban quarter of the North Lotts. Regeneration of the North Lotts has established 7-8 storey frontage along the southern side of Sheriff Street Upper, with 11-12 storey gateways, that has begun to transform the streetscape from its traditional industrial and docklands character to one of an emerging urban quarter. At present, this transformation terminates abruptly along the southern side of Sheriff Street Upper and the northern side of the street is markedly different in character and quality. Moving from east to west, it includes the high boundary walls and gateways of the railway yards, followed by those of the Castleforbes Business Park. The contrast between both sides of the street creates a strong sense of underutilisation along the northern side of the street.

At the corner of Sheriff Street Upper and East Road, a modern 6-11 storey residential building defines the junction and has frontage onto both streets. Two further developments adjoin it to the west, and together they form a modern block between East Road and Abercorn Road. Further west, the road rises to traverse the old railway arches. The established Park Lane residential development defines the southern side of the street, however the northern side is entirely open, with expansive views over the disused railway lands towards the low rise East Wall area beyond. After the Docklands Railway Station, the street then continues over the Royal Canal via the Bascule lifting bridge before terminating at the mid-19th century St. Laurence O'Toole Church. The spire of the church is a distinctive local landmark, and is visible along the entire length of Sheriff Street Upper.

This sense of underutilisation along the northern side of the street is reinforced by the continual emergence of new developments in both the immediate and wider urban context. Within the streetscape, these include the new developments along the southern side of the street that are within the defined North Lotts SDZ, and also the block of buildings on the northern side of the street between Abercorn Road and East Road. North of the railway, redevelopment and regeneration activity is also evident in a range of residential and commercial towards the northern end of East Road.

Planning has been granted for developments to the immediate east and west of the Site of the proposed Project. These include a mixed use commercial and hotel development of up to 9 and 10 storeys to the east, and a 9 storey hotel development to the west at the corner of Sheriff Street Upper and East Road. These developments will contribute to the establishment of a high quality urban streetscape along the eastern end Sheriff Street Upper.

13.3.2.3 East Wall

The landscape of the East Wall area, north of the railway lines, is also naturally flat and low lying, and is characterised by the diversity in scale and function of its built fabric, and the confluence of major road, rail

and water-based transport infrastructure. East Wall generally marks the transition from the River Liffey corridor and north Docklands to the outer residential areas at Fairview and Clontarf. East Road has traditionally marked the eastward transition from Dublin City to Dublin Port, however, as the City expands, the location of this transition has and continues to move eastwards.

The area to the west of East Road comprises traditional two-storey terraced and semi-detached residential properties with occasional larger community buildings including St. Joseph's Church and the distinctive Seán O'Casey Community Centre, as well as recreational facilities and a range of neighbourhood centre facilities. In more recent times, a number of larger apartment, commercial and retail buildings have been developed to the north and east of this area along the East Wall Road and East Road. The East Wall neighbourhood is physically contained by the elevated railway line to the west, the walled railway corridor to the south, and by the embankment leading to the road bridge along East Road. This area also includes a smaller cluster of established dwellings immediately south of the railway line at Abercorn Road, Church Street East, Irvine Court and Irvine Terrace. Despite being enclosed and physically contained, the proximity of this area to the North Lotts is such that there are many locations within East Wall from where the modern higher density and taller buildings of the expanding city are readily apparent.

Lands to the east of East Road were traditionally more industrial in use, with extensive warehousing, marshalling yards and railway sidings associated with Dublin Port. More recently, this larger scale fabric has been in part redeveloped with mixed-use residential and commercial buildings rising to six and seven storeys already redefining the northern and middle section of East Road, and clearly visible form the bridge over the railway towards the southern end of East Road. Merchant Road runs parallel to East Road, and is a two-storey streetscape with residential and industrial uses, that also leads to a small modern residential cluster at Merchant's Square on the northern side of the railway.

Permission has been granted for the mixed-use East Road development, immediately north of the railway line and on the eastern side of East Road. This development will introduce a new 15 storey gateway building adjacent to the bridge together with a cluster of buildings stepping down to between 10 and 3 storeys.

The elevated East Road bridge, crossing over the railway tracks below, affords good visibility and an understanding of both the historic and modern built and infrastructural context of the North Docks and East Wall areas, and their relationship to the City and to Dublin Port.

13.3.2.4 M50/Dublin Port Tunnel

The M50 emerges from the Dublin Port Tunnel as it approaches Dublin Port and the East Link Bridge. The carriageway rises to cross Promenade Road that leads into the reclaimed lands of Dublin Port. This elevated position affords extended views of:

- East Point Business Park to the left;
- Dublin Port straight ahead and to the left, and the Poolbeg Chimneys visible in the distance;
- framed views of the distant Dublin Mountains to the south, including the roof of the Aviva Stadium; and
- views of the emerging North Lotts buildings and the new mixed-use buildings along the eastern side of East Road to the right.

Despite the elevated position, there is little if any awareness of the original East Wall residential area by virtue of its low lying nature and also the intervening presence of newer higher density structures along East Road.

13.3.2.5 East Wall Road

The East Wall Road has two parts. The first runs along the northern side of East Wall and leads from the Alfie Byrne Road to the junction with the M50/Dublin Port Tunnel road. The second part leads from that junction southwards to the River Liffey at the East Link Bridge.

To the north, the road is characterised by a mixture of five and six storey commercial developments, car sales outlets, supermarkets, a filling station and a range of light industrial and retail units. The road itself varies from two to four lanes, and has generous footpaths on both sides. Two blocks of the East Wall terraced dwellings, comprising approximately thirty dwellings, form the southern elevation of a short portion of the road. A number a roads lead directly from East Wall Road into East Wall. These include Church Road, Forth Road, East Road and Merchant's Road, and afford glimpse views into the East Wall settlement as well as framed vistas to the North Lotts developments beyond. The view along East Road is perhaps the most interesting, as it demonstrates the juxtaposition of different periods and scales of development on either side of the road. The western side is initially two storey and residential leading to the taller Canon Hall residential development beyond the bridge in the distance. The eastern side is up to six and seven storey mixed-use development along the original line of the North Docks boundary. East Road provides a vista towards the North Lotts, and the corner tower of the PWC building on north Wall Quay is distinctive at the end of this vista.

The eastern portion of East Wall Road is predominantly vehicular in character and nature, comprising six traffic lanes reducing to three south of Sheriff Street. The road is a regional distributor road, with extensive undeveloped, vacant and brownfield sites on either side, and with limited offer in terms of urban character. The Dublin Port Company head office has recently upgraded its frontage onto the road and established a

contemporary public realm along that part of the road that reflects the heritage of the Port and the heavy industrial materials associated with ports and marine activities. A restored gantry crane and sculptural steel display creates a strong visual reference along the road to the port activity beyond. Towards the southern end of the road, the 3Arena and the Point Square establish a stronger and more attractive pedestrian environment that can be highly animated with larger crowds during events and concerts. The Exo Building is nearing completion and will bring further activity, animation and visual interest to this location.

13.3.2.6 Dublin Port

Dublin Port is a working port, catering for both passenger and freight, and while it immediately adjoins the East Wall Road, the six lane nature of the road and the high boundary walls limit visual awareness of the port from outside. The Dublin Port Company head office building, a seven storey structure, is the most prominent port structure along the East Wall Road. The recent boundary and public realm works along its frontage from Sheriff Street to Alexandra Road, incorporating a gantry crane and contemporary forms of corten steel as sculptural elements and boundary treatment, have greatly improved the presentation and presence of the head office and the entrance to Dublin Port along East Wall Road.

13.3.2.7 Royal Canal

The Royal Canal defines the western edge of the area, and was originally constructed for the transport of goods by barge to and from the North Quays to the midlands. Today, the section that forms the western edge of the North Lotts is a linear park, with strong references to the waterways heritage, providing a local amenity, and providing a setting for the Convention Centre and redevelopment at the North Lotts.

13.3.3 Site of the Proposed Project

The application Site boundary is 2.44 hectares (ha) and the proposed Project development area is 2.02ha. The Site comprises the Castleforbes Business Park with frontage onto both Sheriff Street Upper and East Road. The Site is characterised as an established light industrial facility, comprising an extensive marshalling yard with a range of industrial, office and warehouse structures of varying size and quality. The larger buildings are typically single storey industrial type units, and the smaller buildings generally single or two storey office or light industrial units, and with occasional taller built elements. Frontages onto Sheriff Street Upper and East Road are defined by a combination of the smaller buildings and high boundary walls, presenting a mix of brickwork, plastered or dashed masonry, profiled metal cladding, and stone walls. The entire Site is inward looking, with any windows mostly blocked or boarded up, and a single vehicular entrance provides access from Sheriff Street Upper directly opposite the northern end of Castleforbes Road. There is no landscape on the Site. Boundaries with the adjoining railway lands are defined by high concrete or masonry walls.

To the northwest of the Site, at the bottom of the East Road bridge embankment, there is a separate light industrial property comprising a single storey shed, a single storey office building, and a small marshalling and parking area. This property is accessed from East Road via a laneway that runs along the bottom of the bridge embankment. The embankment includes some shrub planting and two small trees.

13.3.4 Landscape Planning Context

13.3.4.1 Dublin City Development Plan 2016-2022

Core Strategy

The Core Strategy of the Development Plan promotes the intensification and consolidation of Dublin City, and the Docklands is identified as one of the SDRAs capable of realising this objective.

Land Use Zoning

The Site is located within *SDRA 6 Docklands (SDZ and Wider Docklands Area)* as set out in the Development Plan, see Figure 13.4 below. The land use zoning within the SDRA is Z14, with the objective:

> "*to seek the social, economic and physical development and/or rejuvenation of an area with mixed use, of which residential and 'Z6' would be the predominant uses*".

The Z6 zoning aims to provide for enterprise and facilitate opportunities for employment creation.

The Dublin City Development Plan, Section 15.1.1.6 identifies that:

> '*the designation of the Docklands, including the Docklands SDZ, as a strategic development and regeneration area (SDRA) provides for the continued physical and social regeneration of this part of the city, consolidating the area as a vibrant economic, cultural and amenity quarter of the city, whilst also nurturing sustainable neighbourhoods and communities*'.

Building Height

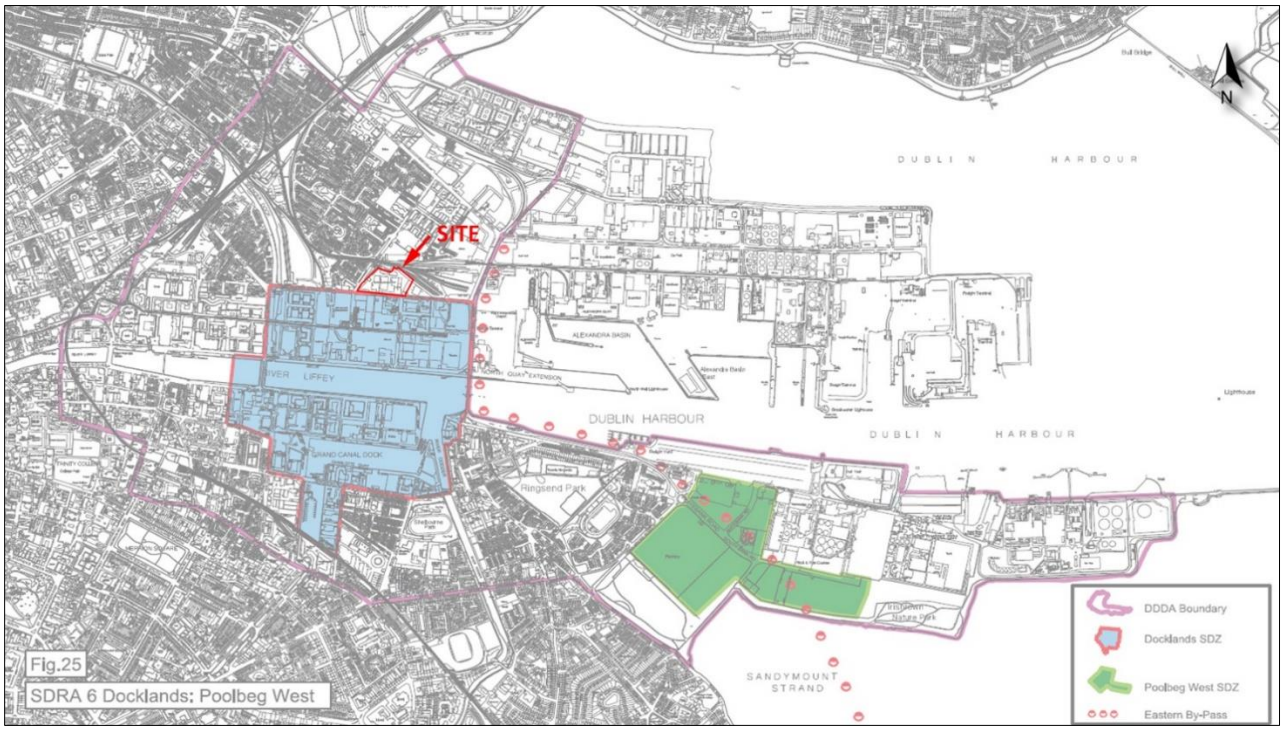
The Development Plan Height Strategy identifies a general building height cap of 24m for residential development in this location, however the introduction of the *Urban Building Height Guidelines*[136] establish the principle for the re-examination of height limits on a site specific contextual basis, and these now take precedence over the more general Development Plan height limits.

A comprehensive consideration of the *Urban Building Height Guidelines*, in conjunction with the SDRA objectives, and in the context of the proposed Project, is provided in Chapter 3 (Planning and Development Context) of this EIAR. This sets out a robust rationale for the principle of development of a cluster of buildings of up to 18 storeys at this location.

[136] DHPLG (2018).

The proposed Project represents a comprehensive urban regeneration development, that responds both to the existing and emerging context, addresses all of the criteria set out in the *Urban Building Height Guidelines*, and will establish a landmark to the scheme itself and to the wider East Wall area.

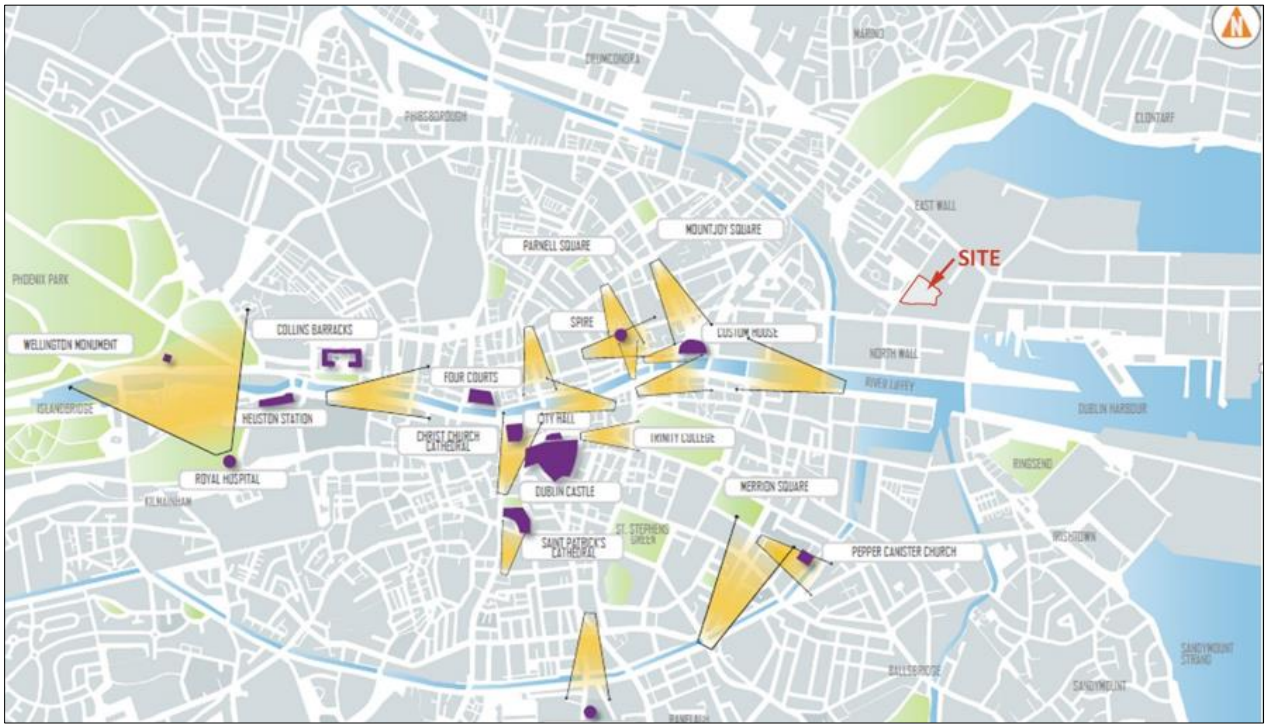
Figure 13.4: SDRA 6 Docklands (SDZ and Wider Docklands Area) (Site location in red)



13.3.4.2 Views and Prospects

The key *Views and Prospects of the City are presented in Fig. 4 of Dublin City Development Plan*, although indicative at present and subject to a more detailed review during the lifetime of the Plan, substantially relate to the areas between the Canals, and do not pertain to the Site or its surrounds, see Figure 13.5 below.

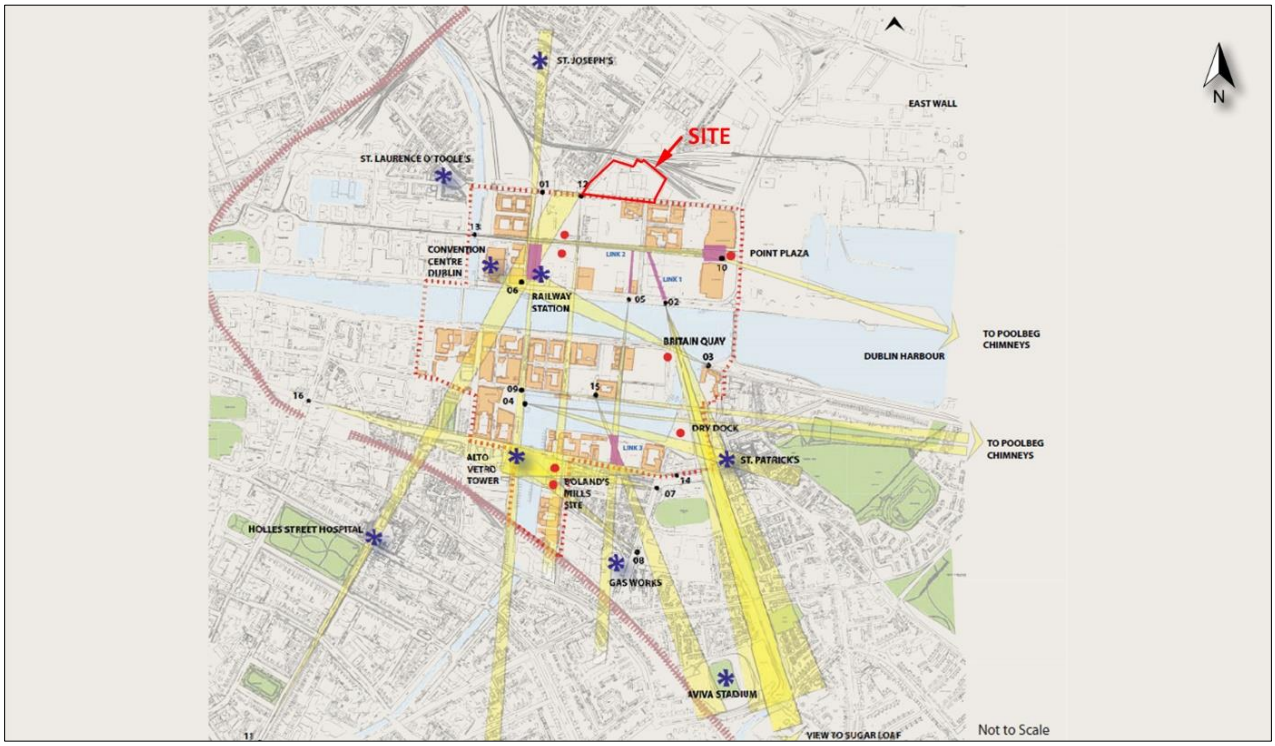
Figure 13.5: Extract - Fig. 4 of the Dublin City Development Plan. Key Views and Prospects (Indicative) (Site location in red)



The *North Lotts and Grand Canal Dock SDZ Planning Scheme*[137], the extent of which is fully contained within the SDRA 6 boundary, identifies additional Views and Prospects within the area of the Planning Scheme (see Section 4.6.7 of the Planning Scheme & Fig. 18). The Site is overlaid on Figure 18 of the Planning Scheme, see Figure 13.6 below, and it is clear that the location of the Site relative to the Views and Prospects will not feature

[137] DCC (2014). Planning: http://www.dublincity.ie/main-menu-services-planning-urban-development-plans-local-area-plans/north-lotts-grand-canal-dock

Figure 13.6: Extract - Fig. 18, North Lotts and Grand Canal Dock SDZ Planning Scheme 2014 (Indicative) (Site location in red)



13.3.5 Landscape/Townscape and Visual Significance and Sensitivity

The Site is significant in terms of its location along Sheriff Street Upper and East Road within the wider Docklands, and for its interface with a diverse range of land uses, building types and scales that characterise the north Docklands and East Wall areas.

The Site itself has no landscape features, trees or other vegetation *of any significance*.

The principal landscape and visual sensitivities relate to existing residential settlements in the locality of the Site, to the views towards the Site from roads, streets and public open spaces within the wider setting, and views of the East Wall and north Docklands skyline from the wider City.

13.4 Characteristics of the Proposed Project

13.4.1 Introduction

See Section 13.1 and Chapter 5 (Description of the Proposed Project) for full details on the proposed Project.

Two vehicular access points are proposed along Sheriff Street, and the part basement car parking is split into two areas accordingly, accommodating bicycle parking spaces, car parking spaces, plant, storage areas and other associated facilities. The main pedestrian access is located centrally along Sheriff Street with additional access points from East Road and from the eastern end of Sheriff Street.

The application also includes for a pocket park on the corner of Sheriff Street Upper and East Road to be provided as a temporary development prior to additional future development on this part of the Site. A detailed development description is set out in the Statutory Notices.

13.4.2 Design Strategy

The overall Site development strategy adopts a primary axis that has a north easterly alignment parallel to East Road. This arrangement facilitates the establishment of a pattern of four primary building lines with three intermediate open space zones across the site, and with maximum sunlight and daylight penetration into the development. The permitted hotel development at the corner of East Road and Sheriff Street will occupy the most westerly building line, and will have frontage onto both streets. Where the buildings meet Sheriff Street Upper, their geometries turn to align with the street frontage.

The primary building lines, including the permitted hotel development, are expressed on Sheriff Street Upper as 9 storey elements, with the design of structural framing and window fenestration providing a vertical emphasis to their facades. The central open space area will have a strong relationship with the street, providing generous and direct pedestrian access from Sheriff Street Upper into the main central public open space of the development. Where the other two main open space areas meet the street, 7 storey elements will complete the definition of the streetscape and also provide enclosure to the open spaces behind. These elements are lower, set back slightly, and have stronger horizontal expression than the 9 storey elements. As such, the northern edge of the streetscape will have a diverse and visually interesting appearance, incorporating a range of building heights, building lines and architectural detailing, as well as incorporating openings of different scales that will ensure the development is permeable and inviting.

As the main building lines continue northwards into the site towards the northern boundary with the railway, taller buildings are introduced, and will range in height from 12 storeys at East Road, to 18, 15 and 13 storeys along the northern site boundary. The tallest building will be the local landmark and signature building of the development, and will be differentiated by not just its height, but also its slenderness and form, and by adopting a more distinctive colour scheme. Additionally, while the other tall buildings will follow the main north easterly grid alignment, this landmark building will be rotated to follow the Sheriff Street alignment. Within the development, this alignment will establish a more dynamic relationship between it and the main public open space within which it stands. Outside the development, it will present as a distinctive landmark that will be visible from across the city, and will form a focal point from North Wall Quay along the space between the NAMA and NTMA buildings.

Landscaping will include a high quality hard and soft landscaped central plaza as the main public open space, together with public and communal landscaped podium areas, and roof top terraces and garden spaces. All vehicle parking will be at basement and/or below podium level, ensuring the entire public realm of the

development is available for pedestrian use and enjoyment. The location of pedestrian entrances and routes also permit permeability of the development and facilitate free movement through the development from Sheriff Street Upper to East Road. Additionally, the public streets will incorporate generous pavements formed with high quality materials that extend from the open spaces of the development, and will also include specimen tree planting.

Full details of the proposed Project are provided in the *Architectural Design Statement*[138].

13.5 Potential Impact of the Proposed Project

New development in an urban environment has the potential to impact on the wider city scale, the district within the city, and the locality of the development, or all three. The quality of impacts can be *positive, neutral* or *negative*, and the significance of impacts is determined by the particular characteristics of the proposed Project and the existing context.

The proposed Project will involve the construction of a substantial new mixed-use residential development on a currently underutilised site. It is intended to provide a landmark development that completes the streetscape of Sheriff Street Upper, optimises the potential of the brown field site between the North Lotts and the railway line, and also establishes a meaningful connection between the North Lotts and the East Road area of the Docklands.

13.5.1 Construction Phase

During the Construction Phase, which is anticipated to take place over a c. 48 month period (four years), potential landscape and visual effects will arise from:

- Site establishment, including provision of the site compound, provision of hoarding, etc.;
- Site clearance, including demolition of existing light industrial units and break up and removal of existing concrete marshalling yard;
- earthworks, excavation and stockpiling;
- access and egress of construction traffic for material import and export;
- erection and operation of tower cranes;
- construction traffic movement onsite;
- construction site lighting;
- general construction activity, including site personnel and equipment;
- gradual appearance of elements of the development in certain local and wider views towards the Site;
- provision of public realm, lighting, paving, landscaping and planting etc.; and

[138] O'Mahony Pike (2020).

- completion and occupation of the development.

13.5.1.1 Effects on Landscape/Townscape Character

Effects on landscape/townscape character during the Construction Phase will be *temporary to short-term,* and will vary considerably from the wider city scale to the more local context of the Site.

At the wider City scale, and given the height of the tallest element at 18 storeys, and the substantially low rise development to the east and west of the Site, there will be locations from where the construction activity may feature on the Docklands skyline. At distances of c. 1-3km from the River Liffey, North Strand, Clontarf and Strand Road, such activity will have *negligible* or *slight* and *neutral* effects on landscape character. From the major open spaces within the Georgian Core, by virtue of distance and built and landscape enclosure, there will be *no landscape effect.*

At the closer Docklands scale, from areas along Sheriff Street Upper, East Wall Road, Castleforbes Street, and Royal Canal, construction activity will become apparent along street corridors and across more open settings. Landscape effects will range from *slight* to *moderate*, and from *neutral* to *negative*.

At the local scale, from the adjoining established residential streets and developments at East Wall and at Merchant's Square, construction activity and the emerging taller structures will be more apparent, giving rise to landscape effects typically ranging from *slight/moderate negative* to *moderate/significant negative*.

13.5.1.2 Effects on Views

Effects on views during the Construction Phase will be *temporary* to *short-term*, and will also vary considerably from the wider city scale to the more local context of the Site.

At the wider city scale, construction cranes and the emerging taller elements of the proposed Project will become visible on the Docklands skyline from locations with more open foregrounds, however, at distances of c. 1-3km from the Site, visual effects will be *not significant/slight* and *neutral* in the context of an established and continually evolving Docklands skyline. From the major open spaces within the Georgian Core, by virtue of distance and built and landscape enclosure, there will be no visual effect.

At the closer Docklands scale, there will be views of the construction activity and emerging structures along street corridors and from more open vantage points. Visual effects will range from *not significant/slight* and *negative*, to *moderate/significant* and *negative*.

At the local scale, construction activity and the emerging development, particularly following construction of the podium level and lower floors, will be more visible from the adjoining streetscapes and developments at East Wall and at Merchant's Square. Visibility from these closer and generally more sensitive locations will

typically give rise to *moderate/significant negative* visual effects as the new and larger scale buildings emerge in views where no existing structures are currently visible.

13.5.2 Operational Phase

New development in an urban environment has the potential to impact on the wider city scale, the district within the city, and the locality of the development, or all three. The quality of impacts can be *positive, neutral or negative*, and the significance of impacts is determined by the particular characteristics of the proposed Project and the existing context.

The proposed Project will involve the construction of a substantial new mixed-use residential development on a currently underutilised site, and is intended to provide a landmark development comprising a cluster of distinctive buildings set within a series of public and communal open spaces, and that will be a natural extension to the emerging North Lotts, and that completes the streetscape of Sheriff Street Upper. The proposed Project is the final piece that will establish a connection between the North Lotts and the existing and planned regeneration at East Road, and will complete the north Docklands are as a distinctive new urban quarter of the City.

13.5.2.1 Effects on Landscape/Townscape Character

Upon completion, the effects of the proposed Project on the landscape character will depend on form, massing and quality of the development in its receiving environment. Landscape effects will be *permanent* and will vary considerably from the wider city scale to the more local streetscapes depending on its presence within the context.

At the wider City scale, the form and massing of the development, within a substantially low rise development to the east and west of the Site, is such that the taller elements of the proposed Project will be readily visible on the Docklands skyline. At distances of c. 1-3km from the River Liffey, North Strand, Clontarf and Strand Road, the taller elements will introduce new skyline elements giving rise to landscape effects ranging from *slight/moderate* to *not significant/slight*. These effects will be *positive* as the new skyline feature will not detract from the existing skyline, and will aid legibility from the wider city by presenting the East Wall landmark. From the major open spaces within the Georgian Core, by virtue of distance and built and landscape enclosure, there will be no landscape effect.

At the closer Docklands scale, from areas along Sheriff Street Upper, East Wall Road, Castleforbes Street, and Royal Canal, the proposed Project will provide a substantial new urban landmark within an urban context that is continuing to evolve. The presence of the new buildings will become part of the composition of established and partially established streetscapes, and will provide a landmark focal point on key streets. The proposed Project will connect the North Lotts area to the existing and emerging East Road area, and together with its

landmark taller building along the railway, will clearly signal a new contemporary urban quarter taking the place of the underutilised light industrial lands at the north Docklands. Landscape effects will range from *slight/ moderate* to *moderate*, and will typically be *positive* as the buildings provide legibility, order and regeneration within an evolving and regenerating context, and the quality of the architectural design, form and detailing is becoming apparent with proximity to the Site.

At the local scale, from the adjoining established residential streets and developments at East Wall and at Merchant's Square, the new taller buildings will give rise to substantial change with certain streetscapes, where the proposed Project will further intensify the appearance of the emerging new contemporary urban quarter as a modern extension of the traditional low rise residential streetscapes. As mentioned in Section 13.3.2, the City and Docklands context of the East Wall residential area is already evident, with many streetscapes including larger modern high density commercial and residential development just beyond the immediate streetscape. Landscape effects will range from *slight/moderate* to *moderate/significant*. Effects are likely to be perceived initially as *negative* by virtue of the change and the larger scale, however these will become more acceptable over time as the buildings are occupied and the development provides a new destination and facilities to the locality.

13.5.2.2 Effects on Views

Upon completion, effects of the proposed Project on views will depend on the form, massing and quality of the development, and also on the distance from which it is viewed and the visual context. Visual effects will be *permanent*, varying considerably from the wider city scale to the more immediate locality of the proposed Project.

At the wider City scale, visual effects will range from *not significant/slight* to *imperceptible/not significant*, and will generally be *positive or neutral* depending on the extent to which the proposed Project provides a visible landmark that signals the East Wall locality within the City and Docklands context. From the major open spaces within the Georgian Core, by virtue of distance and built and landscape enclosure, there will be no visual effect.

At the closer docklands scale, the new buildings will be visible along particular streetscape and from vantage points overlooking undeveloped lands. Visual effects will range from *slight/moderate* to *moderate*, and will generally be *positive* as the proposed Project completes the streetscape of Sheriff Street Upper and provides a landmark and focal point at this locality in the context of the wider Docklands redevelopment.

At the local scale, from the adjoining established residential streets and developments at East Wall and at Merchant's Square, the new taller buildings will be visible along residential streets and adjoining residential developments, and from closer vantage points, will be more pronounced. As noted above, many of the residential streets and developments within the East Wall locality already experience views of increasing

numbers of larger new commercial and residential developments just beyond the immediate streetscape. The addition of the proposed Project will be consistent with that trend, and together with previously permitted developments in the locality, is intended to provide a landmark and focal point for the East Wall locality as well as connectivity between the East Wall area and the North Lotts and River Liffey. Visual effects will typically range from *slight/moderate* to *moderate/significant*. Visual effects are likely to be perceived initially as negative, however these will become more acceptable over time as the buildings are occupied, the neighbourhood is strengthened, and the value of the new public spaces and facilities to the existing community are realised.

13.6 Mitigation Measures

As the proposed Project proposes a complete redevelopment of an underutilised site to deliver a new and contemporary high density mixed-use residential development, the primary mitigation measures are by design.

The *Architectural Design Statement*[139] provides comprehensive details of the existing urban context, concept and design development, and the final design solution. It includes details on how the proposed Project responds to the local context in terms of urban form, massing and height, optimising daylight and sunlight penetration to the development itself and to adjoining properties, and the establishment of a new series of neighbourhood spaces and public realm incorporating active uses.

13.6.1 Construction Phase

Construction activity by its nature can be disruptive to the locality, both in terms of emerging works within the Site, and also with access and egress of construction vehicles to and from the Site and within the local road network.

Mitigation during the Construction Phase will include the establishment of solid perimeter Site hoarding that will restrict views into the Site area and minimise the sense of visual disruption. A Construction Traffic Management Plan (CTMP) for construction traffic will also be agreed with the Local Authority to establish appropriate access routes, times of access, and any occasional or temporary traffic management requirements at the interface of the Site and either East Road or Sheriff Street Upper.

Additionally, permitted construction hours will be agreed in advance with the Local Authority to ensure construction activity does not take place during times that would cause inappropriate inconvenience to local residents.

[139] O'Mahony Pike (2020).

13.6.2 Operational Phase

The proposed Project is to be a landmark and gateway building, signalling a new urban destination within the wider docklands, and providing an attractive and vibrant community focal point for the locality. The design solution will establish a contemporary identity for the East Wall and Sheriff Street Upper locality within the Docklands context, and will serve to integrate and connect the East Wall locality to the North Lotts and River Liffey within that wider Docklands and City context. It will establish a contemporary sense of place that builds on the established neighbourhood identity and reinforces it as a distinct locality in a continually evolving city context.

The design of the proposed Project has involved detailed consideration of avoidance of inappropriate landscape and visual effects through an iterative process of Site analysis through to concept design and final design of layout, massing and detailed design of the scheme as a whole.

The distinctive 18 storey block will presents as a landmark that signals the new East Wall and Sheriff Street Upper locality. Subsequent blocks will step down along the northern boundary with the railway, and also southwards towards Sheriff Street Upper where the proposed Project will establish an attractive and permeable contemporary urban streetscape.

The height, massing, architectural form and material selection of each element of the proposed Project are informed by the local context. The overall development incorporates a range of architectural forms and expressions that provide diversity and visual interest, and reflect both the robust structures of the former Docklands as well as high quality contemporary mixed urban development. Full details of the architectural design are provided in the *Architectural Design Statement*[140].

The proposed buildings will be set within a series of connected public and communal open spaces that will be pedestrian in nature and will incorporate high quality hard and soft landscaping that will add significant new open space and public realm areas to the locality, while also providing a strong focal point to the development. Full details of the landscape proposals are provided in the *Landscape Design Statement*[141].

13.7 Residual Impacts

The proposed Project provides a *positive* response to the regeneration and re-use of the existing brownfield site. It provides a strong mixed-use profile and intensification of under-utilised urban lands in a manner that will extend the North Lotts to the railway and connect to the newly emerging areas of East Road and East Wall. The proposed Project, together with previously permitted developments at East Road and on Sheriff Street Upper, will complete the streetscape of the eastern part of Sheriff Street Upper, and strengthen the urban

[140] O'Mahony Pike (2020).
[141] BSM (2020).

form of East Road as the central spine of the East Wall area that connects through to the River Liffey. The proposed Project will make a *significant* and *positive* contribution to the townscape/urban structure of immediate and wider area.

Residual effects are illustrated in the series of 36 no. photomontage views included in the accompanying *Photomontage Booklet* with this planning application. The view locations are representative of the wider City views, the Docklands context, and the more immediate local context. The view location map is included in the *Photomontage Booklet* on Figure 13.1.0.

13.7.1 Sheriff Street Upper and North Docklands

13.7.1.1 View 01 and 02

View 01 and 02 are from Sheriff Street Upper, approach the proposed Project from the east and west respectively. Figures 13.1.1 and 13.2.1 show the existing streetscape, with new development along the southern side of the street, and vacancy and underutilisation along much of the northern side. Figures 13.1.2 and 13.2.2 include the proposed Project, and show the establishment of the northern side of the street with a building line ranging from 7 to 9 storeys, and the taller buildings stepping up towards the open railway line beyond. The proposed Project represents high quality urban regeneration that will continue the redefinition of this part of the north Docklands as a new urban quarter. Landscape and visual effects are considered to be *moderate* and *positive.*

Figures 13.1.3 and 13.2.3 also include the permitted cumulative developments at East Road, and east and west of the proposed Project, and illustrate the considered composition of the collective developments in seeking to establish a distinctive new mixed use urban locality that connects the North Lotts and East Road areas and responds appropriately to the low rise context of East Wall. Cumulative landscape and visual effects are considered to be *moderate* and *positive.*

13.7.1.2 View 03

View 03 is from East Wall Road which is predominantly a vehicular route into Dublin Port and between the north and south City areas. It clearly illustrates the current abrupt termination of the North Lotts regeneration, and the gap that exists between the North Lotts and the East Wall area across the underutilised railway lands. Figure 13.3.2 includes the proposed Project as a new urban locality, with a series of distinctive taller buildings increasing in height along the railway boundary and dropping again to join East Road beyond, as well as the lower north-south building elements that connect to Sheriff Street Upper and define the public and communal open spaces within the development. Landscape and visual effects are considered to be *moderate* and *positive.*

Figures 13.3.3 also includes the permitted cumulative developments at East Road, and east and west of the proposed Project, and illustrate how the forms and massing of collective developments respond appropriately to their setting. The taller buildings and landmark elements of the proposed Project and of the permitted East Road Project frame the alignment of the railway and also provide appropriate space between the two developments. Cumulative landscape and visual effects are considered to be *moderate* and *positive.*

13.7.1.3 View 04

View 04, Figure 13.4.1, is from Castleforbes Road at Mayor Street and displays extensive new urban regeneration. The LUAS Red Line travels along Mayor Street bringing passengers between the City centre and Point Village. The vista along the streetscape is terminated by the low rise light industrial units at Castleforbes Business Park. Figure 13.4.2 includes the proposed Project, and shows one of the nine storey elements at Sheriff Street Upper terminating the streetscape, and elements of the taller buildings at the northern edge of the site signalling the wider development and providing visual interest on the skyline. Landscape and visual effects are considered to be *moderate* and *positive.*

Figure 13.4.3 includes an outline of the permitted cumulative developments at East Road, and east and west of the proposed Project, however, these are screened by the existing foreground streetscape and the proposed Project.

13.7.2 East Wall

13.7.2.1 Views 05 to 12

A series of 8 Views, Views 05 to 12 inclusive, are from the residential streetscapes of East Wall, including St. Mary's Road at Caledon Road, Hawthorne Terrace, Boolavogue Road, St. Mary's Road at Killane Road, Russell Avenue East, Church Road, Irvine Terrace and Abercorn Road.

All of these streets are established one and two storey residential streets comprising cottages, terraces and semi-detached dwellings. It is an attractive environment with a strong sense of community. The area includes St. Joseph's Church and the Seán O'Casey Community Centre buildings that are taller and distinctive community structures that contribute to the identity of the area and are visible from the network of streets. While the East Wall is generally low rise in itself, it is also noted that there are numerous locations within East Wall that currently afford views of taller structures in the wider urban context, including St. Laurence O'Toole Church and modern developments at Spencer Dock, North Lotts, East Wall Road, Sheriff Street and East Road itself. As such, there is an established sense of the City and Docklands as part of the wider landscape, by virtue of the visual relationship to that wider context. Figures 13.5.1 to 13.12.1 show these streetscape as existing, and illustrate the low rise foreground with views to different elements of the wider city context.

Figures 13.5.2 to 13.12.2 include the proposed Project, and clearly illustrate that the development will give rise to substantial change in the landscape and visual context, however, such change will be outside the immediate low rise residential area, will be consistent with other nearby modern developments. Initially, landscape and visual impacts may be perceived to range from *moderate* and *negative* to *moderate/significant* and *negative*. It is considered that this will reduce over time as the buildings are occupied and become an accepted part of the built and community fabric of the locality, with landscape and visual effects becoming *slight/moderate* and *moderate* and *neutral* or *positive*.

Figures 13.5.3 to 13.12.3 also include the permitted cumulative developments at East Road, and east and west of the proposed Project. Together, these will intensify the sense of regeneration and redevelopment, and will reinforce the establishment of a new and contemporary identity at the East Road and Sheriff Street Upper area. As with the proposed Project, all of this new development is outside the immediate low rise residential area. As they will introduce substantial change, cumulative landscape and visual impacts may be perceived initially to range from *moderate* and *negative* to *moderate/significant* and *negative*. As these development are completed and occupied, and become an integral part of the built and community fabric of the locality, landscape and visual effects will reduce to *slight/moderate* and *moderate* and *neutral* or *positive*.

13.7.3 East Road Area

A series of 5 views, Views 13 to 17 inclusive, are representative of the streetscape of the East Road and of the residential areas to the east of East Road.

13.7.3.1 Views 13 and 14

Views 13 and 14, Figures 13.13.1 and 13.14.1, are the existing views from the northern and middle sections of East Road looking along East Road. These illustrate the mixed building profiles along the street, with typically low rise residential buildings along the western side of the street and larger mixed use commercial and residential development along the eastern side. The vista along the street is emphasised by the elevated road in the distance and by the taller elements beyond including the PWC building on the River Liffey.

Figures 13.13.2 and 13.14.2 include the proposed Project. By virtue of the south westerly alignment of the street, the proposed Project will be either fully or partially screened by existing building frontages along the eastern side of the street. Where parts of the Project become visible further south along East Road, they will add visual interest to the streetscape and be consistent with established modern buildings of the streetscape and wider context. Landscape and visual impacts will range from *imperceptible* to *slight* and *positive.*

Figures 13.13.3 and 13.14.3 also include the permitted cumulative developments at East Road, and east and west of the proposed Project. From East Road, the permitted East Road development will be more apparent and will present new facades defining the street edge with a range of heights, forms and materials and balconies that add visual interest to the street, and with the taller block visible but set back behind the new

building line of the street. The permitted hotel development will be partially visible beyond the elevated bridge, however, the permitted developments will prevent visibility of the proposed Project. Cumulative landscape and visual effects are considered to be *moderate* and *positive*.

13.7.3.2 View 15

View 15 is from within the Teeling Way development, and Figure 13.15.1 shows the existing situation with the communal open space area oriented in a south westerly direction and including views of parts of the North Lotts developments. Figure 13.15.2 includes the proposed Project, and illustrates the northernmost towers of the development as distinctive built forms on the far side of the intervening railway lines, and incorporating permeability through to the North Lotts beyond. Landscape and visual impacts are considered moderate and positive as the proposed Project will introduce a more attractive urban development than the existing underutilised light industrial area.

Figure 13.15.3 also includes the permitted cumulative developments at East Road, and east and west of the proposed Project. As Teeling Way is immediately north of the permitted East Road development, the latter will substantially enclose the existing communal open space with new residential uses, and will the proposed Project may only be partially visible in a glimpsed manner. Cumulative landscape and visual effects are considered to be *slight* and *positive*.

13.7.3.3 Views 16 and 17

View 16 and 17, Figures 13.16.1 and 13.17.1 are from Merchant's Road and Merchant's Square to the east of East Road. Merchant's Road is linear and is defined by two storey terraced residential properties on both sides. The street is aligned on parts of the North Lotts, and the existing 10 storey development at the corner of Sheriff Street and Castleforbes Street forms a focal point at the end of the vista. Merchants's Road leads to Merchant's Square which is a two storey residential development along the northern edge of the railway yards. It is inward focussed, but does have views in all directions to taller buildings in the wider north Docklands area and the City.

Figures 13.16.2 and 13.17.2 include the proposed Project, and illustrate the upper parts of some of the northern tower elements becoming visible on the skyline outside the immediate context, and as an extension of the North Lotts towards Sheriff Street and East Road. The proposed Project will present as a distinct contemporary residential blocks, retaining permeability through to the wider North Lotts beyond, and will reinforce the proximity of Merchant's Road and Merchant's Square to the newly emerging urban quarter. Landscape and visual effects are likely to be perceived initially as *moderate/significant* and *negative*, however, it is considered that at this City and Docklands location, with continual establishment of new regeneration projects throughout the locality, the landscape and visual effect will reduce be *moderate* and *neutral*.

Figures 13.16.3 and 13.17.3 also includes the permitted cumulative developments at East Road, and east and west of the proposed Project. From Merchant's Road, the East Road development will be substantially screened by the immediate streetscape, and the permitted office and hotel development will be visible at the end of the street in line with the northernmost tower of the proposed Project and retaining visibility through to the North Lotts beyond. At Merchant's Square, the cumulative developments will intensify the presence of contemporary regeneration and are likely to be perceived initially as *moderate/significant* and *negative*. As these developments establish and become occupied, they will extend the new urban quarter along East Road, bringing new life and amenity to the locality and become more accepted as part of the locality, and landscape and visual effects will reduce to *moderate* and *neutral*.

13.7.4 River Liffey Corridor

A series of 6 views, Views 18 to 23 inclusive, are representative of the River Liffey setting from the Docklands at the east to the historic City to the west.

13.7.4.1 Views 18 to 21

These views, from east to west, are of the modern Docklands, and include views from Pigeon House Road approaching the Tom Clarke Bridge, Sir John Rogerson's Quay looking across the River Liffey and along Castleforbes Road, North Wall Quay looking along the space between the NAMA and NTMA offices, and from Sir John Rogerson's Quay opposite the Convention Centre

Figures 13.18.1 to 13.21.1 show the existing situation, and all illustrate the extensive regeneration activity at the North Lotts on the northern side of the River Liffey, but also in the context of similar regeneration along the southern side of the river. The new river frontage of the North Lotts can be seen extending from the 3Arena and Point Square, and continuing along the North Wall Quay as far as the Convention Centre that marks the western extent. Many of the City blocks within the North Lotts have been completed, presenting a range of high quality contemporary building types and uses to the river front and extending north into the North Lotts, and others are at various stages of construction. The Exo Building, nearing completion, and the Capital Dock tower clearly signal the transition from the Port area to the urban docklands when approaching from the east. The Site of the proposed Project is located behind the North Lotts, and as such, there are limited direct views towards it.

Figures 13.18.2 to 13.21.2 included the proposed Project, and afford glimpse or framed views of elements of the proposed Project, including the landmark tower element. The latter can be clearly seen from Pigeon House Road signalling the presence of the emerging North Dockland and East Road cluster, and aiding legibility of the North Docklands. The north-south linear alignment of Castleforbes Road affords a view through the North Lotts to the proposed Project, adding visual interest and depth to the built forms of the North Lotts. Figure 13.19.2 illustrates the design intent of aligning the landmark tower so as to be a distinct focal point from North

wall Quay, again creating visual interest and aiding urban legibility. From the western end of Sir John Rogerson's Quay, opposite the Convention Centre, the emerging development behind the red brick former Irish Rail buildings will all but screen the Proposed Project. The landscape and visual impact of the proposed Project is considered *moderate* and *positive.*

Figures 13.18.3 to 13.21.3 also include the permitted cumulative developments at East Road, and east and west of the proposed Project, however, these are substantially less visible or fully screened from the River Liffey corridor and cumulative landscape and visual impacts are *imperceptible* or *slight,* and *neutral.*

13.7.4.2 View 22 and 23

These views, Figures 13.22.1 and 13.19.1, are from the River Liffey corridor within the historic City centre, and are from Aston Quay at O'Connell Bridge and from Capel Street Bridge respectively. Both illustrate the historic river corridor, however the view from Aston Quay includes a greater proportion of modern buildings east of O'Connell Bridge and beyond, and including parts of the IFSC beyond the Loop Line Bridge. From Capel Street Bridge, the river corridor is mostly defined by historic building frontages, and the modern buildings form a cluster in the distance, including parts of the IFSC at over 1.1km distance.

Figures 13.22.2/3 and 13.19.2/3 include the proposed and cumulative Projects. The will be no impact from Aston Quay arising from any of these projects. From Capel Street Bridge, the uppermost part of the landmark element will be partially visible between the IPSF and O'Connell Bridge House. As the distance from Capel Street Bridge to the landmark building is over twice that to the IFSC, the landmark building will present in perspective at a similar level on the skyline as the closer IFSC buildings. It will not be prominent or impact adversely on the river corridor or its setting, but will serve to aid urban legibility of the wider city. Landscape and visual impacts, including cumulative impacts, are considered *imperceptible/slight*, and *neutral/positive.*

13.7.5 South City

A series of 6 views, Views 24 to 29 inclusive, are representative of the most distant views from the south city environs, and also from the principal public open spaces within the South Georgian Core.

13.7.5.1 View 24 to 26

View 24, 25 and 26, Figures 13.24.1, 13.25.1 and 13.26.1 are from Strand Road, London Bridge over the River Dodder, and from Ringsend Bridge over the River Dodder. The nature of the Strand Road and the River Dodder is such that there are potential direct distant sightlines towards the proposed Project. The vista from Strand Road is substantially terminated by the landscape at Seán Moore Park, however, there are glimpse views of taller and more distant city elements. The River Dodder leads directly to the River Liffey, and development within the Docklands is visible along the river corridor, together with the mixed foreground of traditional

residential area, the distinctive spire of St. Patrick's Church at Ringsend, and also new development at Grand Canal Dock on the southern side of the River Liffey.

Figures 13.24.2, 13.25.2 and 13.26.2 include the proposed Project, and each illustrate partial visibility of one or more of the taller residential towers proposed along the northern side on the skyline. The development, punctuated by the taller element, reads as a local landmark and signals the extension of the new urban quarter at north Docklands beyond North Lotts. Together with the district landmark of Capital Dock, a clear hierarchy is established between the buildings along the River Liffey corridor and within the urban fabric beyond. The colour palette of the principal tower is distinctive in the context, and is also applied to the upper floors of the adjoining shorter towers, presenting all building elements as part of overall Project. Landscape and visual impacts are considered *moderate* and *posi*tive and the proposed Project signals the new urban quarter and aids urban legibility.

Figures 13.24.3, 13.25.3 and 13.26.3 also include the permitted cumulative developments at East Road, and east and west of the proposed Project. These will be partially visible, although to the lesser extent that the proposed Project as they are typically lower. The collective developments will increase the intensity of the new development in this area. They will not impact adversely on the cityscape, and will further reinforce the identity of the new urban cluster between the North Lotts and East Road. Cumulative landscape and visual impacts are considered *moderate* and *positive*.

13.7.5.2 View 27 to 29

View 27, 28 and 29, Figures 13.27.1, 13.28.1 and 13.29.1 are from the within the grounds of Trinity College, Merrion Square and St. Stephen's Green which are all important historic public open spaces within the South Georgian Core of the City. These views illustrate the quality and character of these public spaces, and their substantial if not complete enclosure provided by mature tree planting and build elements.

Figures 13.27.2/3, 13.28.2/3 and 13.29.2/3 include the proposed Project and the permitted cumulative developments at East Road, and east and west of the proposed Project. In each case, the profile of the proposed Project is shown in a red outline, indicating there will be no impact on the open space. Similarly, the East Road development, the Hotel development and the Office/Hotel development are shown in a purple, green and light blue outline, also confirming that these development will not impact the open spaces.

13.7.6 North City Centre

13.7.6.1 View 30

View 30 is from North Circular Road, and is representative of the potential views of the proposed Project from the more elevated streetscapes of the north City. Figure 13.30.1 illustrates diverse streetscapes and setting,

including a range of residential building types, ages and scales, and with varying degrees of visibility to the wider Docklands context beyond.

Figures 13.30.2/3 includes the proposed Project, and the permitted cumulative developments at East Road, and east and west of the proposed Project, and illustrate the relative skyline positions of the proposed Project and intervening building forms. There may be glimpse views of the top of the landmark building in the distance, making a positive contribution to urban legibility, and giving rise to landscape and visual impacts that are considered *slight* and *positive.*

13.7.6.2 View 31

View 31, Figure 13.31.1, is from Harbourmaster Square c. 1.0km west of the proposed Project. Harbourmaster Square is itself a regeneration development of a former docklands area, and the main access roadway is aligned on the spire of St. Laurence O'Toole Church.

Figures 13.31.2/3 include the proposed Project and the permitted cumulative developments at East Road, and east and west of the proposed Project, in outline format, and confirm the developments will not detract from the vista to the spire of St. Laurence O'Toole Church.

13.7.7 Fairview and Clontarf

A series of 5 views, Views 32 to 36 inclusive, are included as representative of the views from the Fairview and Clontarf areas of the North City, and include the elevated view from the Casino at Marino, as well as a sequence of views along the Clontarf Road, Alfie Byrne Road and at the Annesley Bridge at North Strand Road.

13.7.7.1 View 32

View 32, Figure 13.32.1, is from the elevated grounds of the Casino at Marino looking southwards towards the City and Docklands. While elevated, the view is framed by layers of vegetation in the foreground and middle ground, with only glimpse views of some of the taller built elements of the City.

Figures 13.32.2/3 include the proposed Project and the permitted cumulative developments at East Road, and east and west of the proposed Project. The proposed Project is shown in a red outline, indicating there it will be screened or imperceptible from the Casino, and similarly, the East Road development, Hotel development and the Office/Hotel development are shown in a purple, green and light blue outlines, confirming that these development will not be visible from the Casino.

13.7.7.2 Views 33 to 35

Views 33 to 35, Figures 13.33.1, 13.34.1 and 13.35.1 are representative of the visibility of the City and Docklands are from the Clontarf Road and Alfie Byrne Road. Views from the Clontarf Road are southwards across the Tolka Estuary to Dublin Port and the East Point Business Park, and include glimpse views of some

built elements of the wider City beyond, including occasional church spires and some taller modern buildings. Alfie Byrne Road, by contrast, is substantially enclosed by vegetation, and has limited visual connection towards the City.

Figures 13.33.2, 13.34.2 and 13.35.2 include the proposed Project, and each illustrate partial visibility of one or more of the taller residential towers along the northern side of the site presenting on the skyline. The slender form, material and colour selection will render the building distinctive, but not prominent, and as a landmark as intended, and will aid legibility of the urban setting. Landscape and visual impacts will be *slight* and *positive.*

Figures 13.33.3, 13.34.3 and 13.35.3 also include the permitted cumulative developments at East Road, and east and west of the proposed Project. These will be partially visible, although to a lesser extent that the proposed Project, or fully screened (as shown by coloured outlines), and will assist in identifying the new urban cluster between the North Lotts and East Road. Cumulative landscape and visual impacts are considered *slight* and *positive.*

13.7.7.3 View 36

View 36, Figure 13.36.1, is from the Annesley Bridge, and is a focussed view along the Tolka River, framed by Fairview Park on the left, and by building and vegetation along East Wall Road to the right. Visibility of buildings is substantially confined to those along East Wall Road and at the northern end of East Road, however, the spire of St. Joseph's Church at the heart of East Wall is also apparent beyond the foreground trees.

Figure 13.36.2 includes the proposed Project, and illustrates the landmark tower presenting on the skyline above the intermediate tree canopies, and signalling the new development at Sheriff Street Upper and East Road, and resulting in a *slight* and *positive* landscape and visual impact.

Figure 13.36.3, also includes the permitted cumulative developments at East Road, and east and west of the proposed Project. The taller element of the East Road development will be partially visible, but will not detract from the landmark characteristic of the proposed Project. Other elements of the cumulative development will be fully screened, and are shown in outline as appropriate.

13.8 Monitoring

13.8.1 Construction Phase

Monitoring during the Construction Phase will requires the regular inspection and maintenance, if required, of Site perimeter hoarding and continual review of access and egress arrangements to and from the Site to ensure minimal impact on road users and the local community.

13.8.2 Operational Phase

The development is for a high quality mixed-use urban regeneration that will transform the existing underutilised site. Monitoring during the Operational Phase will ensure that the proposed Project is maintained as designed so as to deliver on the stated design objectives. A defects liability period will be required for all soft landscaping and any planting that fails to establish will need to be replaced. A maintenance regime will be established to ensure that soft landscaping and public realm is maintained in a high quality manner, and that any damage is repaired promptly so as to ensure the spaces remain attractive and continue to benefit the occupants and the wider local community.

13.9 Reinstatement

There is no reinstatement required in accordance with this study.

13.10 Interactions

The main interactions relating to Landscape and Visual are **Population & Human Health**, which is discussed in Section 20.3.7 of this EIAR. During the **Operational Phase** the proposed Project will impact on the quality of the open spaces, which will ultimately impact on people's health and well-being.

13.11 Cumulative Impacts

13.11.1 Cumulative Effects - Construction Phase

The proposed Project is an urban redevelopment that will be part of the wider regeneration and development that is ongoing in the North Lotts and Docklands area. Construction activity in the locality is extensive, with numerous building developments at all stages of construction, and with further streetscape and public realm works ongoing. In that context of an evolving City precinct, the cumulative effect of the Construction Phase of the proposed Project, in-combination with many other construction projects, *will be not significant*.

13.11.2 Cumulative Effects - Operational Phase

The development will establish a distinct urban landmark that connects the North Lotts area to the East Road and East Wall locality in the wider docklands context. The docklands and North Lotts is an area undergoing extensive redevelopment with new urban commercial, residential and mixed use blocks continually redefining the urban fabric from the former historic docklands to a modern urban district.

The proposed Project will be consistent with that emerging trend, and the cumulative effect of the proposed Project, in-combination with the continually evolving urban district, *will be not significant*.

13.12 'Do-Nothing' Impact

In the event that the proposed Project does not proceed, it is likely that the Site will remain in its current industrial use in the *short* to *medium term*, or until such time as an alternative redevelopment proposal is granted permission and constructed.

13.13 Difficulties Encountered in Compiling the Chapter

Generally, no difficulties were experienced in compiling this Chapter of this EIAR. Much of the baseline photography for photomontages was taken in late 2019 and early 2020, and prior to the COVID-19 pandemic. Certain developments in the North Lotts and north Docklands area progressed during the middle of 2020. Where relevant, baseline images were subsequently updated either by re-taking the entire view, or by inserting detailed images of buildings that had been completed or commenced construction.

14 Cultural Heritage, Archaeology and Architectural

14.1 Introduction

This Chapter of the EIAR was prepared by Courtney Deery Heritage Consultancy Ltd. and considers and assesses the cultural and heritage, archaeological and architectural environment of the proposed Strategic Housing Development (SHD) (referred to as "*the proposed Project*"), located at Sheriff Street Upper and East Road, Dublin 1.

The purpose of the study is to assess the possible significance of the receiving archaeological and cultural heritage environment, to identify and evaluate the significance of the impact of the proposed Project on this environment, and to suggest any ameliorative measures that might be appropriate.

The proposed Project will consist of the demolition of all structures on the Site and the construction of a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a standalone three storey childcare facility and residential tenant amenity. The proposed Project will also accommodate car parking spaces, bicycle parking, storage, services and plant areas. More details on the background and Site history is provided in Chapter 5 (Description of the Proposed Project).

14.2 Methodology

14.2.1 Research Methodology

The assessment is based on a desktop study. This was supported by a site inspection to confirm the current state of the development site and any relevant cultural heritage sites identified during the course of the assessment. The desk study availed of the following sources:

- The *National Monuments, Preservation Orders and Register of Historic Monuments* lists were sourced directly from the Department of Culture, Heritage and the Gaeltacht (DCHG);
- *Record of Monuments and Places (RMP) and Sites and Monuments Record (SMR*). The SMR, as revised in the light of fieldwork, formed the basis for the establishment of the statutory Record of Monuments and Places in 1994 (RMP; pursuant to Section 12 of the National Monuments (Amendment) Act, 1994). The RMP records known upstanding archaeological monuments, their original location (in cases of destroyed monuments) and the position of possible sites identified as cropmarks on vertical aerial photographs. The information held in the RMP files is read in conjunction with published constraint maps. Archaeological sites identified since 1994 have been added to the non-statutory SMR database of the Archaeological Survey of Ireland (National Monuments Service, DCHG), which is available online at www.archaeology.ie and includes both

RMP and SMR sites. Those sites designated as SMR sites have not yet been added to the statutory record, but are scheduled for inclusion in the next revision of the RMP;

- *Record of Protected Structures (RPS) and Architectural Conservation Areas (ACAs),* Dublin City Development Plan (2016-2022);
- The topographical files of the National Museum of Ireland;
- Cartographical sources included de Gomme (1673), Bolton, (1717), Brooking (1728), Rocque (1756), Taylor (1816), Clarke's map of a conjectural medieval city superimposed on the 1943 edition of the Ordnance Survey (OS) map (not shown) and various editions of the OS Maps;
- Excavations Bulletins and Excavations Database (1970-2019);
- Other documentary sources (as listed in the references, Section 14.13); and
- Aerial imagery (Google Earth 2001-2018, Bing 2013; OSi 1995, 2000, 2006).

14.2.2 Standards and Guidelines

The following legislation, standards and guidelines were consulted to inform the assessment:

- EPA (2017). *Draft Guidelines on the Information to be Contained in EIARs.*
- EPA (2015). *Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements.*
- National Monuments Acts, 1930-2004.
- The Planning and Development Act 2000, as amended.
- Heritage Act 1995.
- Department of Arts, Heritage, Gaeltacht and Islands (1999). *Frameworks and Principles for the Protection of the Archaeological Heritage.*
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 2000 and the Planning and Development Act 2000.
- Minister for Arts, Heritage and the Gaeltacht (June 2000). *Code of Practice between the National Roads Authority (NRA*).
- NRA (2006). *Guidelines for the Assessment of Architectural Heritage Impact of National Road Schemes*.
- NRA (2006). *Guidelines for the Assessment of Archaeological Heritage Impact of National Road Schemes.*
- The Council of Europe's Convention for the Protection of the Architectural Heritage of Europe signed at Granada in 1985, was ratified by Ireland in 1991.
- European Convention on the Protection of the Archaeological Heritage 1992 (the Valletta Convention) was ratified by Ireland in 1997.

- The UNESCO World Heritage Convention, 1972.
- ICOMOS Xi'an Declaration on the Conservation of the Setting of Heritage Structures, Sites and Areas, 2005.
- The Burra Charter, the Australia ICOMOS Charter for Places of Cultural Significance 2013.
- The European Landscape Convention (ELC), ratified by Ireland 2002 European Landscapes Convention 2010. (The Department of the Environment, Heritage and Local Government *'Landscape and Landscape Assessment Guidelines*' have been in draft form since 2000, however the *Draft National Landscape Strategy* (NLS) was launched in July 2014).
- Guidance on Heritage Impact Assessments for Cultural World Heritage Properties – *A publication of the International Council on Monuments and Sites* (January 2011).
- NRA (2006). *Guidelines for the Testing and Mitigation of the Wetland Archaeological Heritage for National Road Schemes.*
- Department of Arts, Heritage and the Gaeltacht (2015). *National Landscape Strategy for Ireland 2015-2025*.
- Historic England (2015). *Historic Environment Good Practice Advice in Planning, Note 3: The Setting of Heritage Assets.*
- Historic Scotland (2010). *Managing Change in the Historic Environment*.
- The Heritage Council (2011). *Proposals for Irelands Landscapes; and International Council on Monuments and Sites.*
- ICOMOS (2011). *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties*.

Excerpts from the relevant legislation are contained in Appendix A14.1, Volume 3 of this EIAR.

14.3 Baseline Environment

14.3.1 Archaeological and Historical Background

14.3.1.1 Introduction

The Site of the proposed Project lies within an area of the City that, until the large-scale reclamation projects of the late 17th century and 18th centuries, formed part of the sloblands of the broad River Liffey estuary. It is located well outside of the zone of archaeological potential (ZAP) for Historic Dublin (c. 475m north and over 1km east of the ZAP boundary).

14.3.1.2 Prehistoric Riverine Activity in the Study Area

The earliest human activity in Ireland dates from the Mesolithic period (c. 8000-4000BC), with the evidence indicating a strong preference for riverine and coastal areas. In the greater Dublin area, for example, large numbers of Mesolithic tools have been recovered from the Malahide and Rogerstown estuaries. Middens are also recorded at Sutton to the north of Dublin Bay and at Dalkey Island to the south. Evidence for activity in

the vicinity of rivers, the sea and indeed lakes probably reflects the importance of fish in the diet of Mesolithic people, a trend observed in other European countries. Furthermore, given the absence of the large mammals hunted in mainland Europe, it is even more likely that fish and fowl were important sources of meat in Mesolithic Ireland[142].

There is very little evidence for prehistoric activity in the Dublin City area, although a number of artefacts recovered from excavations indicate a prehistoric presence on and around the banks of the Liffey. The most significant evidence for prehistoric activity along the Liffey, however, was revealed in 2004 and 2006-07 during archaeological investigations at the Spencer Dock development site on North Wall Quay, c. 345m southwest of the Site of the proposed Project (this large block of land now houses the National Convention Centre and adjacent residential buildings;

Figur). The material uncovered had been sealed beneath 18th century reclamation deposits and post-medieval structural remains and was located at the southern end of the site, in an area formerly occupied by the Liffey estuary (McQuade, Excavations 2003:0576, Licence No. 03E0654; Myles & McQuade, Excavations 2006:634 & 2007:494, Licence No. 06E0668).

The excavations revealed evidence relating to prehistoric riverine activity in the silts which had accumulated to the south of the former shoreline of the Liffey, c. 13.0m-16.0m north of the North Wall Quay. This included the discovery in 2006/07 of Late Mesolithic fish trap remains (radiocarbon dated to 6000-5840 BC) and a mid-Neolithic wattle fence (which was probably also part of a fish trap structure) and dated to 5980-5760BC (located at depths of c. -5.0mOD and c. -4.66mOD respectively[142]). The Late Mesolithic fish traps excavated in 2006/07 are similar to the very well-preserved archaeological remains of up to five finely woven wooden fish traps of late Mesolithic date (6100-5720 cal. BC) identified in 2003/4 on the adjacent site to the east. The wooden remains were preserved in the silt deposit, with the activity concentrated c. 1.2-1.3m to the south of the early shoreline of the River Liffey and in the estuarine waters to the south at an average depth of -5mOD[143].

The discovery of the first fish traps in 2003/04 was of international significance as they were the earliest dated examples recorded in either Ireland or the UK. They provided the first definitive evidence for the use of fish traps in Ireland during the Mesolithic period. The subsequent discovery of another Late Mesolithic fish trap nearby illustrates that the Late Mesolithic population of the Dublin area were, over a period of up to 200 years, fishing along a 70m a stretch of the Liffey intertidal zone in the area currently known as Spencer Dock. The remains of the large wooden Middle Neolithic fish trap further indicates that several millennia later, the occupants of the surrounding area were once again fishing along this part of the Liffey estuary[142]. Although no

[142] McQuade, M. (2007).
[143] McQuade, M. (2003).

evidence for prehistoric settlement was uncovered at the site, the people who constructed and used the fish traps must have been living nearby.

There is tantalising evidence of further waterlogged wooden remains of possible prehistoric date on a neighbouring site (c. 105m southwest of the Site of the proposed Project), though unfortunately no radiocarbon dates are currently available. They were uncovered during archaeological monitoring of bulk excavations by Archaeological Development Services (ADS) Ltd in 2011/2012 in advance of the planned North Lotts pumping station. The remains comprised two clusters of horizontal brush-woods that were identified in the sandy silt deposit at levels of between -1.39m and -1.43mOD, which is significantly closer to present ground level than the remains found on the NCC/Spencer Dock site. The arrangement of the surviving wood pieces did not retain the original form of the structures from which they came. In addition, there were no *in situ* pegs and none of the pieces could be described as stakes. Nonetheless, the remains may represent parts of larger structures, possibly fish-traps that had been damaged and displaced by the tide (McQuade 2012; Licence No. 09E0375). All of the remains were preserved by record by means of archaeological excavation[144], though post-excavation analysis was not completed due to funding problems on the part of the developer (*Pers. Comm.* Eoin Halpin, ADS Ltd, June 2015).

14.3.1.3 Post-Medieval Period - Introduction to the sources

This section examines the historical evidence for settlement on the development site from the inception of the reclamation project in the late 17th century through to its residential and industrial usage in the 19th and the 20th centuries. The industrial heritage is characterised locally by the extension of the Royal Canal navigation to the river and the subsequent arrival of the railway. The introduction of the latter altered the flat landscape of the polder, necessitating the elevation Sheriff Street, one of the principal thoroughfares in this area.

The primary source for the early history of the area is the Calendar of Ancient Records of Dublin (CARD), the earlier volumes of which were compiled by Sir John Gilbert in the last decade of the 19th century. The CARD volumes record the activities of the Municipal Corporation of Dublin and, from 1708 onwards, those of the Ballast Office, which elected its committee of directors from the City Assembly.

Other early sources used are primarily cartographic in nature. These include Bolton's Map of 1717, a pictorial representation of the notionally reclaimed area drawn up by J. Macklin during the mayoralty of Thomas Bolton, and later maps drawn up for the Wide Streets Commissioners (WSC). Other maps consulted were Bernard de Gomme's *The city and suburbs of Dublin* and *A map of Dublin harbour*, both dating to 1673; Charles Brooking's *A map of the city and suburbs of Dublin* (London, 1728); John Rocque's *Plan of the city of Dublin and the environs* (Dublin, 1756; his better-known *Exact survey of the city and suburbs of Dublin* stops a few hundred

[144] McQuade, M. (2012).

meters short of the site); and the *Modern plan of the city and environs of Dublin, including the Grand and Royal Canals, new docks, etc.*, published in Wilson's *Dublin Directory* in 1798. Various editions of the Ordnance Survey have been consulted for the later period of the site's morphological development.

14.3.1.4 Post-Medieval Period - Introduction to the sources

The relatively settled state of Ireland after the succession of James II acted as a catalyst to the continued expansion of the urban centre beyond the medieval walls. In Dublin, the requirement of new building ground to ease the accommodation situation within the walls was analogous with the necessity of keeping the harbour open to shipping. The construction of permanent stone quaysides had the double advantage of providing secure berthing for shipping while allowing the directed flow of the Liffey to retard the silting up process that had always been a problem for the medieval port. Land thus reclaimed was ostensibly in the hands of the city, the shoreline having been included in the riding of the franchises as early as 1488; private development was encouraged, however, with preferential rents and leases.

Two maps produced by de Gomme in November 1673 accurately depict the city and harbour in the period immediately prior to the reclamation of the sloblands to the northeast of the city. The map of the harbour was produced as a supplement to the better-known city map and included a contemporary account of the approaches to the port, see Figure 14.1 below. Of particular interest is the description of the area occupied by today's Gardiner and Lower Abbey Streets as 'marsh ground,' while the slope to the north towards Mountjoy Square and Summerhill is depicted as 'the heights.' The general area of the site is located among the tortuous channels of the Liffey, where expanses of mud may have been exposed at spring tides. The situation was further complicated by the estuary of the River Tolka, which emerged from the northwest, the confluence of both rivers leaving only one area of high ground, Clontarf Island, exposed at high tides.

The shoreline depicted by de Gomme would appear to start from a small promontory in the general area of the Abbey Theatre, continuing along a line which today extends along Amiens Street as far as the Five Lamps before turning slightly to the north between Ballybough Road and North Strand Road to Luke Kelly Bridge (over the Tolka) and on to Fairview Strand[145]. The shoreline adopted by the Geological Survey of 1915 was based on de Gomme's evidence. The impetus to extend this shoreline to the east came from the City Assembly, which commissioned a survey of the area stretching eastwards to the present-day East Wall Road in 1682.

The assembly had previously taken a speculative interest in the reclamation of the Liffey sloblands on the south side, offering George Burroes a lease of four and a half acres east of the mouth of the River Staine in 1599 to manufacture bricks (CARD ii, 328-9). If the ground were to prove inadequate, Burroes was to be given the opportunity to relocate his workings, provided he backfill his old site and 'committ noe nusans.' The period

[145] De Courcy, J. W. (1996).

leading up to the Confederate Wars of the 1640s saw interest grow in the financial possibilities of reclamation work along the south side of the river. This is reflected in the number of disputes between the City Assembly and prominent property speculators of the day. While reclamation work initially focused on the opening of a direct and secure route to Ringsend – and in doing so, provide new ground for the city to lease at a profit – the need for a secure harbour to advance the interest of the city's merchants and traders became paramount. William Hawkins's construction of a wall along the river as far as the present-day Townsend Street in 1662–63 was to have an adverse effect on the northern side of the river, where the force of the incoming tide would redirect the flow, causing the formation of sand banks and shallow streams that were even more hazardous to shipping (CARD vi, 402).

The 1682 survey resulted in the division of a notional area on the north side of the river ('*the strand between Mabbot's Mill* [in the area of Connolly Station] *and the Furlong of Clontarf*') into 152 lots, which were to be granted in fee to the mayor, recorder, aldermen, sheriffs, sheriffs' peers and remainder of the common council, along with one lot each to the clerk of the Tholsel and the city surveyor. The lots were to be drawn from a hat after the lord mayor and recorder had made their choice, and the rent was set at 12 pence sterling per annum (CARD v, 328). The obligation 'to take in and improve' the plots does not appear to have secured the new land from the sea, as four years later the assembly annulled the granting of the strand 'forasmuch as there were great disorders in doing the same' (CARD v, 383-4). This decision may indicate that such a huge reclamation undertaking was beyond the efforts of the individual leaseholders and that a more systematic effort would be necessary – perhaps backed by municipal authority – in order to save and reclaim the area from the sea. The City would not, however, be in a position to support such an undertaking for another generation.

Figure 14.1: De Gomme's Map of Dublin, 1673

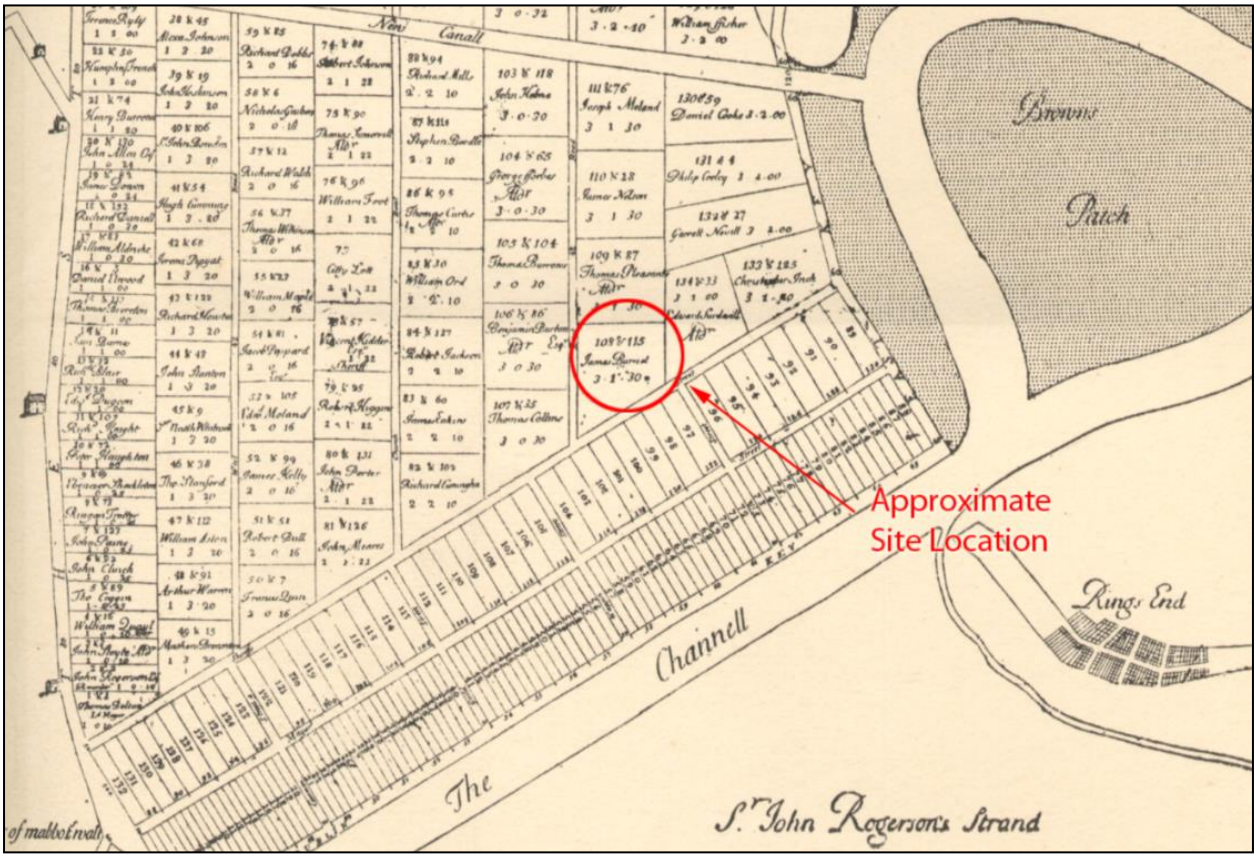
Consequently, at the close of the 17th century, it is unlikely that any development had taken place in the area east of the North Strand. That being said, it would be unusual if the area had not been used for the sorts of riverine activities recorded along other estuaries; such evidence for intertidal activity is usually discovered in the form of fish traps, dugout canoes or trackways. The evidence for such activities in the general area is much earlier in date, with both Neolithic and Mesolithic fish traps excavated on a site at Spencer Dock (as discussed in Section 14.3.1.2), but presumably continued up to the 17th century.

14.3.1.5 Reclamation, 18th Century

Jurisdiction over tidal waters had, for a long time, been a contentious issue in Dublin. Ostensibly vested in the crown and exercised on the crown's behalf by the lord high admiral, the medieval city charters had given the city the right to construct quays and other structures associated with trade along the river's banks. As trade developed in the post-medieval period, there was a growing demand for the city to take over responsibility for the port and navigation. Private attempts to establish a port authority had, however, been frustrated by the crown's claim to the foreshore and harbour. The corporation itself petitioned the crown on the matter in 1685. The fact that the position of lord high admiral was held by the prince consort, George, did not advance the city's case, and it was not until 1707, when the city was to effectively bribe the admiral with an annual payment of 100 yards of Irish sail cloth, that an act was passed to establish the Ballast Office.

The reclamation of the area between the city and Ringsend has been well documented in the secondary sources (for example de Courcy (1996), pg. 333-5). It was accelerated by the assembly's granting of an estate along the strand in 1713 to Sir John Rogerson, who immediately began to enclose his new land with a massive sea wall, thus relieving the Ballast Office of the responsibility. Plans were soon afoot to extend Rogerson's wall out into the bay to provide safer entry for shipping into the port. The Ballast Office now concentrated its efforts on the northern bank of the river, and as early as May 1712, work commenced along the line of the present-day Eden and Custom House Quays. By October, 686 kishes (baskets filled with stone) had been laid down, approximately as far as the western end of the North Wall (CARD vi, passim). As the northern wall began to extend further into the eastern sloblands, the City Assembly ordered that the area between the Tolka and the Liffey, along with the sloblands between the Tolka and Clontarf, be re-surveyed and notionally divided in 132 lots, to be known as the North Lots (CARD vii, 30-34).

Figure 14.2 Bolton's Map of the North Lots, 1717

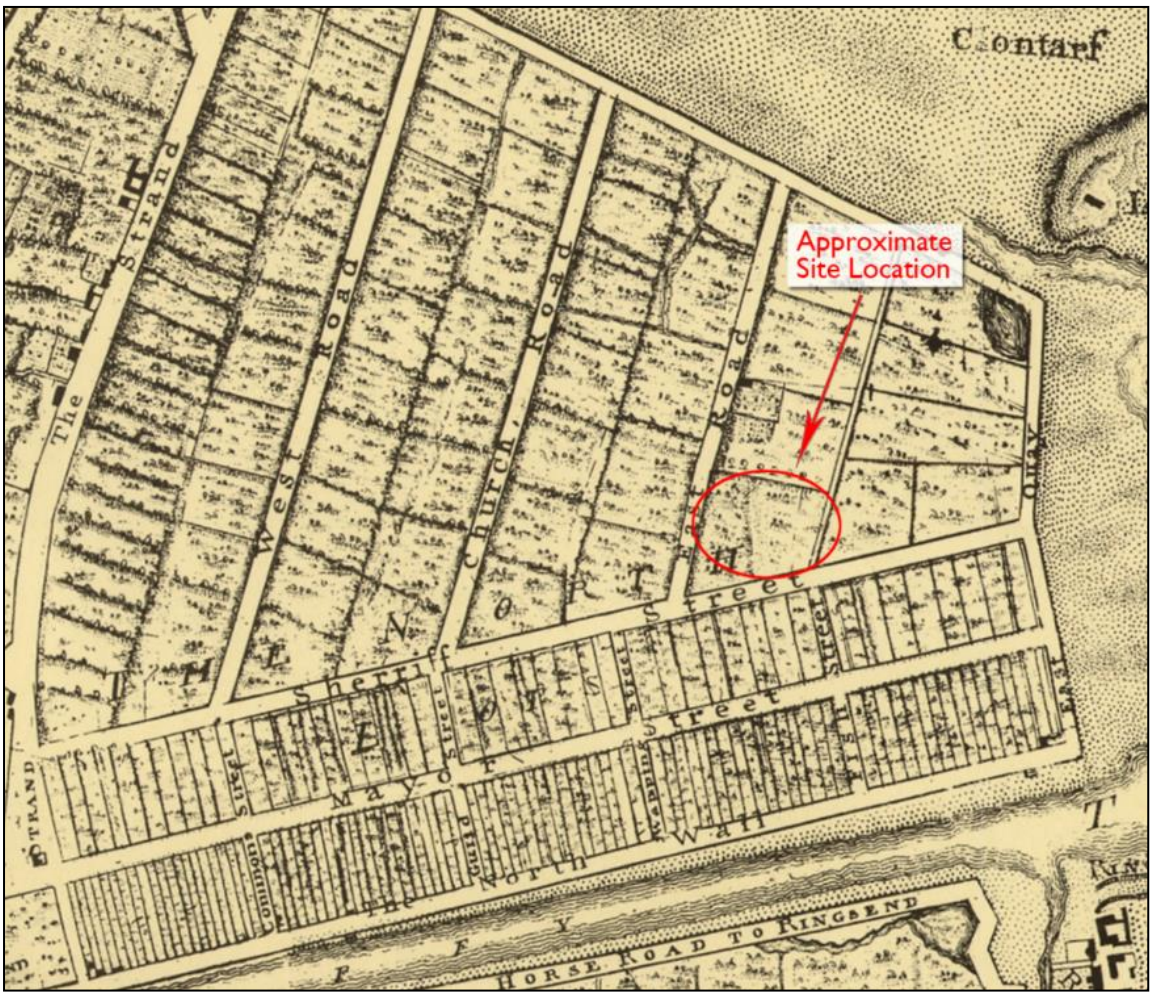


The survey was carried out by Macklin in 1717, and the resultant schematic map (known as Bolton's Map after the sitting lord mayor) shows both the plots themselves and the names of the initial lease holders, see Figure 14.2. East Road is depicted and named and the approximate site location falls largely within the plot granted to James Burnet (Plots No. 108 & 115), but may also include parts of the neighbouring plot to the east (granted to Alderman Edward Surdarill). The map also demonstrates confidence in the future development of what effectively became a polder. However, to best appreciate what the City Assembly intended, it is necessary to

examine Rocque's 1756 *Plan of the city of Dublin and the environs*, see Figure 14.3, which was published just as the reclamation project should have been nearing completion.

The street pattern was to be laid out in grid form (as shown on Rocque's map), the uniformity of which contrasts with the medieval city to the southwest, sprawling out over its walls and merging into the great urban estates, which were themselves in their final state of initial development. The Great North Wall (depicted by Rocque as having an underlying strand extending eastwards for over half its length) fronted a wide quayside, with Mayor Street and Sheriff Street running parallel to the north. These thoroughfares were linked by a series of streets, spaced at regular intervals, named as Commons Street, Guild Street, Wapping Street, Fish Street and the East Wall; the areas in between were divided into plots as indicated on the earlier Bolton's Map. The area north of Sheriff Street is laid out in larger plots that were accessed from The Strand to the west and from West Road, Church Road, East Road and the East Quay, all angled off Sheriff Street, to the northeast. A pool of water is depicted in the very northeast corner of the polder, while there still appears to be streams running through the northern part of the area, indicating the unfinished state of the reclamation work. The only two plots that were developed to the north of Sheriff Street at the time of Rocque's survey lie on the east side of East Road, to the north of the Site of the proposed Project. The northernmost plot contains a small building and garden/cultivated area, with a second cultivated plot immediately south.

Figure 14.3: Rocque's Map of Dublin, 1756



The original idea to extend the polder across the Tolka and to lay out the area as far as Clontarf had been abandoned by the 1730s, and the Tolka was never channelled into a canal. Reclamation in this area did not commence until the early years of the 20th century.

When, in April 1724, the Ballast Committee informed the City Assembly of its financial difficulties in carrying on projects on both sides of the river simultaneously, the latter voted to extend funding to complete the North Wall before moving on to the piling for the South Wall (CARD vii, 257-9). This vote indicated the importance then being placed on north-side development by the members of the assembly (not surprisingly, as many of them were lot holders).

The construction of the polder was a classic landfill operation which initially involved the construction of massive sea walls to contain the land and prevent water ingress. As illustrated on Brooking's *A Prospect of the City of Dublin from the North*, by 1728 the North Wall along the Liffey and the East Wall along the southern bank of the Tolka had been constructed, with the area thus contained *'Walled in but as yet overflow'd by ye Tide',* see Figure 14.4 below. His prospect shows ships on the river, their reflections evident on the water behind the wall, see Figure 14.5 below. The area of high ground south of the Tolka appears to be well

established with trees and several houses. After the area had been thus enclosed, an attempt was made to pump out the remaining water, a task which had not been completed by 1837.

The material introduced to the new ground came from latrine pits all over the city. This was initially collected by organised groups of scavengers who literally dug out the formal brick or stone-lined pits located in the back plots, carting the material off to laystalls located at strategic points around the city. Here, the material was sorted and dispatched off in barges, the more organic material perhaps being sent up country to be sold as manure, the more general refuse being sent downriver to the reclamation works as evidenced by archaeological work undertaken at different locations on both sides of the Liffey.

Figure 14.4: Brooking's Map of Dublin, 1728

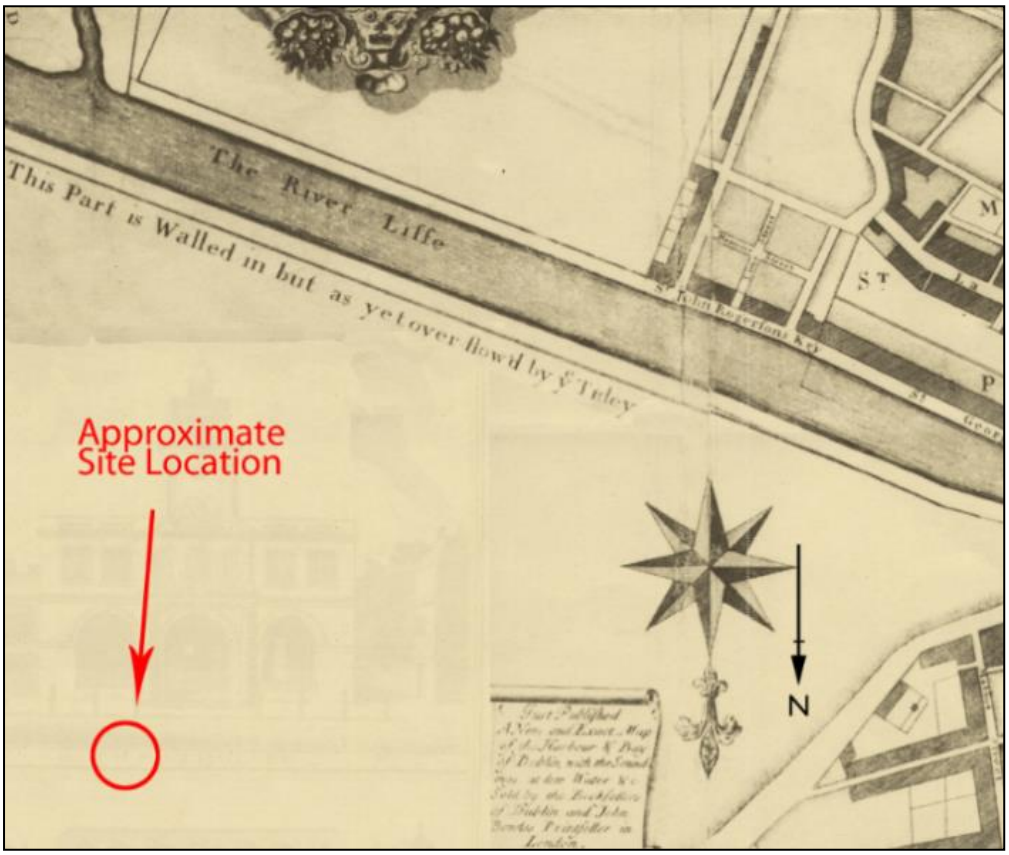


Figure 14.5: Extract from the Prospect from Brooking's map of Dublin, 1728

To a greater extent, the urban project at the North Lots was eclipsed by developments happening elsewhere in the city. From the 1740s onwards, the north side estates of Luke Gardiner had attracted those with sufficient funds to invest in property at the upper end of the market. The focus for such investment was soon to shift to the south side again following the construction of Leinster House and the development of the Fitzwilliam estate a decade later, and this area has remained the most fashionable in Dublin until the present day. The Act of Union in 1801 and the resultant exodus of the fashionable classes to London emptied many of the large houses, which soon fell prey to speculative landlords, who needed to fill the properties with as many occupants as possible to pay the high rents. The houses thus became tenements and this phenomenon was particularly evident in the Gardiner estates adjacent to the North Lots.

The slowing demand for accommodation at the upper end of the market was probably detrimental to the development of the North Lots and perhaps retarded the progress of the works. In any case, Gilligan, an authority on the port of Dublin, considers Brooking's 1728 depiction premature (1988, 25).

It would seem likely, therefore, that the impetus to reclaim the North Lots came more as a consequence of the necessity of providing a safe channel for shipping rather than as an attempt to provide more building ground for the city. The changing political situation at the turn of the 19th century dealt the final blow to any possibility of aristocratic settlement on the polder; by the publication of the first edition of the Ordnance Survey in 1843, the industrial nature of the area was becoming increasingly obvious, albeit with residential pockets.

14.3.1.6 Industrial and Residential Development - Late 18th to 20th centuries

Comparing the first edition Ordnance Survey (OS) six-inch map of 1843 (see Figure 14.6) to Rocque's map of eighty years previously, one is struck more by the similarities than the differences (chief of the latter is the Royal Canal now bisecting the area and entering the Liffey between Guild and Wapping Streets). The construction of the Royal Canal began after 1789, and the map published in Wilson's Dublin Directory in 1798 (not shown) shows the connection from Broadstone Harbour to the Liffey through a system of locks. However, this work cannot have been undertaken before 1806, when an appeal was made by the Royal Canal Company (RCC) for more funding to bring the canal to the river. Two berthing pools, the Royal Canal Docks, lay between the riverfront and Mayor Street and between Mayor Street and Sheriff Street, while a spur extended to the west from the northern pool. Although depicted on Taylor's map of 1816 (not shown), this was filled-in by 1837, and Nixon and Newfoundland Streets were constructed on the site before 1850.

The association of railway and canal occurred in 1845, when the Midland Great Western Railway (MGWR) Company acquired a majority interest in the RCC in order to close the canal and run the tracks along the bottom, thus saving on land purchase and surveying costs. The RCC had, however, initially acquired enough land for the railway to run alongside the canal and the MGWR kept the navigation open without investing

further in its operation. The rail spur was opened for freight traffic on 1 March 1864 and for passenger traffic on 2 September 1877 (Johnson 1997, passim). In 1872, the canal bank between Sheriff Street and the North Strand Road was developed by the company, which invested £71,961 in the new wharves and cranes. The new facility enabled coasters of up to 500 tons to discharge coal directly into railway wagons. The lord lieutenant, Earl Spencer, performed the opening ceremony on April 15, 1873 and his name was given to the wharves, sidings and the swivel bridge on Sheriff Street.

The canal cut through Mayor Street and Sheriff Street, neither of which had reached anything near their full urban maturity. The canal was initially crossed on Sheriff Street by means of a narrow swing bridge. The subsequent construction of the railway on its eastern side necessitated raising the road level above the polder. This probably happened prior to 1864, the canal being eventually crossed by means of a Schwerzer lift-bridge in 1912.

By the time of the first Ordnance Survey in the late 1830s, some areas behind the East Wall are obviously still under reclamation (with two plots inundated with water, see Figure 14.6) indeed, as late as 1835, a request was submitted to the Ballast Committee for one thousand tons of river mud to reclaim a 'low North lot' (Gilligan 1988, 19). For the most part, the North Lotts was still meadow, pasture and wasteland in the early years of Queen Victoria's reign. The 1837 OS map shows just seven large houses in the North Wall – East Wall area. Two of these were on Sheriff Street Upper, Castle Forbes within the Site of the proposed Project and Fort William in the adjacent plot to the east. The remaining five were Forbes Castle on East Road ('in ruins' by Cosgrave's day), Fort Lodge on West Road, Mayfield on North Strand, and Fort Crystal Court, North's Court and Fort Crystal on Church Street (described in 1844 as 'the ruins of an eccentrically constructed glasshouse').

There was a similarly slow rate of development in the plots to the south of Sheriff Street Upper and much of that was industrial or commercial in nature. There was a large Gas Works to the east of Fort William, at East Wall Road, two Vinegar Works at the west end of Sheriff Street Upper beside the canal basin, and a Vitriol Works south of Mayor Street. A large building housing public baths is depicted to the south of the Gas Works, on East Wall Road. A small terrace of five houses on the south side of Sheriff Street (southwest of the proposed Project) and some terraces off Church Street are the only clear evidence for residential development in the area. Smaller buildings depicted in some of the plots may have been residential but were more likely to be workshops (or a combination of both).

Figure 14.6: First edition Ordnance Survey six-inch map, 1837

It is readily apparent that little building work had been carried out by this time, and the only indication that any of the 1717 plot holders had developed their land for residential use was evident in the names of two houses, 'Forbes Castle' and 'Castle Forbes'; the original plot granted to Ald. George forbes lay to the northwest of Forbes Castle. Castle Forbes, which lay within the Site of the proposed Project, is depicted in greater detail on the 1847 OS five-foot plan, see Figure 14.7 and Figure 14.8 below. It shows a large house on the north side of Sheriff Street, with a straight carriageway running northwest to a gate lodge at East Road (outside the Site of the proposed Project) and another entrance to the west of the house accessing Sheriff Street. Landscaped walled gardens are depicted to the rear and side of the house (both house and part of the gardens are within the Site of the proposed Project) and trees planted along the northeast boundary. The adjacent plot is

occupied by the similarly elaborate gardens of Fort William. The nascent industrial development of the area is as depicted on the six-inch map of slightly earlier, though the Baths are now indicated as 'Old Baths'.

Figure 14.7: Detail of Ordnance Survey Five-Foot Plan, 1847 (scale 1:1056), Showing Castle Forbes

Figure 14.8: Ordnance Survey five-foot plan, 1847 (scale 1:1056)

This situation had begun to change by the time of the OS five-foot plan of 1864 (see Figure 14.9); although Castle Forbes is still in place along with the formal gardens to the east, the walled garden to the west had been removed to make way for a less formal curved drive-way and entrance, and over half of the property had been sold off or rented out. To the west of Castle Forbes, a large block was under development, with a terrace of houses along the Sheriff Street frontage and two other small properties along the East Road side. Elsewhere in the area, formerly vacant blocks and plots were gradually being developed, with large-scale industrial works (charcoal, iron, and soap), smaller industries, and terraces of workers' cottages.

Figure 14.9: Ordnance Survey five-foot plan, 1864 (scale 1:1056)

The 1887 OS 25-inch map (see Figure 14.10 below) demonstrates the growing development within the North Lots area, with the most significant change being the introduction of the Great Southern and Western Railway (GSWR) line (the embankment spur heading north-eastwards would become the East Wall Branch). The grounds formerly associated with Castle Forbes have been subdivided and given over to industrial works, see Figure 14.11 below. Although the house is still depicted and named (unlike Fort William), the yard to the north and west contains a Bottle Works, with a weighing machine situated immediately to the east of the house, and the remaining grounds to the west now a timber yard. The timber yard contains a series of long sheds, as well

as a small building in the southeast corner. Outside the yard to the north, a Corporation Sewerage Works is depicted, with an embankment along East Road and the railway line on its north side. To the north of the railway line, Forbes Castle is still named (and indicated as in ruin) but it is no longer recognisable as the large house it once was. New areas of terraced housing have been built to the north and south of the railway line, on the west side of East Road, with additional industrial development along the south side of Sheriff Street Upper.

Figure 14.10: Ordnance Survey 25-inch map, 1887

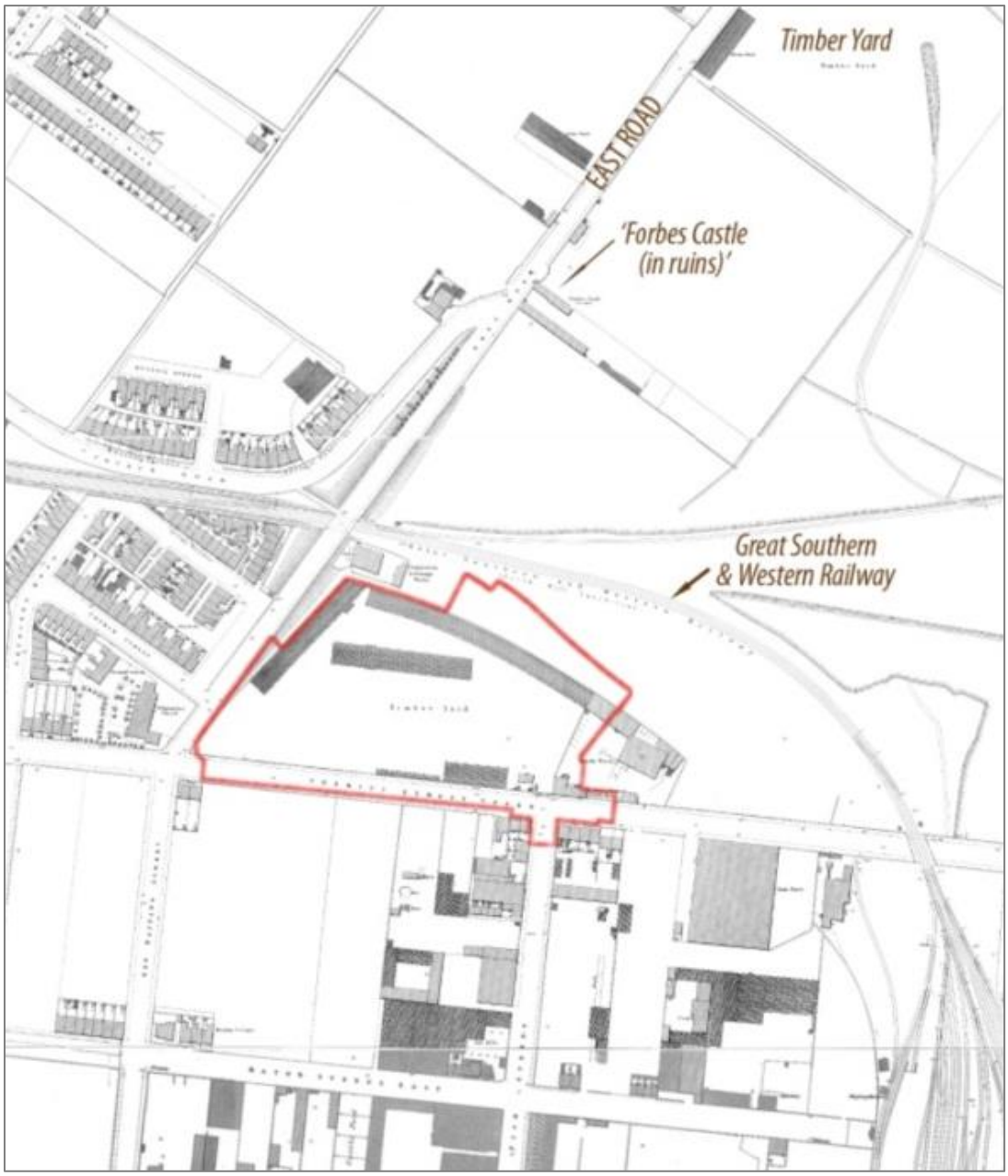
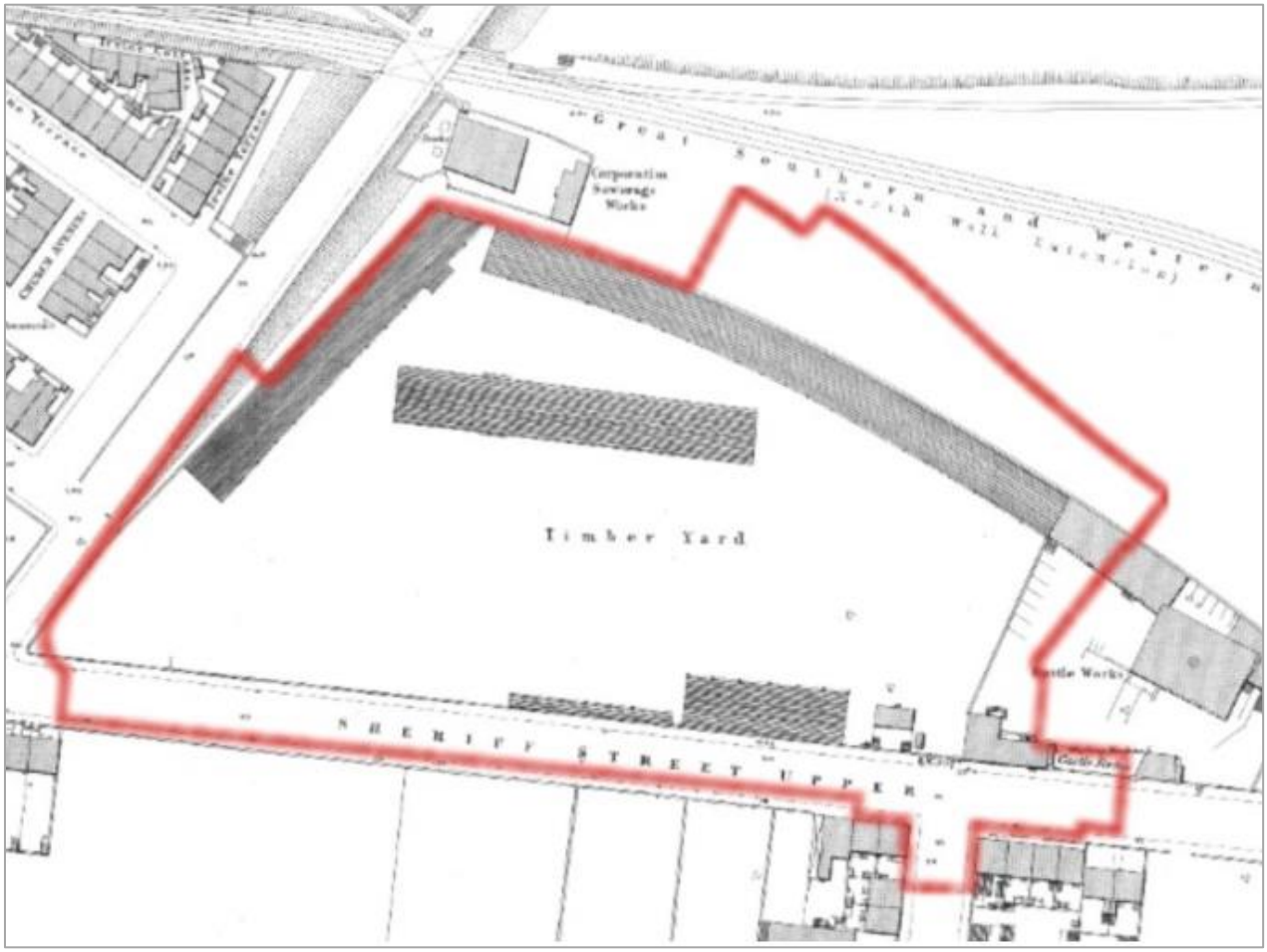


Figure 14.11: Ordnance Survey 25-inch map, 1887, showing Castle Forbes



14.3.1.7 Industrial Decline

In 1905, 127,656 tons of coal was discharged on Spencer Dock; however, only 6,000 tons were loaded on canal boats for distribution through the country. This was not surprising due to the difficulties that canal users were encountering with the railway company. Where cranes were in operation to load the train wagons, the barges had to be loaded using planks and wheelbarrows. A further problem emerged at the oral hearing of the Royal Commission on Canals and Inland Waterways, chaired by Lord Shuttleworth in 1907. The commission was told that there was only space for two boats at a time to enter the dock from the river. When canal boats had to unload from boats on the river, access in and out of the canal dock was limited to two hours each side of high tide. This rule was enforced by the railway company, ostensibly to save water in the canal, but more likely to discriminate against the canal traders. The latter alleged that the rule was fabricated to suit the large coasters entering Spencer Dock, which took up all the dock time, after which the lock keeper refused the smaller boats access to the system[146].

As happened elsewhere, the development of the railway system eventually rendered the canals practically obsolete. The arrival of a second railway company to the North Wall had initially occurred as a result of a

[146] Delaney, R. (1992). P. 160-7.

decision taken by the London and North Western Railway (LNWR) Company to transfer its passenger terminal from Kingstown in 1861. The Chester and Holyhead Railway Company (which had been taken over by the LNWR) had long been in competition with the City of Dublin Steam Packet Company, which had secured the monopoly on the Royal Mail contract between the two islands. It was thought that establishing a terminal in the port of Dublin would reduce sailing times and therefore win the contract. A freight station was constructed alongside the Chester and Holyhead berthage, along with a passenger station in 1877, most of which still survives as the former Iarnród Éireann Freight Offices and a rail link, the North Wall Extension Line, was constructed to the main line.

In 1883, increasing passenger traffic encouraged the LNWR to purchase the Prince of Wales Hotel on the junction of (old) Wapping Street and the North Wall. A new hotel was constructed behind the existing one, which was soon demolished. The new building was brought out to the North Wall and renamed the North Western Hotel. It stands today as the Former British Rail Hotel.

By the late beginning of the 20th century, extensive railway marshalling yards extended back from the quays, most tracks running alongside the canal and across the north inner city, with a connection along West Road to the Belfast line and eastern spurs extending back to the area now occupied by the former Point Depot and the docks. The increase in passenger traffic to the North Wall was promoted by the use of larger, faster steam-powered vessels, which required deeper berthage than that provided at the railway terminus.

Although the port was to develop deeper berthages down river, the problem of shallow water had been anticipated by 1842, when wooden wharves were constructed against the quay wall for 500 yards either side of the opening of the Grand Canal Docks. Increased competition for berthage led to the extension of the timber wharves from the Custom House Dock to the present-day Castleforbes Road by the early 1860s[147]. The problem of berthing at the North Wall at low water was only solved several years later with the construction of a new masonry quay wall several meters further out into the river. By the late 1860s, a section 740 feet long had been built west of the junction of the North and East Walls for the use of 'deeply laden vessels from foreign ports with cargoes of grain and timber,' which required sixteen to eighteen feet at low water[148]. This section of quay wall is listed in the RMP (DU018-020564).

The parish of St Barnabas was established in 1866 and named for St Paul's Jewish companion, Saint Barnabas, stoned to death in Cyprus in 61AD. The first parson appointed to the parish was the charismatic Rev J Grainger from the parish of St Thomas. His brief was to look after the Protestant families of English and Welsh men employed by the London and North Western Railway (LNWR) at the company's facilities on the North Wall Quay and on the trains and boats operating, via Holyhead and Liverpool, between Dublin and London. The East

[147] Gilligan (1988). P. 125-6.
[148] Gilligan (1988). P. 129.

Wall at this time was a rough and grimy landscape largely comprised of docks, railways and steamers. By holding services in private houses in the area - primarily at 7 Seaview Terrace and on Albert Avenue – he managed to increase his congregation from 800 to 2000 in three years ('Dublin Docklands - An Urban Voyage').

The development of the Alexandra Basin downstream of the North Wall enabled ships of greater tonnage to discharge their cargoes at all stages of the tide, thus restricting the amount of traffic docking at the railway terminus. Coal continued to be discharged along Spencer Dock, primarily to feed the railway locomotives. The outbreak of the First World War brought renewed passenger activity to the immediate area, and the railway yards were used for troop movements. Railway workers until recently referred to a railway siding alongside Church Road as 'The Dardanelles.'

The dominance of the railways in the study area can be seen on the 1906-9 25-inch OS map, see Figure 14.12. Two branch lines run to the north of the Site of the proposed Project, coming from the main hub to the west. These are annotated as the 'G.*S. & W.R. Dublin Warehouse Co.'s Siding'* and the 'Amiens Street and North Wall Branch', accessing corn stores to the northeast at East Wall and a large Goods Station to the southeast. Many of the formerly empty lots have been developed by this time, with a mix of warehouses, stores and yards, and rows of small terraced houses (probably occupied largely by the dock workers and their families). With the exception of the additions to the timber yard sheds and extra buildings in the former Bottle Works area (no longer so-named), the site remained relatively unchanged into the early 20th century, see Figure 14.12. Castle Forbes House is still depicted and named. The sewerage works outside the site had been renamed as a pumping station, but the buildings were unaltered.

A wider view of the area, provided in Figure 14.13 shows that by the 1930s the area was densely packed. Industrial activity was mainly concentrated east of East Road and south of Sheriff Street, framed by the large railway hub and branch lines, with residential streets to the west of East Road. By this time, the Site of the proposed Project was entirely occupied by a Soap Works, with ranges of buildings across much of the space. The long sheds around the former timbers yard appear to have been retained for use in the soap works, though sections of the sheds in the southwest corner had been removed.

Figure 14.12: Ordnance Survey 25-inch maps, 1906-9

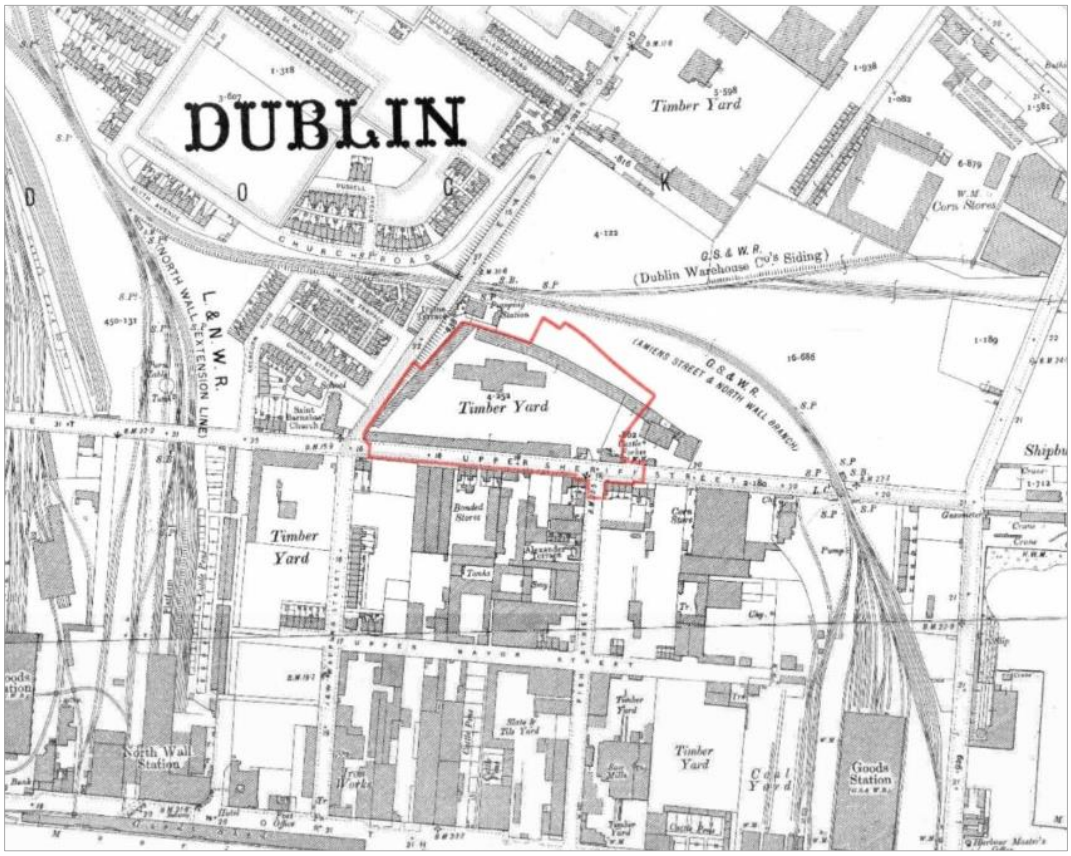
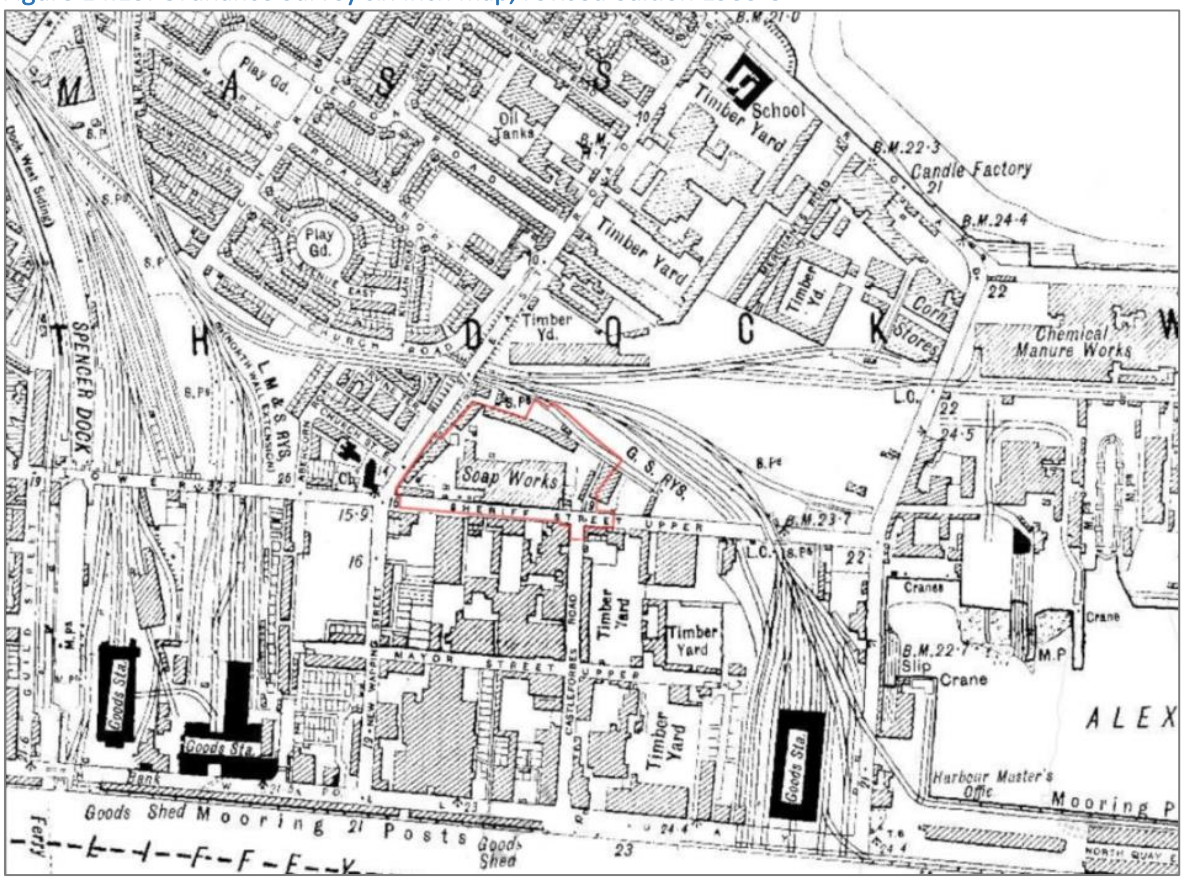


Figure 14.13: Ordnance Survey six-inch map, revised edition 1935-8



14.3.2 Archaeological Heritage

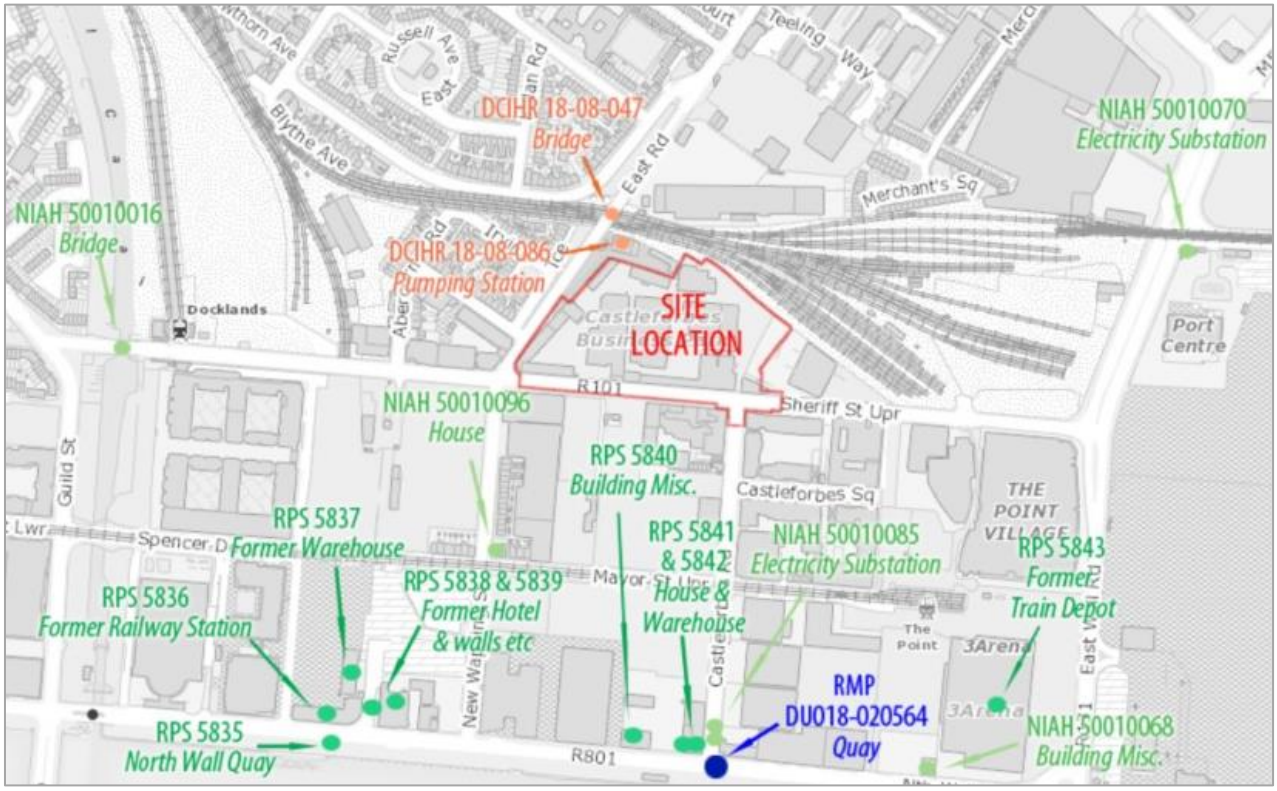
14.3.2.1 Recorded Archaeological Sites (RMP/SMR Sites)

There are no RMP/SMR sites recorded within the Site of the proposed Project or in its vicinity. Only one RMP site is recorded within a c. 500m radius, the quay at North Wall Quay, c. 335m south, see Figure 14.14. The Site of the proposed Project is also located well outside of the zone of archaeological potential (ZAP) for Historic Dublin (c. 325m north and over 1km east of the ZAP boundary).

14.3.2.2 Stray Finds

There are no stray finds recorded in the Topographical Files of the National Museum of Ireland (NMI) along East Road. The nearest, an iron knife-shaped object (typology and date unknown), is recorded c. 600m southeast on East Wall Road (NMI Reg. No. 1954:168).

Figure 14.14: RMP, RPS, NIAH and DCIHR Sites within c. 500m of Proposed Project



14.3.2.3 Previous Archaeological Investigations

There have been no previous archaeological investigations within the Site of the proposed Project, though there are three nearby, see Table 14.1 and Figure 14.15. The closest of these involved archaeological monitoring of groundworks relating to the North Docklands Sewerage Scheme in 2017 and 2018 (Licence No. 17E0058), which uncovered a limestone wall representing the foundation courses of a house depicted on the 1886 OS map at the corner of Castleforbes Road and Sheriff Street Upper. Archaeological testing on the opposite side of East Road found the foundation remains of a late 18th/19th century church (Licence No. 05E0080).

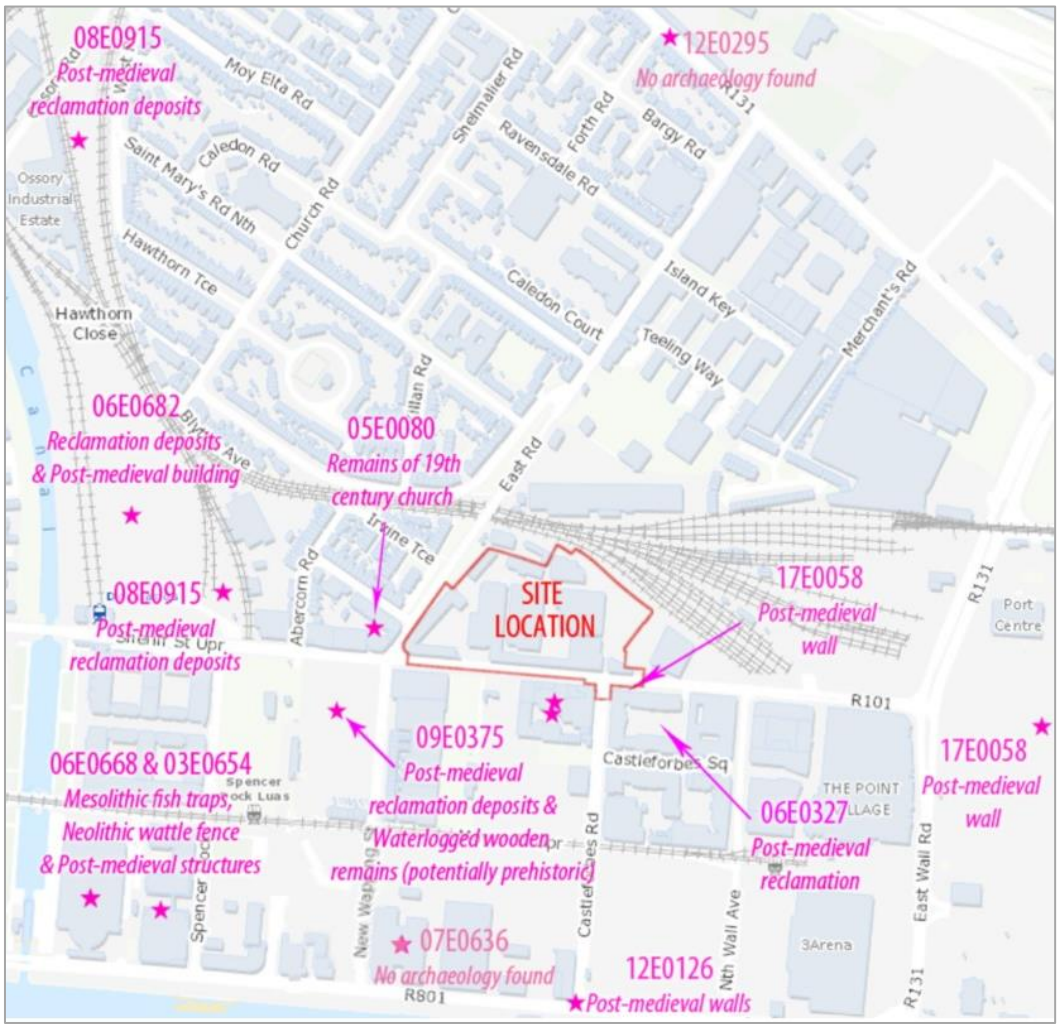
A number of investigations are also recorded in the surrounding area (see Table 14.1 and Figure 14.15), the majority of which found no significant archaeological material, mostly uncovering evidence of the large-scale dumping in the 18th and 19th centuries in an effort to reclaim the land. Two of the sites are of note, where excavations at Spencer Dock identified Late Mesolithic fish traps and a late Neolithic wattle fence preserved in the riverine silts beneath the later reclamation deposits. Also of interest are the waterlogged wooden remains of possible prehistoric date that were identified at a site to the northeast of this (c.105m southwest of the Site of the proposed Project). These findings are discussed in more detail in Section 14.3.1.2.

Table 14.1: Previous Archaeological Investigations in the Vicinity of the Site

Excavation Licence No.	Excavations Bulletin Ref.	Investigation Type	Results	Street	Distance
06E0327	2006:640	Monitoring	Post-medieval reclamation	117-126 Sheriff Street Upper	c. 45m SE
09E0375	2011:200	Monitoring	Post-medieval reclamation and modern landfill deposits, overlying waterlogged wooden remains of potentially prehistoric date (see Section 14.3.1.2)	New Wapping St / Sheriff Street Upper	c. 105m SW
05E0080	2005:477	Testing	Remains of late 18th / 19th century church foundations.	Sheriff Street / Church St East	c. 65m W
08E0915	2009:AD5	Monitoring	Post-medieval reclamation and modern landfill deposits over 7m deep.	North Quays to East Wall	c. 325m W & c. 570m NW
06E0682	2006:639	Monitoring	Uncovered reclamation deposits and remains of post-medieval small red-brick building.	Sheriff St Lower	c. 365m W
07E0636	2007:492	Monitoring	No archaeology found.	North Wall Quay	c. 265m S
03E0654	2004:0565	Monitoring & Excavation	Late Mesolithic fish trap remains (see Section 14.3.1.2)	Spencer Dock	c. 345m SW
06E0668	2007:494	Monitoring & Excavation	Late Mesolithic fish trap remains, a mid-Neolithic wattle fence & post-medieval structures (see Section 14.3.1.2)	Spencer Dock	c. 400m SW

Excavation Licence No.	Excavations Bulletin Ref.	Investigation Type	Results	Street	Distance
12E0126	2012:211	Monitoring	Post-medieval. Walls of 19th century structures and 18th/19th century quay wall, with a depth of c. 4.3m.	North Wall Quay	c. 330m S
12E0295	2012:646	Monitoring	No archaeology found.	East Wall Rd	c. 515m NNW
17E0058	2017:565	Monitoring	Post-medieval. Wall of 19th century house shown on 1887 OS map at corner of Castleforbes Rd/Sheriff Street Upper and wall of Patent Slip shown on 1837 OS map, with a depth of 3.2m & 4m respectively.	Castleforbes Rd & Dublin Port	c. 17m S & c. 400m ESE

Figure 14.15: Previous Archaeological Investigations in Vicinity of Proposed Project



14.3.2.4 Aerial Photographic Analysis

The Site of the proposed Project is a brownfield site located at the heart of the industrial docklands. Sometime in the late 18th /early 19th century, Castle Forbes house was constructed, with associated gardens, grounds, and gate lodge. The house and parts of the gardens and grounds lay within the site, and although the grounds were gradually given over to industrial use over the course of the 19th century, the house remained in situ until its demolition in the early 20th century. During the late 19th century and into the mid-20th century the site was in use as a timber yard, bottle works and soap works (as evident from the historic OS mapping), with several large buildings (stores, sheds and workshops) occupying much of the site and a railway access line running parallel to the north eastern boundary.

By the late 20th century, the buildings shown on the historic maps had been removed within the Site of the proposed Project and replaced by modern stores, warehouses and cabins (OSi aerial imagery 1995 & 2000; Figure), with little or no change to the site subsequently, see Figure 14.16 and Figure 14.7.

Figure 14.16: OSi Aerial Imagery, 1995 (left) and Digital Globe Aerial Imagery, 2011-13 (right)

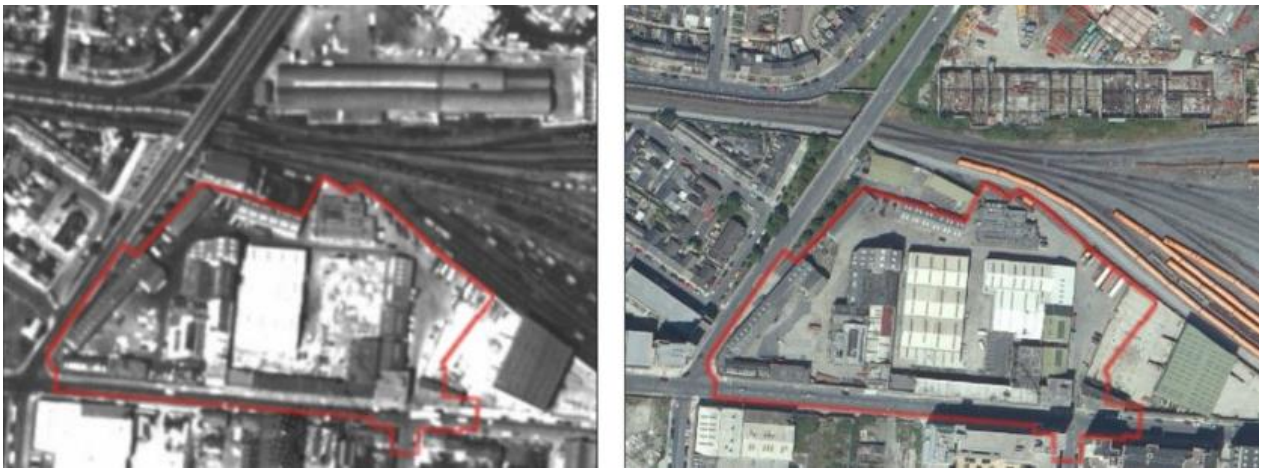


Figure 14.17: Google Earth Aerial Imagery, 2018

14.3.3 Cultural and Industrial Heritage

14.3.3.1 Undesignated Sites

The Site of the proposed Project is bounded along its north eastern side by the Amiens Street and North Wall Branch of the Great Southern and Western Railway. This was one of the many railway lines built in the latter part of the 19th century to serve Dublin's burgeoning Docklands area, providing it with links to Ireland's railway network.

The early 20th century pumping station just outside the Site of the proposed Project to the north is recorded in the Dublin City Industrial Heritage Record (DCIHR Ref. 18-08-086; see Figure 14.14). Built as part of Dublin Corporation's Main Drainage Scheme, which was completed in 1906, this pumping station forms an important part of Dublin's industrial heritage. The provision of a proper drainage system represented a major development in the infrastructure of the city, tackling what had become a major problem for the city. The structure was extensively rebuilt c. 1995 and at the time of the DCIHR survey, it was still in use as a pumping station.

Another nearby structure of industrial heritage interest is the bridge carrying East Road across the railway line c. 30m north of the Site of the proposed Project (DCIHR Ref. 18-08-047; Figure 14.14). The bridge displays a high level of craftsmanship in the execution of the stonework to its surviving original piers was an important component amongst the infrastructure of the Docklands, aiding industrial growth in the area (DCIHR appraisal).

No sites of cultural heritage interest were identified during the course of the assessment.

Table 14.2: Industrial Heritage (Undesignated) Sites on East Road

DCIHR Ref.	Site Type	Description	Location	Distance
18-08-047	Bridge	Single-span masonry bridge built c. 1880, carried East Road over East Wall Branch of Great Northern Railway. Extended to north c. 1970. Rock-faced squared uncoursed stone piers with platbands and cornices, random coursed walls to north side of the original north pier, concrete walls to extended section. Piers support the replacement concrete deck, traces of cobbling beneath the tarmacadam surface. Concrete parapet walls incorporating squared uncoursed limestone piers from original parapet. DCIHR regional merit rating (architectural, social, technical and industrial heritage interest).	East Road (ITM 717611, 734934)	c. 30m N

DCIHR Ref.	Site Type	Description	Location	Distance
18-08-086	Pumping Station	Detached double-pile pumping station, built c.1905, extensively rebuilt c.1995 with original east and west walls retained. Red and yellow brick gate piers to west giving pedestrian access to site from East Road with pyramidal cap to north pier and wrought-iron gate. DCIHR local merit rating (social, technical and industrial heritage interest).	East Road (ITM 717628, 734904)	c. 7m N

14.3.4 Architectural Heritage

14.3.4.1 General

The Site of the proposed Project is located in an area which was, and remains, predominantly industrial in nature. The Docklands area was developed following a land reclamation scheme initiated in the late 17th century, with the construction of warehouses and stores beginning in earnest following the building of the Custom House a century later.

A two-storey house dating to c. 1890 survives at No. 7 Mayor Street (c. 330m south/southwest) and is the nearest site of architectural heritage significance. The house is an unusual and rare example of domestic Victorian architecture in this area (NIAH Ref. 50010096). Its facade is enlivened by polychrome brick platbands and plinth course, which point to late 19th century technology in brickmaking. The house is not visible from the Site of the proposed Project.

Other architectural heritage sites in the surrounding area (within c. 500m) are similarly industrial in nature, also dating to the late 19th or early 20th centuries (see Table 14.3; Figure 14.14). These include several stores or warehouses, an electricity substation and railway station situated along North Wall Quay, a train shed at the former Point Depot, and another electricity substation at Alexandra Road. Many of the buildings have decorative elements (often in red brick but occasionally in terracotta or stucco), which attests to the Victorian practice of making even utilitarian buildings pleasing to the eye.

The Sheriff Street Lifting Bridge, over 380m to the east on Sheriff Street Upper (NIAH Ref. 50010016), was built over the Royal Canal c. 1900. Although no longer functioning as a bascule draw bridge, this remnant from the canal infrastructure continues to carry traffic across the canal. Now in a semi-derelict state, the bridge retains the industrial aesthetic of the area and forms a visual focal point of the recently landscaped Spencer Dock area.

A detached eight-storey red-brick former hotel on North Wall Quay, represents the commercial history of the area, having been built by the London and North Western Railway to replace an earlier hotel called the Prince of Wales Hotel (the present structure was built c. 1885, incorporating parts of the earlier 1860s structure;

NIAH Ref. 50010014). The rail company had been operating a steam packet service across the Irish Sea and moved its terminus from Dún Laoghaire in 1861 to North Wall Quay. The company bought the previous hotel and opened this hotel in 1890. The hotel provided much employment in the locality until the LNWR ships abandoned the North Wall in 1908. Occupied by British officers during the War of Independence it became known as the British Rail Hotel and ceased to operate as a hotel during the 1920s. Recently used as offices of Irish Rail the building retains all original external fabric, being the most elaborate structure east of the Custom House. Forming part of a small group of associated buildings, the cluster constitutes an historic site of considerable architectural interest that has the potential to become the focal point of the redeveloped Docklands area fronting onto the Liffey.

14.3.4.2 Record of Protected Structures and NIAH Sites

There are no architectural heritage sites (RPS or NIAH) in proximity to the Site of the proposed Project, with the closest a two-storey Victorian House, which is located c. 165m to the east on Sheriff Street Upper (NIAH Ref. 50010016).

Table 14.3: RPS/NIAH Sites within c. 500m of Site of the Proposed Project

Reference	Site Name and Description	Location	Distance
RPS 5835, NIAH 50010011	North Wall Quay. Granite ashlar quay walls, stone setts, mooring rings, steps, bollards, lamp standards and machinery. Erected c. 1800.	North Wall Quay	c. 395m SW
RPS 5836, NIAH 50010012	CIE Goods Depot (originally North Wall Railway Station), built c. 1900, including curved wall and chimneys	48-57 North Wall Quay	c. 375m SW
RPS 5837, NIAH 50010013	The Wool Store, including hexagonal lantern. Former warehouse, built c. 1850. Originally built as a port facility the building became incorporated into the adjacent North Wall Railway Station.	North Wall Quay (off)	c. 330m SW
RPS 5838, NIAH 50010014	Former British Rail hotel. Detached eight-bay four-storey red brick and terracotta former hotel, built c. 1885.	58-59 North Wall Quay	c. 335m SW
RPS 5839, NIAH 50010015	Granite walls at former British Rail hotel, railings, gates, and adjoining setts in cul-de-sac.	58-59 North Wall Quay	c. 335m SW
RPS 5840, NIAH 50010065	Richford Motors. Building (Miscellaneous) – Façade. Detached multiple-bay three-storey brick commercial building, built c. 1900, with central pediment.	73 North Wall Quay	c. 315m SW

Reference	Site Name and Description	Location	Distance
RPS 5841, NIAH 50010066	Business premises. Originally a late Victorian townhouse. Attached two-bay three-storey house over concealed basement, built c. 1880, with pub shopfront inserted to ground floor.	81 North Wall Quay	c. 320m S
RPS 5842, NIAH 50010067	Attached gable-fronted three-storey warehouse, built c. 1900, with attractive gabled brick elevation to the river front. Now derelict.	82 North Wall Quay / Castleforbes Road	c. 320m S
RPS 5843, NIAH 50010069	The O2. Former goods depot/train shed, dated 1878. Converted for use as a concert venue c. 1988, E & N facades retained. Front block remains largely as built, presents a very handsome elevation onto North Wall Quay and announces the end of the north quays as well as the end of 19th century developments along the Liffey. Fine stone masonry evident throughout with decorative arcades and doorcases to the front block. An attractive remnant from the heyday of Dublin's freight industries on the quays.	North Wall Quay/East Wall Road	c. 350m SE
NIAH 50010016	Sheriff Street Lifting Bridge (formerly Spencer Bridge), erected c. 1900. Wrought and cast-iron single-span bascule draw bridge.	Sheriff Street Upper	c. 395m W
NIAH 50010096	Detached two-storey three-bay house, built c. 1890.	7 Mayor Street	c. 165m SSW
NIAH 50010070	Electricity Substation. Detached corner-sited two-storey electricity substation, built c. 1900, with single-bay breakfronted front elevation and three-bay north side elevation, latter fronting onto Alexandra Road. With decorative brick detailing.	East Wall Road / Alexandra Road	c. 360m ENE
NIAH 50010068	Building (Miscellaneous). Detached three-bay two-storey industrial building, built c. 1880. Now derelict but retains its form, decorative stuccowork and many other features and details. It is essentially a utilitarian structure with a decorative neo-Classical front.	94 North Wall Quay	c. 365m SE
NIAH 50010085	Electricity Substation. Two detached single-storey electricity substations, built c. 1900, northern being six-bay and southern two-bay. Subtle yet decorative brick detailing.	Castleforbes Road	c. 300m S

14.3.4.3 Undesignated Sites

No undesignated sites of built heritage interest were identified during the course of this assessment.

14.3.4.4 Site Inspection

A Site inspection was carried out on 6 August 2020. The Site of the proposed Project is a brownfield site, occupied by existing industrial and office buildings and car parking area of the Castleforbes Business Park, with

rail lines and yards to the north. Large-scale residential and commercial developments have taken place or are currently under construction to the south. The surrounding area is a mix of industrial, commercial and residential.

There are two nearby structures of industrial heritage interest, a rail bridge and pumping station, both of which are as described in the DCIHR, with no discernible change since the time of that survey (Section 14.3.3.1). Both structures have been altered in the late 20th century - quite considerably in the case of the pumping station - and only the bridge retains some visible historic elements and character.

No other features of archaeological, architectural or cultural heritage interest were identified.

Plate 14.1: View Southeast of Pumping Station and Site of the Proposed Project from Rail Bridge (East Road)

Plate 14.2: Pumping Station, Facing Northeast

Plate 14.3: View East from Rail Bridge, with Pumping Station and Site of the Proposed Project on right in photo

Plate 14.4: Rail Bridge on East Road, Facing North

Plate 14.5: Rail Bridge on East Road, Facing South

Plate 14.6: View North Towards Rail Bridge on East Road

14.4 Potential Impact of the Proposed Project

14.4.1 Archaeological Heritage

There are no RMP/SMR sites recorded within the Site of the proposed Project or in its vicinity. Only one RMP site is recorded within a c. 500m radius, the quay at North Wall Quay, c. 335m south. The Site of the proposed Project is also located well outside of the zone of archaeological potential (ZAP) for Historic Dublin (c. 325m north and over 1km east of the ZAP boundary).

There have been no previous archaeological investigations within the Site of the proposed Project. Three nearby investigations uncovered foundation remains of 19th century buildings and post-medieval reclamation deposits. Investigations in the surrounding area (within c. 500m) have, for the most part, found no significant archaeological material. The results indicate that the archaeological potential of this area is represented by a sequence of 17th century reclamation deposits (containing dumped post-medieval material of varying depths) sealed by vestigial remains of 18th - 19th century applotment and structural remains.

Of note are the excavations at Spencer Dock, which identified Late Mesolithic fish traps and a late Neolithic wattle fence preserved in the riverine silts beneath the later reclamation deposits (c. 400m southwest of the Site of the proposed Project, at an average depth of -5mOD). Further waterlogged wooden remains of possible prehistoric date were identified on a neighbouring site during archaeological monitoring of bulk excavations (c. 105m southwest of the Site of the proposed Project; found at levels of between -1.39m and -1.43mOD).

It is likely that the foundations of the 19th and earlier 20th century buildings that once occupied the site survive below ground; these were mostly industrial buildings (warehouses, sheds etc.). The foundation remains of the late 18th/early 19th century Castle Forbes would be of particular interest, however, as one of the earliest residential buildings in the North Lots. If any such remains survive, they would require full recording prior to removal. As these foundations were built on top of the earlier reclamation deposits, they could be present at relatively shallow depths below present ground level.

Archaeological monitoring of ground disturbance works (including of any bulk excavations required for the half-basement level), would ensure the full recognition of, and - if necessary - the proper excavating and recording of all archaeological features, finds or deposits which may lie undisturbed beneath the ground surface.

14.4.2 Cultural and Industrial Heritage

Two undesignated sites of industrial heritage interest are located in the environs of the Site of the proposed Project (listed in the Dublin City Industrial Heritage Record): an early 20th century pumping station (just outside the Site of the proposed Project to the northwest, DCIHR Ref. 18-08-086) and the late 19th century bridge carrying East Road across the railway line (DCIHR Ref. 18-08-047) c. 30m to the north. Neither site will be

negatively affected nor is it considered that the development of an otherwise unattractive urban plot would have a positive impact on the environs of the sites.

No sites of cultural heritage interest are located within or in the vicinity of the Site of the proposed Project.

14.4.3 Architectural Heritage

There are no architectural heritage sites (RPS or NIAH) in proximity to the Site of the proposed Project. The closest is a two-storey Victorian House, which is located over 300m to the south on Mayor Street (NIAH Ref. 50010096), and will not be affected by the proposed Project.

14.5 Mitigation Measures

14.5.1 Construction Phase

14.5.1.1 Archaeological Heritage

Archaeological monitoring of ground disturbance works will be carried out under licence to the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht (DCHG). This will ensure the full recognition of, and – if required – the proper excavating and recording of all archaeological features, finds or deposits which may lie undisturbed beneath the ground surface.

The developer's attention is drawn to National Monuments Legislation (1930–94), which states that, in the event of the discovery of archaeological finds or remains, the National Monuments Service and the National Museum of Ireland should be notified immediately, see Appendix A14.1. The developer should make provision to allow for, and to fund, the necessary archaeological monitoring, inspection and excavation works that may be needed on the site during the site preparation and Construction Phases of development. Such works will need to be carried out under licence to the National Monuments Service (DCHG) and the National Museum of Ireland and sufficient time should be factored into the construction programme to allow licences to be obtained and investigative works completed.

All recommendations in this Chapter are subject to approval of the National Monuments Service of the DCHG, the National Museum of Ireland and the City Archaeologist.

14.5.1.2 Architectural and Cultural Heritage

As no adverse impacts were identified, no mitigation measures are required.

14.5.2 Operational Phase

All physical archaeological, architectural and cultural heritage impact issues will be resolved at the pre-Construction Phase of the proposed Project and therefore no potential impacts are envisioned at the Operational Phase of the proposed Project.

14.6 Residual Impacts

No residual impacts were identified during the assessment process.

14.7 Monitoring

There will be no requirement for monitoring post-construction.

14.8 Reinstatement

There will be no requirement for reinstatement.

14.9 Interactions

No interactions were identified during the assessment process.

14.10 Cumulative Impacts

No cumulative impacts were identified in the course of this assessment.

14.11 'Do-Nothing' Impact

In the '*do-nothing*' scenario the proposed Site would not be redeveloped and therefore there would be no adverse impacts to any as yet undiscovered subsurface archaeological deposits, features or finds, nor to any features of architectural heritage, cultural heritage or historic interest.

14.12 Difficulties Encountered in Compiling the Chapter

No difficulties were encountered in compiling this Chapter of the EIAR.

15 Microclimate - Daylight/Sunlight

15.1 Introduction

This Chapter of the EIAR was prepared by ARC Architectural Consultants Ltd and assesses the likely potential **daylight** and **sunlight** access impacts associated with the microclimate of the proposed Strategic Housing Development (SHD) (referred to as "*the proposed Project*"), located at Sheriff Street Upper and East Road, Dublin 1.

The proposed Project will consist of the demolition of all structures on the Site and the construction of a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a standalone three storey childcare facility and residential tenant amenity. The proposed Project will also accommodate car parking spaces, bicycle parking, storage, services and plant areas. More details on the background and Site history is provided in Chapter 5 (Description of the Proposed Project).

In assessing sunlight and daylight access, Irish practitioners tend to refer to PJ Littlefair's 2011 revision of the 1991 publication *Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice* for the Building Research Establishment (the BRE Guide).

Indeed, the Dublin City Development Plan 2016-2022 states as follows in relation to residential development: *"Development shall be guided by the principles of Site Layout Planning for Daylight and Sunlight, A guide to Good Practice*[149]*."* Given this, the standards for daylight and sunlight access in buildings (and the methodologies for assessment of same) suggested in the BRE Guide have been referenced in this Chapter.

However, it is noted that the BRE Guide does not set out rigid standards or limits and is preceded by the following very clear warning as to how the design advice contained therein should be used:

> *"The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design."* [Emphasis added].

That the recommendations of the BRE Guide are not suitable for rigid application to all developments in all contexts is of particular importance in the context of national and local policies for the consolidation and densification of urban areas or when assessing applications for highly constrained sites (*e.g.* lands in close proximity or immediately to the south of residential lands).

[149] *Building Research Establishment Report (2011).*

15.2 Baseline Environment

The Site of the proposed Project comprises a large brownfield site on the northern side of Sheriff Street Upper located to the south and west of the Dublin Port railway lane. It currently accommodates one to three storey industrial warehouses and commercial buildings, which form part of the Castleforbes Business Park. The Site is adjoined on its eastern and western sides by lands, which are also in the ownership of the Applicant. To the east, planning permission has been granted for the demolition of all existing structures and the construction of a commercial office building (6 to 9 storeys) and a 270 no. bedroom hotel (7 to 10 storeys) under DCC Reg. Ref. 3433/19. To the west, planning permission has been granted for a 219 no. bedroom hotel, ranging in height from 6 to 9 storeys (DCC Reg. Ref. 2143/20).

The section of East Road opposing the Site to the west is characterised by two storey terraced buildings in residential use at Church Street East, Irvine Court and Irvine Terrace and the single storey cottages at Church Avenue and Irvine Cottages. Lands at the southern end of East Road have been redeveloped with commercial and residential developments, including the Canon Hall development which rises to a height of eleven storeys at the junction of East Road and Sheriff Street Upper. It is notable that the site at Canon Hall site is outside the boundary of the *North Lotts and Grand Canal Dock SDZ Planning Scheme* and that other development of similar scale and height has been granted permission on lands outside the Strategic Development Zone (SDZ), including a residential development in 9 no. blocks, ranging in height from 3 to 15 storeys recently permitted on lands at No. 1-4 East Road to the north of the application site (ABP Ref. PL29N.304710).

The section of Sheriff Street Upper opposing the Site is characterised by major residential and mixed commercial and residential development ranging in height from 6 to 10 storeys and developed as part of the regeneration of Dublin Docklands SDZ.

The wider context of lands to the south of the application site is also characterised by recent dense development of significant scale that has occurred as part of the regeneration of the Dublin Docklands area, including the Convention Centre Dublin at Spencer Dock and the Point Village complex at East Wall Road. It is notable that to the southwest of the site, at City Block 2, construction of a seven storey hotel and residential development (permitted under DCC Reg. Ref. DSDZ4111/19) is underway. To the south of the site, at City Block 3, Dublin City Council have granted permission for a residential development (DCC Reg. Ref. DSDZ2186/20) ranging in height from two to seven storeys. Much of the lands on either side of the railway remains vacant or underused (e.g. accommodating low density warehousing).

Given the underutilised character of the Site and relatively large areas of low density development surrounding the site, the shadow environment of the existing site and of its immediate surroundings is inconsistent with what would normally be expected in the urban core or the industrial docklands area of a city.

Figure 15.1: Overview diagram showing the Existing Castleforbes Business Park in the context of surrounding Streets and Developments

15.3 Daylight Access Impact Analysis

15.3.1 Methodology

Section 2.2.21 of the BRE Guide suggests that:

> *"If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected. This will be the case if ..*
>
> *..the VSC measured at the centre of an existing main window is less than 27%, and less than 0.8 times its former value..."*

A three dimensional digital model of the proposed Project and of existing buildings in the area was constructed by ARC Consultants based on drawings and three dimensional models supplied by the Design Team. As it is under construction, the permitted development at City Block 2 (DCC Reg. Ref. DSDZ4111/19) was included in the existing baseline model. For the cumulative scenario, ARC included developments permitted on lands

adjoining the Site to the east and west (DCC Reg. Ref. 3433/19 and DCC Reg. Ref. 2143/20, respectively); development permitted on lands at No. 1-4 East Road to the north of the Site (ABP Ref. PL29N.304710); and development permitted on lands to the south of the Site at City Block 3 (DCC Reg. Ref. DSDZ2186/20).

Where survey data of surrounding context was not available, assumptions were made, with reference to on-site, satellite and aerial photography and to the online planning register, where relevant, in the creation of the three dimensional model. Existing and proposed landscaping was not included in this model.

The only Irish statutory guidance to provide advice on undertaking sunlight and daylight access impact analysis is set out in the EPA *Advice Notes on Current Practice*[150] which accompany the EPA Guidelines (2002)[151].

These Advice notes state: *"Climate in an Environmental Impact Statement generally refers to the local climatological conditions or "microclimate" of an area, such as local wind flow, temperature, rainfall or solar radiation patterns ... it is important to identify receptors which may be particularly sensitive to climate change."* [Emphasis added.] Having regard to the Advice Notes, ARC undertook detailed quantitative analysis of those receptors particularly sensitive to changes in the daylight environment in order to provide an empirical basis for the conclusions outlined in this Chapter.

In identifying receptors particularly sensitive to changes in the shadow environment, ARC considered two factors:

(i) *the use of receptors (i.e. buildings) surrounding the application site*: buildings in residential use (and, particularly, habitable rooms within residences) would be considered to be sensitive to changes in the shadow environment; and

(ii) *the location of receptors relative to the application site:* as set out in Section 2.2.21 of the BRE Guide *"If any part of a new building or extension, measured in vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends to an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected."*

Given this, the receptors most sensitive to changes in the daylight environment as a result of the construction of development on the Site of the proposed Project would be windows facing towards the proposal at low levels of accommodation in buildings in residential use in close proximity to the Site (*i.e.* low level rooms at Sheriff Street Upper, East Road, Church Street East, Irvine Court and Irvine Terrace). Therefore, ARC identified a representative sample of rooms and windows at Sheriff Street Upper, East Road, Church Street East, Irvine Court and Irvine Terrace for detailed quantitative analysis. That representative sample of buildings includes

[150] EPA (2003).
[151] EPA (2002).

worst case scenario receptors, including windows in existing buildings closest to proposed large or tall structures and windows at lower levels of accommodation.

ARC assessed the Vertical Sky Component of each window at a point at the centre of each window. Having regard to the extreme variability in sky luminance over the course of any given day depending on weather conditions and the changing seasons, this daylight access analysis uses the Commission Internationale de l'Eclairage (CIE) Standard Overcast Sky Distribution model in its calculations, which is the standard sky most commonly used in daylight access analysis. This model assumes that sky luminance varies from horizon to zenith and is considered to correspond to an overcast day. As such, calculation of daylight levels in a room in circumstances where the sky luminance corresponds to the CIE Standard Overcast Sky Distribution could be considered to represent a worst case scenario.

15.3.1.1 Definition of Effects on Daylight Access

The assessment of the impact of the proposed Project on daylight access had regard to the EPA Guidelines[152] and to Directive 2011/92/EU (as amended by Directive 2014/52/EU) on the assessment of the likely effects of certain public and private projects on the environment.

Table 15.1 below lists the definitions taken from *Table 3.3: Descriptions of Effects* contained in the EPA Guidelines[153]. Some comment is also given below on what these definitions might imply in the case of daylight access. The definitions from the EPA document are in italics[154].

[152] EPA (2017).
[153] EPA (2017).
[154] Please note that, for the purpose of this chapter, the word "effect" is taken to have the same meaning as the word "impact".

Table 15.1: Definitions of Significance of Impact

Significance of Impact	Description of Significance of Impact
Imperceptible	*An effect capable of measurement but without significant consequences.* The definition implies that the development would cause a change in the daylight received at a location, capable of measurement, but not noticeable to the casual observer. If the development caused no change in daylight access, there could be no effect. Examples of "*imperceptible*" impacts on daylight access would include: (a) a scenario where the proposed Project is predicted to reduce the Vertical Sky Component received by a sample window, but the sample window will continue to receive the relevant recommended level of Vertical Sky Component after the construction of the proposed Project; and (b) a scenario where the proposed Project is predicted to reduce the Vertical Sky Component to less than 0.8 times its former value (i.e. the BRE Guide threshold for an adverse impact).
Not Significant	*An effect which causes noticeable*[2] *changes in the character of the environment but without significant consequences* (the footnote "2" to the word *"noticeable"* is: *"for the purposes of planning consent procedures"*). The definition implies that the development would cause a change in the daylight received at a location, which is capable of measurement and capable of being noticed by an observer who is taking an active interest in the extent to which the proposal might affect daylight access.
Slight	*An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.* For this definition to apply, the amount of daylight received at a location would be changed by the construction of the development to an extent that is both capable of measurement and is noticeable to a minor degree. However, the daylight environment within an existing building should remain largely unchanged. An example of a "slight" impact would be a scenario where, although the impact of the proposed Project is not predicted to reduce the amount of daylight received by a sample window to less than 0.8 times its former value, the amount of light received by the sample window is predicted to fall below a key recommended level, whether that is the BRE Guide recommended target value or an alternative target value. A further example of a "slight" impact would be where, although the construction of the proposed Project is predicted to reduce the amount of light received to a level below the BRE Guide threshold for an adverse impact, the predicted reduction is just outside that BRE Guide threshold (e.g. the amount of daylight received by a sample window or sunlight received by a sample window or garden falls to not less than 0.7 times its existing value*). A "slight" impact could also occur where there is a more considerable reduction in daylight or sunlight by a sample window within an existing building, but only a small number of windows within that property are affected to that extent.
Moderate	*An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.*

Significance of Impact	Description of Significance of Impact
	In this case, a development must bring about a change in the daylight environment within an existing building; and this change must be consistent with a pattern of change that is already occurring, is likely to occur, or is envisaged by policy. A moderate effect would occur where other developments were bringing about changes in daylight access of similar extent in the area. A "moderate" impact might also be considered to occur where the level of daylight received by a sample window falls below the BRE Guide recommended level and to between 0.5 and 0.7 times its existing value, subject to consideration of other factors*.
Significant	*An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.* The definition implies that the existence of the development would change the extent of daylight access in a manner that is not *"consistent with existing and emerging baseline trends"*. For example, a development resulting in a *"significant"* diminution of daylight access would reduce daylight to the extent that minimum standards for daylighting are not met and artificial lighting is required for part of the day. A "significant" impact could occur where the predicted reduction in daylight access is greater than what is envisaged to occur if the application site were developed in line with existing and emerging baseline trends. Subject to consideration of other factors, a "significant" impact could occur where daylight access to the sample window falls to between 0.25 and 0.5 times its former value*.
Very Significant	*An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.* The definition implies that the existence of the development would change the extent of daylight access to a considerable degree and in a manner that is not *"consistent with existing and emerging baseline trends"*. For example, a *"very significant"* effect would occur where a development would result in daylight received in a room falling well below the minimum standards for daylighting and where artificial lighting would be required in that room as the principal source of lighting all the time. A "very significant" impact could occur where the predicted reduction in daylight access is considerably greater than what is envisaged to occur if the application site were developed in line with existing and emerging baseline trends. Subject to consideration of other factors, a "very significant" impact could occur where daylight access to the sample window or sunlight access to the sample window or garden falls to between 0.01 and 0.25 times its former value*.
Profound	*An effect which obliterates sensitive characteristics.* Examples of development resulting in a *"profound"* effect on daylight access would include facilitating daylight access to a room in an existing building where the existing room has none (e.g. as a result of the demolition of a building) or by removal of all access to daylight within an existing building.

* Please note that, while this section sets out indicative quantitative ranges that could apply to each type of impact, this assessment considers a range of factors (such as relevant target values, the use of the affected building, the number of rooms affected within the building, etc.) in classifying impacts.

In relation to daylight access, it is conceivable that a development could result in positive effects, but this implies that a development would involve a reduction of the size or scale of built form (*e.g.* such as the demolition of a building, which might result in an increase in daylight access). Though that is possible, it is usually unlikely as most development involves the construction of new obstructions to daylight access.

15.3.2 Potential Impact of the Proposed Project

15.3.2.1 Construction Phase

The potential impact of the Construction Phase of the proposed Project on daylight access is likely to be, initially, lesser than the potential impact of the completed development. There is a potential for the demolition of existing structures on the Site to result in a minor improvement in daylight access to buildings for a short-time, although any such reduction is likely to be very minor as existing buildings on the Site are low rise in character. As the proposed Project nears completion, the potential impact of the emerging development is likely to be similar in all material respects to that of the completed development. It is noted that temporary structures and machinery (*e.g.* hoarding, scaffolding, cranes, *etc*.) have the potential to result in changes in daylight access in buildings, although any additional impacts arising from temporary structures or machinery are likely to be *temporary* and *minor.*

15.3.2.2 Operational Phase

The BRE Guide provides that *"The quantity and quality of daylight inside a room will be impaired if obstructing buildings are large in relation to their distance away".* Generally speaking, new development is most likely to affect daylight access in existing buildings in close proximity to the Site of the proposed Project.

<u>Overview of the Potential Impact of the Proposed Project on Daylight Access to Existing Buildings outside the Site</u>

The impact of the proposed Project on daylight access within existing buildings is likely to be most significant in the case of existing buildings at close proximity with windows directly opposing the Site.

The impact of the proposed Project on daylight access to existing buildings (and, indeed, envisaged buildings on lands yet to be developed) to the south on Sheriff Street Upper in proximity to the Site is predicted to range from "slight" to "significant", with a potential for some "moderate" to "very significant" impacts to occur in the case of a limited number of recessed windows at Northbank Apartments. However, having regard to the pattern of development in the area and to statutory planning policy for densification for the urban area, while, under a worst case scenario, the potential impact to lands to the south may be considered to be "significant" to "very significant", the impact of the proposed Project on existing buildings in proximity to the Site may be considered to be consistent with an emerging pattern of medium to high density development in the area and, therefore, "moderate" in extent.

There is also a potential for the proposed Project to result in "imperceptible" to "slight" impacts on daylight access within existing buildings at East Road, Church Street East, Irvine Court and Irvine Terrace. Potential

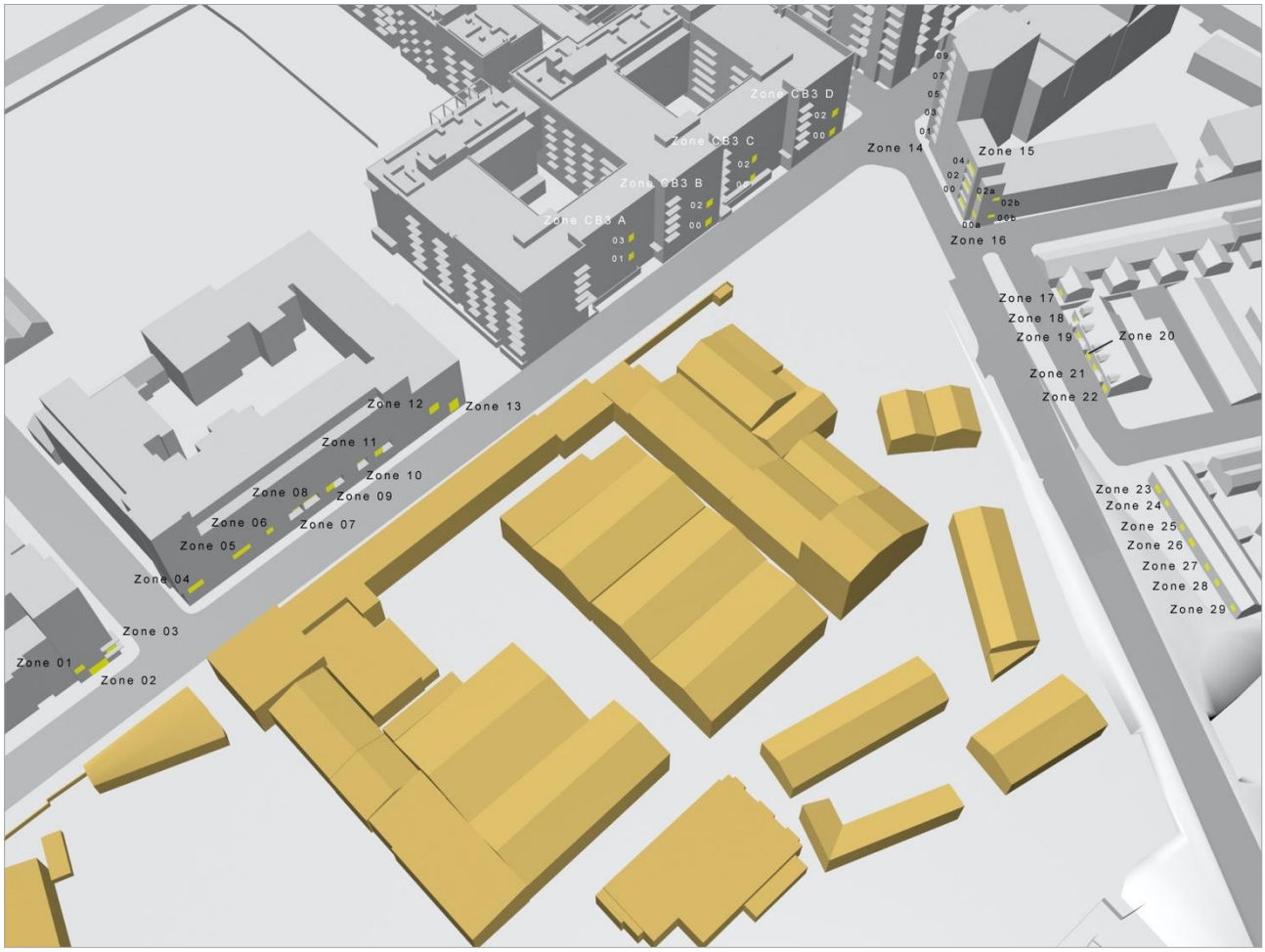
impacts on daylight access within more distant existing buildings, such as houses to the northwest at Church Road or to the north/northeast at Merchant's Square are likely to range from none to "imperceptible".

Given that the potential for development to result in impacts on daylight access diminishes with distance, it is the finding of ARC's analysis the proposed Project will have no undue adverse impact on daylight access within buildings in the wider area surrounding the Site.

Detailed Analysis of the Potential Impact of the Proposed Project on Daylight Access to Existing Buildings outside the Site

This Chapter assesses the impact of the proposed Project to all potential receptors surrounding the Site - these impacts are described in the overview section above. However, by way of example in order to illustrate briefly the findings outlined in the overview section, ARC conducted detailed analysis of the potential for the proposed Project to result in impacts on daylight access to a representative sample of sensitive receptors (i.e. rooms) in buildings in proximity to the Site, see Figure 15.2 below.

Figure 15.2: Indicative Diagram Showing Location of Sample Rooms and Windows Assessed Under this Chapter
[Please note that, as it is yet to be constructed, the sample windows in City Block 3 were assessed under Section 15.3.3: Cumulative Impacts only]



As explained in Section 15.3.1, ARC measured daylight access to existing buildings before and after the construction of the proposed Project with reference to Vertical Sky Component to identify whether the construction of the proposed Project creates the potential for adverse impacts on daylight access. Section 2.2.21 of the BRE Guide suggests that:

> *"If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected. This will be the case if ...the VSC measured at the centre of an existing main window is less than 27%, and less than 0.8 times its former value..."*

The results of ARC's analysis are set out in Table 15.2 below, together with a short comment on each result.

Table 15.2: Potential Impact of the Proposed Project on Daylight Access to Sample Windows* in Existing Buildings in Proximity to the Site

Zone	Location	Floor	Vertical Sky Component			
			Existing	Proposed	Change (times existing value of VSC)	Potential Impact
Zone 01	Castleforbes Square	Floor 01	37.40%	26.60%	0.71	Slight
Zone 02	Castleforbes Square	Floor 00	28.80%	19.90%	0.69	Slight to Moderate
Zone 03	Castleforbes Square	Floor 01	27.20%	15.90%	0.58	Moderate
Zone 04	Northbank Apts	Floor 01	29.00%	13.70%	0.47	Moderate to Significant
Zone 05	Northbank Apts	Floor 01	34.90%	18.30%	0.52	Moderate
Zone 06	Northbank Apts	Floor 01	35.10%	18.10%	0.52	Moderate
Zone 07	Northbank Apts	Floor 01	13.30%	3.00%	0.23	Moderate to Very Significant
Zone 08	Northbank Apts	Floor 01	13.80%	3.00%	0.22	Moderate to Very Significant
Zone 09	Northbank Apts	Floor 01	32.50%	17.30%	0.53	Moderate
Zone 10	Northbank Apts	Floor 00	12.10%	2.40%	0.20	Moderate to Very Significant
Zone 11	Northbank Apts	Floor 00	35.30%	18.00%	0.51	Moderate
Zone 12	Northbank Apts	Floor 00	36.40%	21.50%	0.59	Moderate
Zone 13	Northbank Apts	Floor 00	30.90%	19.90%	0.64	Moderate
Zone 14	Canon Hall	Floor 01	5.10%	4.30%	0.84	Imperceptible
		Floor 03	6.50%	5.70%	0.88	Imperceptible
		Floor 05	8.50%	7.90%	0.93	Imperceptible
		Floor 07	10.30%	9.90%	0.96	Imperceptible
		Floor 09	10.80%	10.50%	0.97	Imperceptible
Zone 15	Canon Hall	Floor 00	19.00%	16.60%	0.87	Imperceptible

Zone	Location	Floor	Vertical Sky Component			
			Existing	Proposed	Change (times existing value of VSC)	Potential Impact
		Floor 02	21.10%	19.00%	0.90	Imperceptible
		Floor 04	23.30%	21.60%	0.93	Imperceptible
Zone 16	Canon Hall	Floor 00a	26.80%	23.40%	0.87	Imperceptible
		Floor 00b	37.80%	35.10%	0.93	Imperceptible
		Floor 02a	28.60%	25.70%	0.90	Imperceptible
		Floor 02b	39.20%	36.60%	0.93	Imperceptible
Zone 17	Church Street East	Floor 00	25.20%	23.40%	0.93	Imperceptible
Zone 18	7 Irvine Court	Floor 00	26.10%	22.90%	0.88	Imperceptible
Zone 19	6 Irvine Court	Floor 00	30.30%	25.00%	0.83	Imperceptible to Slight
Zone 20	5 Irvine Court	Floor 00	32.20%	25.70%	0.80	Imperceptible to Slight
Zone 21	4 Irvine Court	Floor 00	30.60%	24.50%	0.80	Imperceptible to Slight
Zone 22	3 Irvine Court	Floor 00	32.50%	25.20%	0.78	Imperceptible to Slight
Zone 23	7 Irvine Terrace	Floor 00	35.90%	26.60%	0.74	Imperceptible to Slight
Zone 24	6 Irvine Terrace	Floor 00	36.00%	26.80%	0.74	Imperceptible to Slight
Zone 25	5 Irvine Terrace	Floor 00	36.10%	27.20%	0.75	Imperceptible (VSC remains above 27%)
Zone 26	4 Irvine Terrace	Floor 00	36.10%	27.30%	0.76	Imperceptible (VSC remains above 27%)
Zone 27	3 Irvine Terrace	Floor 00	36.20%	27.60%	0.76	Imperceptible (VSC remains above 27%)
Zone 28	2 Irvine Terrace	Floor 00	32.50%	25.00%	0.77	Imperceptible to Slight

Zone	Location	Floor	Vertical Sky Component			
			Existing	Proposed	Change (times existing value of VSC)	Potential Impact
Zone 29	I Irvine Terrace	Floor 00	32.50%	25.40%	0.78	Imperceptible to Slight

* Survey information of all structures on private lands surrounding the Sit was not available. Where insufficient survey information was available and window sizes/locations could not be informed by information available from the Dublin City Council online planning register or from aerial photography, window sizes/locations were estimated by ARC.

15.3.3 Cumulative Impacts

A review of the Dublin City Council online planning register identified the following developments for which permission has been granted, which, in-combination with the proposed Project, have the potential to result in material cumulative impacts on daylight access to the area surrounding the Site, within the meaning of the BRE Guide[155]:

- The permitted development of a commercial office building (6 to 9 storeys) and a 270 no. bedroom hotel (7 to 10 storeys) on lands adjoining the Site to the east at Sheriff Street Upper (DCC Reg. Ref. 3433/19);
- The permitted development of a 219 no. bedroom hotel, ranging in height from 6 to 9 storeys adjoining the Site to the west at Sheriff Street Upper (DCC Reg. Ref. 2143/20);
- The permitted residential development of 9 no. blocks, ranging in height from 3 to 15 storeys on lands at No. 1-4 East Road to the north of the application site (ABP Ref. PL29N.304710); and
- To the south of the Site, at City Block 3, the permitted residential development ranging in height from two to seven storeys (DCC Reg. Ref. DSDZ2186/20).

As part of this assessment, ARC has assessed the potential for the proposed Project, in-combination with these permitted developments, to result in cumulative impacts on daylight access within existing buildings surrounding the Site.

15.3.3.1 Construction Phase

The potential cumulative impact of the Construction Phase of the proposed Project, in-combination with the developments permitted under DCC Reg. Ref. 3433/19, DCC Reg. Ref. 2143/20, ABP Ref. PL29N.304710 and DCC Reg. Ref. DSDZ2186/20, on daylight access within existing buildings is likely to be, initially, lesser than the cumulative impact of the completed developments. There is a potential for the demolition of existing structures on these sites to result in a minor improvement in daylight access to buildings for a short-time, although any such reduction is likely to be very minor as any existing buildings on these sites are low rise in character. As the proposed Project and permitted developments near completion, the potential impact of the emerging developments is likely to be similar in all material respects to that of the completed developments. It is noted that temporary structures and machinery (*e.g.* hoarding, scaffolding, cranes, etc.) have the potential to result in changes in daylight access, although any additional impacts arising from temporary structures or machinery are likely to be *temporary* and *minor.*

[155] Littlefair, PJ. (1991).

15.3.3.2 Operational Phase

<u>Overview of the Potential Cumulative Impact of the proposed Project, In-Combination with Nearby Permitted Developments, on Daylight Access to Existing Buildings outside the Site</u>

ARC's analysis indicates that there is a potential for the proposed Project, in-combination with nearby permitted developments (*i.e.* as permitted under DCC Reg. Ref. 3433/19, DCC Reg. Ref. 2143/20, ABP Ref. PL29N.304710 and DCC Reg. Ref. DSDZ2186/20) to result in cumulative impacts on daylight access within existing buildings additional to those already described in Section 15.3.2.

The proposed Project, in-combination with nearby permitted developments, has the potential to result in a greater reduction in daylight access in north-facing apartments at Sheriff Street Upper to the southeast (*e.g*. Castleforbes Square) and to the southwest *(e.g.* in the case of future development on lands at City Block 3/Cooper's Cross) than as described at Section 15.3.2. Cumulative impacts on daylight access, additional to those described at Section 15.3.2, are also likely to occur to the west of the Site at East Road (*e.g*. East Road, Church Street East, Irvine Court and Irvine Terrace).

The potential cumulative impact of the proposed Project, in-combination with developments permitted under DCC Reg. Ref. 3433/19, DCC Reg. Ref. 2143/20, ABP Ref. PL29N.304710 and DCC Reg. Ref. DSDZ2186/20, on daylight access to existing buildings (and, indeed, envisaged buildings on lands yet to be developed) to the south of the Site at Sheriff Street Upper in proximity to the Site is likely to range from "*slight*" to *"significant*", with a potential for some "moderate" to "*very significant*" impacts to occur in the case of a limited number of recessed windows at Northbank Apartments. To the west, the potential cumulative impact of the proposed Project on daylight access in existing buildings at East Road, Church Street East, Irvine Court and Irvine Terrace is likely to range "imperceptible" to "*moderate*" to "*significant".* However, having regard to the pattern of development in the area and to statutory planning policy for densification for the urban area, while, under a worst-case scenario, the potential cumulative impact on existing buildings lands to the south and west may be considered to be "*significant*" to "*very significant",* the impact of the proposed Project on existing buildings in proximity to the Site may be considered to be consistent with an emerging pattern of medium to high density development in the area and, therefore, "*moderate*" in extent.

Potential cumulative impacts on daylight access within more distant existing buildings, such as houses to the northwest at Church Road or to the north/northeast at Merchant's Square are likely to range from none to "i*mperceptible*" to "*moderate*".

Given that the potential for development to result in impacts on daylight access diminishes with distance, it is the finding of ARC's analysis the proposed Project will have no undue adverse impact on daylight access within buildings in the wider area surrounding the Site.

Detailed Analysis of the Potential Cumulative Impact of the proposed Project, In-Combination with nearby Permitted Developments, on Daylight Access within Existing Buildings outside the Site

This analysis assesses the impact of the proposed Project on all potential receptors surrounding the Site - these impacts are described in the section above. However, by way of example in order to illustrate briefly the findings outlined in the overview section, ARC conducted detailed analysis of the potential for the proposed Project, in-combination with nearby permitted developments, to result in impacts on daylight access to a representative sample of sensitive receptors *(i.e.* rooms) in buildings in proximity to the Site of the proposed Project, see Figure 15.2. The representative sample of buildings includes worst case scenario examples, such as rooms at close proximity to the proposed Project and rooms at low levels of accommodation.

The results of ARC's analysis are set out in Table 15.3 below.

Table 15.3: Potential Cumulative Impact of the Proposed Project on Daylight Access to Sample Windows* in Existing Buildings in Proximity to the Site

Zone	Floor	Vertical Sky Component				
		Existing	Existing incl. Permitted	Cumulative Proposed	Change from Existing to Cumulative Proposed (times existing value of VSC)	Potential Overall Cumulative Impact
Zone 01	Floor 01	37.40%	27.60%	17.50%	0.47	Moderate to Significant
Zone 02	Floor 00	28.80%	22.70%	12.80%	0.44	Moderate to Significant
Zone 03	Floor 01	27.20%	20.30%	8.90%	0.33	Moderate to Significant
Zone 04	Floor 01	29.00%	25.90%	11.60%	0.40	Moderate to Significant
Zone 05	Floor 01	34.90%	32.80%	17.40%	0.50	Moderate
Zone 06	Floor 01	35.10%	33.60%	17.60%	0.50	Moderate
Zone 07	Floor 01	13.30%	13.00%	3.00%	0.23	Moderate to Very Significant
Zone 08	Floor 01	13.80%	13.60%	3.00%	0.22	Moderate to Very Significant
Zone 09	Floor 01	32.50%	34.10%	17.10%	0.53	Moderate
Zone 10	Floor 00	12.10%	12.00%	2.40%	0.20	Moderate to Very Significant
Zone 11	Floor 00	35.30%	34.20%	17.90%	0.51	Moderate
Zone 12	Floor 00	36.40%	35.30%	21.30%	0.59	Moderate
Zone 13	Floor 00	30.90%	29.80%	19.80%	0.64	Moderate
Zone 14	Floor 01	5.10%	3.30%	3.30%	0.65	Moderate
	Floor 03	6.50%	4.60%	4.60%	0.71	Slight
	Floor 05	8.50%	7.00%	7.00%	0.82	Imperceptible to Slight
	Floor 07	10.30%	9.40%	9.30%	0.90	Imperceptible
	Floor 09	10.80%	10.50%	10.40%	0.96	Imperceptible

Zone	Floor	Vertical Sky Component				
		Existing	Existing incl. Permitted	Cumulative Proposed	Change from Existing to Cumulative Proposed (times existing value of VSC)	Potential Overall Cumulative Impact
Zone 15	Floor 00	19.00%	7.90%	7.80%	0.41	Moderate to Significant
	Floor 02	21.10%	10.70%	10.60%	0.50	Moderate
	Floor 04	23.30%	14.90%	14.70%	0.63	Moderate
Zone 16	Floor 00a	26.80%	12.30%	12.00%	0.45	Moderate to Significant
	Floor 00b	37.80%	33.90%	33.10%	0.88	Imperceptible
	Floor 02a	28.60%	15.80%	15.40%	0.54	Moderate
	Floor 02b	39.20%	36.00%	35.00%	0.89	Imperceptible
Zone 17	Floor 00	25.20%	20.00%	18.90%	0.75	Slight
Zone 18	Floor 00	26.10%	17.30%	16.70%	0.64	Moderate
Zone 19	Floor 00	30.30%	21.30%	18.60%	0.61	Moderate
Zone 20	Floor 00	32.20%	25.60%	20.90%	0.65	Moderate
Zone 21	Floor 00	30.60%	23.80%	19.70%	0.64	Moderate
Zone 22	Floor 00	32.50%	27.90%	21.80%	0.67	Moderate
Zone 23	Floor 00	35.90%	33.90%	25.30%	0.70	Slight
Zone 24	Floor 00	36.00%	34.20%	25.80%	0.72	Slight
Zone 25	Floor 00	36.10%	34.60%	26.40%	0.73	Imperceptible to Slight
Zone 26	Floor 00	36.10%	34.80%	26.70%	0.74	Imperceptible to Slight
Zone 27	Floor 00	36.20%	35.10%	23.00%	0.64	Moderate
Zone 28	Floor 00	32.50%	31.60%	24.70%	0.76	Slight

Zone	Floor	Vertical Sky Component				
		Existing	Existing incl. Permitted	Cumulative Proposed	Change from Existing to Cumulative Proposed (times existing value of VSC)	Potential Overall Cumulative Impact
Zone 29	Floor 00	32.50%	31.80%	25.10%	0.77	Slight
Zone CB3 A	Floor 01	36.00%	30.20%	17.90%	0.50	Moderate
	Floor 03	38.00%	33.80%	24.60%	0.65	Moderate
Zone CB3 B	Floor 00	36.50%	23.80%	14.20%	0.39	Moderate to Significant
	Floor 02	38.10%	27.40%	19.40%	0.51	Moderate
Zone CB3 C	Floor 00	34.40%	18.80%	15.50%	0.45	Moderate to Significant
	Floor 02	36.30%	27.10%	20.60%	0.57	Moderate
Zone CB3 D	Floor 00	28.00%	19.60%	19.30%	0.69	Slight to Moderate
	Floor 02	30.60%	23.80%	23.50%	0.77	Slight

* Survey information of all structures on private lands surrounding the Site was not available. Where insufficient survey information was available and window sizes/locations could not be informed by information available from the Dublin City Council online planning register or from aerial photography, window sizes/locations were estimated by ARC.

15.3.4 Mitigation Measures

15.3.4.1 Construction Phase

The subject application proposes the major redevelopment of a brownfield site situated in an urban location characterised by medium and high density development. In these circumstances, scope for mitigation measures during the Construction Phase, which would preserve a sustainable level of density, is limited.

15.3.4.2 Operational Phase

The subject application proposes the major redevelopment of a brownfield site situated in an urban location characterised by medium and high density development. In these circumstances, scope for mitigation measures during the Operational Phase, which would preserve a sustainable level of density, is limited.

15.3.5 Residual Impacts

15.3.5.1 Demolition & Construction Phase

As no ameliorative, remedial or reductive measures are now proposed, the residual impact of the proposed Project on daylight access is likely to be as described under Section 15.3.2.

15.3.5.2 Operational Phase

As no ameliorative, remedial or reductive measures are now proposed, the residual impact of the proposed Project on daylight access is likely to be as described under Section 15.3.2.

15.3.5.3 Cumulative Impact

As no ameliorative, remedial or reductive measures are now proposed, the residual cumulative impact of the proposed Project in-combination with development already permitted on daylight access is likely to be as described under Section 15.3.3.

15.3.6 'Do-Nothing' Impacts

In a '*do-nothing*' scenario, the existing daylight environment within neighbouring buildings will remain unchanged.

15.3.7 Interactions

As is always the case where a development will result in a change to the daylight environment within existing buildings, the impacts of the proposed Project on daylight access will result in interactions with **climate**, and **population and human health.**

15.4 Sunlight Access Impact Analysis

15.4.1 Methodology

Section 3.2.1 of the BRE Guide[156] provides as follows in relation to the assessment of the impact of development on sunlight access to existing buildings.

> *"If a living room of an existing dwelling has a main window facing within 90° of due south, and any part of a new development subtends an angle of more than 25° to the horizontal measured from the centre of the window in a vertical section perpendicular to the window, then the sunlighting of the existing dwelling may be adversely affected. This will be the case if the centre of the window:*
>
> - *receives less than 25% of annual probable sunlight hours, or less than 5% of annual probable sunlight hours between 21 September and 21 March and*
> - *receives less than 0.8 times its former sunlight hours during either period and*
> - *has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours."*

A three dimensional digital model of the proposed Project and of existing buildings in the area was constructed by ARC Consultants based on drawings and three dimensional models supplied by the Design Team. As it is under construction, the permitted development at City Block 2 (DCC Reg. Ref. DSDZ4111/19) was included in the existing baseline model. For the cumulative scenario, ARC included developments permitted on lands adjoining the Site to the east and west (DCC Reg. Ref. 3433/19 and DCC Reg. Ref. 2143/20, respectively); development permitted on lands at No. 1-4 East Road to the north of the Site (ABP Ref. PL29N.304710); and development permitted on lands to the south of the Site at City Block 3 (DCC Reg. Ref. DSDZ2186/20).

Where survey data of surrounding context was not available, assumptions were made, with reference to on-site, satellite and aerial photography and to the online planning register, where relevant, in the creation of the three dimensional model. Existing and proposed landscaping was not included in this model.

Using the digital model, shadows were cast by ARC at several times of the day at the summer and winter solstices, and at the equinox. An equinox occurs twice a year: the March or vernal equinox (typically in or around the 20th to 21st March) and the September or autumnal equinox (typically in or around the 21st to 23rd September). For the purposes of this analysis and with reference to the BRE Guide, shadows were cast at several times of the day on 21st March.

[156] Littlefair, PJ. (1991).

The results are presented in shadow study diagrams associated with this report. Three images have been prepared for each time period on each representative date as follows:

- **Receiving Environment:** this image shows the shadows cast by the existing buildings only. Existing buildings surrounding the Site are shown in light grey, while existing buildings on the Site of the proposed Project are shown in orange. The shadows cast are shown in a dark grey tone.
- **Proposed Project:** this image shows the shadows cast by the existing buildings together with the shadows cast by the proposed Project. The existing buildings surrounding the Site are shown in light grey, while the proposed Project on the Site is shown in blue. The shadows cast are shown in a dark grey tone.
- **Cumulative:** this image shows the shadows cast by the existing buildings together with the shadows cast by the proposed Project and nearby permitted developments. The existing and permitted buildings surrounding the Site are shown in light grey, while the proposed Project on the Site is shown in blue. The shadows cast are shown in a dark grey tone.

The only Irish statutory guidance to provide advice on undertaking sunlight and daylight access impact analysis is set out in the EPA *Advice Notes on Current Practice*[157] which accompany the EPA Guidelines (2002)[158].

These Advice notes state: *"Climate in an Environmental Impact Statement generally refers to the local climatological conditions or "microclimate" of an area, such as local wind flow, temperature, rainfall or solar radiation patterns ... it is important to identify receptors which may be particularly sensitive to climate change."* [Emphasis added.]

Having regard to the Advice Notes, ARC undertook detailed quantitative analysis of those receptors particularly sensitive to changes in the sunlight environment in order to provide an empirical basis for the conclusions outlined this Chapter.

In identifying receptors particularly sensitive to changes in the shadow environment, ARC considered two factors:

(i) *the use of receptors (i.e. buildings) surrounding the Site*: buildings in residential use (and, particularly, habitable rooms within residences) would be considered to be sensitive to changes in the shadow environment; and

(ii) the location of receptors relative to the Site: as set out in Section 3.2.2 of the BRE Guide *"obstruction to sunlight may become an issue if some part of a new development is situated within 90° of due south of a main windows wall of an existing building"* and if *"in the section drawn perpendicular to this*

[157] EPA (2003).
[158] EPA (2002).

existing window wall, the new development subtends an angle greater than 25˚to the horizontal measured from the centre of the lowest window to a main living room" (Emphasis added).

Given this, the receptors most sensitive to changes in the daylight environment as a result of the construction of development on the Site would be low level windows to the west, north and east of the proposal in buildings in residential use, which face within 90˚ of due south and which are in close proximity to the Site (*i.e.* low level rooms on East Road, Church Street East, Irvine Court and Irvine Terrace). Therefore, ARC identified a representative sample of rooms and windows at East Road, Church Street East, Irvine Court and Irvine Terrace for detailed quantitative analysis. While the BRE Guide does not identify a need to analyse windows in existing buildings facing within 90˚of due north, ARC also assessed the potential for shadows cast by the proposed Project to affect sunlight access to sample windows facing north, such as those in buildings to the south of the Site on Strand Street Little. That representative sample of buildings includes worst case scenario receptors, including windows in existing buildings closest to proposed large or tall structures and windows at lower levels of accommodation.

In order to calculate sunlight access to rooms, ARC referenced the methodology outlined in Appendix A of the BRE Guide[159]. Using proprietary sunlight and daylight access analysis software, ARC analysed a sun path diagram overlaid with a shading mask corresponding to the existing or proposed shadow environment (as appropriate) and the sunlight probability diagram for a latitude of 53° N (*i.e.* Dublin) for a reference point (*i.e.* the centre point) of each sample study window. The sunlight availability indicator has 100 spots on it. Each of these represents 1% of annual probable sunlight hours (APSH). The percentage of APSH at the reference point is found by counting up all the unobstructed spots.

15.4.1.1 Definition of Effects on Sunlight Access

The assessment of the impact of the proposed Project on daylight access had regard to the EPA Guidelines[160] and to Directive 2011/92/EU (as amended by Directive 2014/52/EU) on the assessment of the likely effects of certain public and private projects on the environment.

Table 15.4 below lists the definitions taken from *Table 3.3: Descriptions of Effects* contained in the EPA Guidelines[160]. Some comment is also given below on what these definitions might imply in the case of daylight access. The definitions from the EPA document are in italics[161].

[159] *Indicators to Calculate Access to Skylight, Sunlight and Solar Radiation.*
[160] EPA (2017).
[161] Please note that, for the purpose of this chapter, the word "effect" is taken to have the same meaning as the word "impact".

Table 15.4: Definitions of Significance of Impact

Significance of Impact	Description of Significance of Impact
Imperceptible	*An effect capable of measurement but without significant consequences.* The definition implies that the development would cause a change in the sunlight received at a location, capable of measurement, but not noticeable to the casual observer. If the development caused no change in sunlight access, there could be no effect. Examples of "imperceptible" impacts on sunlight access would include: (a) a scenario where the proposed Project is predicted to reduce the amount of sunlight received by a sample window, but the sample window will continue to receive the relevant recommended level of Annual Probable Sunlight Hours after the construction of the proposed Project; and (b) a scenario where the proposed Project is predicted to reduce the Annual Probable Sunlight Hours received by a sample window to less than 0.8 times its existing value (i.e. the BRE Guide threshold for an adverse impact). Similarly, where sunlight access to a sample garden is reduced, the impact of proposed Project could be considered to be "imperceptible" or "not significant" where the sample garden continues to the receive at least two hours of sunlight over half its area on 21st March, and, where the area of the garden capable of receiving sunlight on 21st March does not drop to less than 0.8 times its existing level after the construction of the proposed Project.
Not Significant	*An effect which causes noticeable[2] changes in the character of the environment but without significant consequences* (the footnote "2" to the word *"noticeable"* is: *"for* the *purposes of planning consent procedures"*). The definition implies that the development would cause a change in the sunlight received at a location, which is capable of measurement and capable of being noticed by an observer who is taking an active interest in the extent to which the proposal might affect sunlight access.
Slight	*An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.* For this definition to apply, the amount of sunlight received at a location would be changed by shadows cast by the development to an extent that is both capable of measurement and is noticeable to a minor degree. However, the shadow environment of the surrounding environment should remain largely unchanged. An example of a "slight" impact would be a scenario where, although the impact of the proposed Project is not predicted to reduce the amount of sunlight received by a sample window or garden to less than 0.8 times its former value, the amount of light received by the sample window or garden is predicted to fall below a key recommended level, whether that is the BRE Guide recommended target value or an alternative target value. A further example of a "slight" impact would be where, although the construction of the proposed Project is predicted to reduce the amount of light received to a level below the BRE Guide threshold for an adverse impact, the predicted reduction is just outside that BRE Guide threshold (e.g. the amount of daylight received by a sample window or sunlight received by a sample window or garden falls to not less than 0.7 times its existing value*). A "slight" impact could also occur where there is a more considerable reduction in sunlight by a sample window within an existing building, but only a small number of windows within that property are affected to that extent.

Significance of Impact	Description of Significance of Impact
Moderate	*An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.* In this case, a development must bring about a change in the shadow environment of the area; and this change must be consistent with a pattern of change that is already occurring, is likely to occur, or is envisaged by policy. A moderate effect would occur where other developments were bringing about changes in sunlight access of similar extent in the area. A "moderate" impact might also be considered to occur where the level of sunlight access to a sample window or garden falls below the BRE Guide recommended level and to between 0.5 and 0.7 times its existing value, subject to consideration of other factors*.
Significant	*An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.* The definition implies that the existence of the development would change the extent of sunlight access in a manner that is not *"consistent with existing and emerging baseline trends"*. For example, a development resulting in a *"significant"* diminution of sunlight access would overshadow a location to the extent that there is a significant change in the amount of direct sunlight received at that location. A "significant" impact could occur where the predicted reduction in sunlight access is greater than what is envisaged to occur if the application site were developed in line with existing and emerging baseline trends. Subject to consideration of other factors, a "significant" impact could occur where sunlight access to the sample window or garden falls to between 0.25 and 0.5 times its former value*.
Very Significant	*An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.* For example, a *"very significant"* reduction in sunlight access would occur where the development overshadows a location for most of the time that the location would have been in sunlight prior to the construction of the development and where overshadowing of that magnitude is not *"consistent with existing and emerging baseline trends"*. A "very significant" impact could occur where the predicted reduction in sunlight access is considerably greater than what is envisaged to occur if the application site were developed in line with existing and emerging baseline trends. Subject to consideration of other factors, a "very significant" impact could occur where sunlight access to the sample window or garden falls to between 0.01 and 0.25 times its former value*.
Profound	*An effect which obliterates sensitive characteristics.* Examples of development resulting in a *"profound"* effect on sunlight access would include facilitating sunlight access at a location where that location has previously had none (e.g. facilitating sunlight access as a result of the demolition of a building) or by removal of all access to sunlight at a location.

* Please note that, while this section sets out indicative quantitative ranges that could apply to each type of impact, this assessment considers a range of factors (such as relevant target values, the use of the affected building, the number of rooms affected within the building, etc.) in classifying impacts.

In relation to sunlight access, it is conceivable that there could be positive impacts, but this implies that a development would involve a reduction of the size or scale of built form (*e.g.* such as the demolition of a building, which might result in an increase in sunlight access). Though that is possible, it is usually unlikely as most development involves the construction of new obstructions to sunlight access.

The range of possible impacts listed above deal largely with the extent of impact; and the extent of the impact of a development is usually proportional to the extent to which that development is large in scale and/or height and its proximity to the location. This proportionality may be modified by the extent to which the development is seen as culturally or socially acceptable, and on the interaction between the proposed Project the character of the existing shadow environment and the land use pattern of the receiving environment.

15.4.2 Potential Impact of the Proposed Project

15.4.2.1 Construction Phase

The potential impact of the Construction Phase of the proposed Project on sunlight access is likely to be, initially, lesser than the potential effect of the completed development. There is a potential for the demolition of existing structures on the Site to result in a minor reduction in the existing shadow environment for a short time, although any such reduction is likely to be very minor as so much of the existing site is vacant. As the proposed Project nears completion, the potential impact of the emerging development is likely to be similar in all material respects to that of the completed development. It is noted that temporary structures and machinery (*e.g*. hoarding, scaffolding, cranes*, etc.)* have the potential to result in changes in sunlight access in buildings and to open spaces, although any additional impacts arising from temporary structures or machinery are likely to be *temporary* and *minor.*

15.4.2.2 Operational Phase

The statistics of Met Éireann, the Irish Meteorological Service, indicate that the sunniest months in Ireland are May and June. During December, Dublin receives a mean daily duration of 1.7 hours of sunlight out of a mean maximum daily duration of 7.4 hours sunlight each day (*i.e*., only 22% of potential sunlight hours). This can be compared with a mean daily duration of 6.4 hours of sunlight out of a mean maximum daily duration of 16.7 hours each day received by Dublin during June (i.e., 38% of potential sunlight hours). Therefore, impacts caused by overshadowing are generally most noticeable during the summer months and least noticeable during the winter months. Due to the low angle of the sun in mid-winter, the shadow environment in all urban and suburban areas is generally dense throughout winter.

In assessing the impact of a development on sunlight access, the comments of PJ Littlefair in the BRE Guide[162] should be taken into consideration. The BRE Guide states that *"it must be borne in mind that nearly all*

[162] Littlefair, PJ. (1991).

structures will create areas of new shadow, and some degree of transient overshadowing of a space is to be expected."

Overview of the Potential Impact of Shadows Cast by the Proposed Project outside the Site

Given that the Site accommodates low rise development, it is envisaged that the impact of shadows cast by the proposed Project will result in a considerable change in the existing shadow environment of the surrounding area. In this regard, it is noted that the shadow environment of the wider area is undergoing a process of considerable change as developments permitted under the *North Lotts and Grand Canal Dock SDZ Planning Scheme* are constructed to the south and as other vacant and underutilised brownfield lands are being development in line with local, regional and national planning policy for the densification of the urban area.

Shadows cast by the proposed Project are likely to extend to the west to East Road and beyond to Church Street East, Irvine Court, Irvine Terrace and Church Road during the mornings throughout the year. The potential impact of the proposed Project on these lands to the west is assessed as ranging from "imperceptible" to "moderate", being impacts consistent with emerging trends for development in the area.

To the north, shadows cast by the proposed Project have the potential to extend across the railway and to result in "imperceptible" to "moderate" impacts on lands at No. 1-4 East Road during the afternoons and the existing residential estate at Merchant's Square to the northeast during the late evenings.

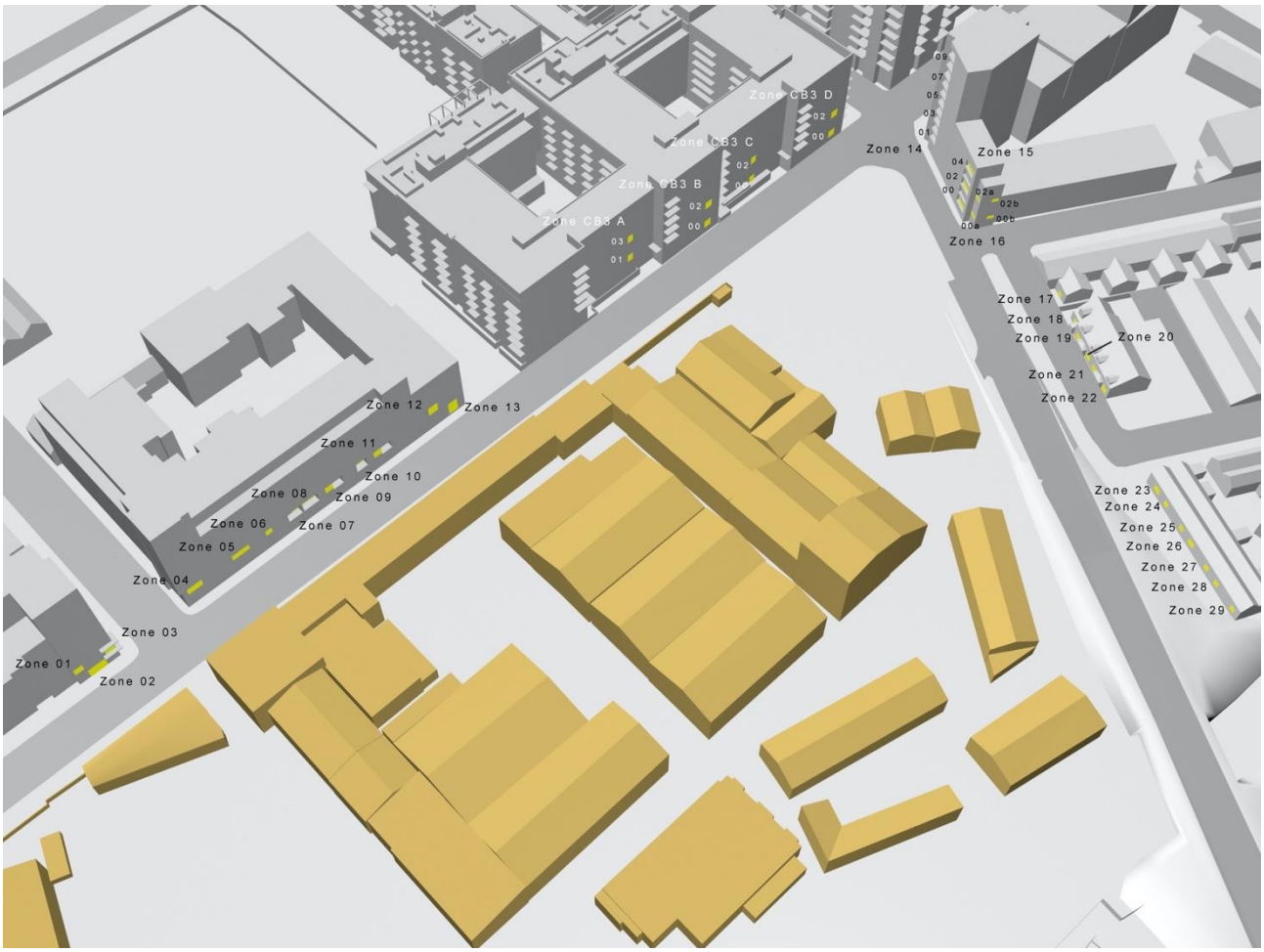
The potential impact of the proposed Project on sunlight access to lands to the northeast is likely to range from "imperceptible" to "significant", although it is noted that these lands are in railway use serving Dublin Port.

North-facing rooms in existing buildings to the south, such as those at Castleforbes Square and the Northbank Apartments, receive little sunlight at present and would not have a reasonable expectation within the meaning of the BRE Guide *(i.e*. do not face within 90°of due south). This will also be the case for any windows facing on to Sheriff Street Upper in whatever development is constructed on the balance of the City Block 3 lands. However, it should be noted that shadows cast by the proposed Project have the potential to result in "imperceptible" to "significant" changes in sunlight access to these windows during the early mornings and the late evenings of the summer months (*e.g*. May, June and July). While, under a worst-case scenario, the potential impact to lands to the west may be considered to be "significant", having regard to the scale of development permitted or constructed in the wider area and to local, regional and national planning policy for densification of the urban area, some may consider the impact to be consistent with emerging trends for development in the area or "moderate" in extent, particularly having regard to the scale of development already permitted outside the SDZ area.

Detailed Analysis of the Potential Impact of Shadows Cast by the Proposed Project on Existing Buildings outside the Site

This Chapter assesses the impact of the proposed Project to all potential receptors surrounding the Site - sunlight impacts are described in the section above. However, by way of example in order to illustrate briefly the findings outlined in the overview section, ARC conducted detailed analysis of the potential for the proposed Project to result in impacts on sunlight access to a representative sample of sensitive receptors (i.e. windows) in buildings in proximity to the Site, see Figure 15.3.

Figure 15.3: Indicative Diagram Showing Location of Sample Rooms and Windows Assessed Under this Chapter
[Please note that, as it is yet to be constructed, the sample windows in the permitted City Block 3 scheme (DCC Reg. Ref. DSDZ2186/20) were assessed under Section 15.4.3: Cumulative Impacts only]



As set out in Section 15.4.1, ARC had regard to the BRE Guide, which provides as follows in relation to the assessment of the impact of development on sunlight access to existing buildings: *"If the available sunlight hours are both less than the amount above* [25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours in the winter months between 21 September and 21 March] *and less than 0.8 times their former value, either over the whole year or just in the winter months (21 September to 21 March), then the occupants of the existing building will notice the loss of sunlight; if the overall annual loss is greater than 4% of APSH, the room may appear colder and less cheerful and pleasant."* This excerpt from the BRE Guide

suggests that where the construction of a new development has the potential to reduce sunlight access values below the recommended annual level, to less than 0.8 times the former level of sunlight access or by more than 4% APSH during the relevant periods, the potential impact of that proposed Project will not be noticed. However, in the interests of presenting a worst-case scenario for the purposes of this assessment, some impacts identified as falling into "imperceptible" ranges under the BRE Guide have been classified as either "imperceptible" to "slight" or "imperceptible" to "moderate" having regard to a range of factors including the extent of sunlight access previously available to the studied window and the extent of potential reduction in sunlight access to the studied windows after the construction of the proposed Project.

It should further be noted that the BRE Guide does not outline a recommended level of sunlight access to be achieved by windows facing within 90° of due north (such as those facing towards the Site on Sheriff Street Upper). The BRE Guide also does not describe a threshold for adverse impact on such windows. Notwithstanding this, in the interests of completeness, this Chapter includes detailed quantitative analysis of the potential impact of the proposed Project on sample north-facing windows at Sheriff Street Upper with reference to the tests outlined for windows facing within 90° of due south.

The results of ARC's analysis are outlined in Table 15.5 below.

Table 15.5: Potential Impact of the Proposed Project on Sunlight Access to Sample Windows** in Existing Buildings in Proximity to the Site

Zone	Floor	Annual Probable Sunlight Hours						Potential Impact
		Existing			Proposed			
		Annual	Summer*	Winter*	Annual	Summer*	Winter*	
1	Floor 01	12%	12%	0%	10%	10%	0%	Imperceptible to Slight
2	Floor 00	8%	8%	0%	7%	7%	0%	Imperceptible to Slight
3	Floor 01	11%	11%	0%	9%	9%	0%	Imperceptible to Slight
4	Floor 01	11%	11%	0%	9%	9%	0%	Imperceptible to Slight
5	Floor 01	11%	11%	0%	9%	9%	0%	Imperceptible to Slight
6	Floor 01	11%	11%	0%	8%	8%	0%	Imperceptible to Moderate
7	Floor 01	0%	0%	0%	0%	0%	0%	None
8	Floor 01	0%	0%	0%	0%	0%	0%	None
9	Floor 01	10%	10%	0%	7%	7%	0%	Imperceptible to Moderate
10	Floor 00	0%	0%	0%	0%	0%	0%	None
11	Floor 00	11%	11%	0%	6%	6%	0%	Moderate to Significant
12	Floor 00	12%	12%	0%	6%	6%	0%	Moderate to Significant
13	Floor 00	10%	10%	0%	5%	5%	0%	Moderate to Significant
14	Floor 01	10%	6%	4%	8%	4%	4%	Imperceptible to Slight
	Floor 03	10%	6%	4%	9%	5%	4%	Imperceptible
	Floor 05	17%	7%	10%	17%	7%	10%	None
	Floor 07	21%	7%	14%	21%	7%	14%	None

Zone	Floor	Annual Probable Sunlight Hours						Potential Impact
		Existing			Proposed			
		Annual	Summer*	Winter*	Annual	Summer*	Winter*	
	Floor 09	21%	7%	14%	21%	7%	14%	None
15	Floor 00	43%	35%	8%	38%	30%	8%	Imperceptible
	Floor 02	46%	35%	11%	41%	30%	11%	Imperceptible
	Floor 04	51%	35%	16%	47%	32%	15%	Imperceptible
16	Floor 00 A	35%	31%	4%	29%	26%	4%	Imperceptible to Slight
	Floor 00 B	19%	18%	1%	13%	13%	0%	Slight to Moderate
	Floor 02 A	37%	31%	6%	31%	26%	6%	Imperceptible to Slight
	Floor 02 B	20%	19%	1%	15%	14%	1%	Slight to Moderate
17	Floor 00	35%	32%	3%	34%	31%	3%	Imperceptible to Slight
18	Floor 00	53%	38%	15%	51%	38%	13%	Imperceptible
19	Floor 00	60%	44%	16%	49%	36%	13%	Imperceptible to Moderate
20	Floor 00	55%	45%	10%	43%	36%	7%	Imperceptible to Moderate
21	Floor 00	61%	43%	18%	51%	36%	15%	Imperceptible to Moderate
22	Floor 00	56%	46%	10%	43%	36%	7%	Imperceptible to Moderate
23	Floor 00	62%	45%	17%	49%	38%	11%	Imperceptible to Moderate
24	Floor 00	64%	46%	18%	52%	40%	12%	Imperceptible to Moderate
25	Floor 00	64%	46%	18%	51%	40%	11%	Imperceptible to Moderate
26	Floor 00	64%	46%	18%	52%	41%	11%	Imperceptible to Moderate

Zone	Floor	Annual Probable Sunlight Hours						Potential Impact
		Existing			Proposed			
		Annual	Summer*	Winter*	Annual	Summer*	Winter*	
27	Floor 00	65%	63%	2%	52%	41%	11%	Imperceptible to Moderate
28	Floor 00	65%	46%	19%	53%	42%	11%	Imperceptible to Moderate
29	Floor 00	65%	46%	19%	52%	42%	10%	Imperceptible to Moderate

* For the purposes of this calculation, summer is taken to mean the period between March and September, and winter is considered to be the period between September and March.

** Survey information of all structures on private lands surrounding the application site was not available. Where insufficient survey information was available and window sizes/locations could not be informed by information available from the Dublin City Council online planning register or from aerial photography, window sizes/locations were estimated by ARC.

15.4.3 Cumulative Impacts

A review of the DCC online planning register identified the following developments for which permission has been granted, which, in-combination with the development now proposed, have the potential to result in material cumulative impacts on sunlight access to the area surrounding the Site, within the meaning of the BRE Guide[163]

- The permitted development of a commercial office building (6 to 9 storeys) and a 270 no. bedroom hotel (7 to 10 storeys) on lands adjoining the Site to the east at Sheriff Street Upper (DCC Reg. Ref. 3433/19);
- The permitted development of a 219 no. bedroom hotel, ranging in height from 6 to 9 storeys adjoining the Site to the west at Sheriff Street Upper (DCC Reg. Ref. 2143/20);
- The permitted residential development of 9 no. blocks, ranging in height from 3 to 15 storeys on lands at No. 1-4 East Road to the north of the application site (ABP Ref. PL29N.304710); and
- To the south of the Site, at City Block 3, the permitted residential development ranging in height from two to seven storeys (DCC Reg. Ref. DSDZ2186/20).

As part of this assessment, ARC has assessed the potential for the proposed Project, in-combination with these permitted developments, to result in cumulative impacts on sunlight access within existing buildings surrounding the Site.

15.4.3.1 Construction Phase

The potential cumulative impact of the Construction Phase of the proposed Project, in-combination with the developments permitted under DCC Reg. Ref. 3433/19, DCC Reg. Ref. 2143/20, ABP Ref. PL29N.304710 and DCC Reg. Ref. DSDZ2186/20, on sunlight access to the surrounding area is likely to be, initially, lesser than the cumulative impact of the completed developments. There is a potential for the demolition of existing structures on these sites to result in a minor improvement in sunlight access to the surrounding area for a short time, although any such reduction is likely to be very minor as existing buildings on the Site are low rise in character. As the proposed Project and permitted developments near completion, the potential impact of the emerging developments is likely to be similar in all material respects to that of the completed developments. It is noted that temporary structures and machinery (*e.g.* hoarding, scaffolding, cranes, etc.) have the potential to result in changes in sunlight access, although any additional impacts arising from temporary structures or machinery are likely to be *temporary* and *minor.*

[163] Littlefair, PJ. (1991).

15.4.3.2 Operational Phase

Overview of the Potential Cumulative Impact of the Proposed Project, In-Combination with Nearby Permitted Developments, on Sunlight Access to the Surrounding Area

ARC's analysis indicates that there is a potential for the proposed Project, in-combination with nearby permitted developments (i.e. as permitted under DCC Reg. Ref. 3433/19, DCC Reg. Ref. 2143/20, ABP Ref. PL29N.304710 and DCC Reg. Ref. DSDZ2186/20) to result in cumulative impacts on sunlight access to the surrounding area additional to those already described in Section 15.4.2.

Specifically, the proposed Project, in-combination with nearby permitted developments, has the potential to result in a greater reduction in sunlight access in north-facing apartments at Sheriff Street Upper to the southeast (*e.g.* Castleforbes Square) and to the southwest (e.g. in the case of future development on lands at City Block 3/Cooper's Cross) than as described at Section 15.3.2. Cumulative impacts on daylight access, additional to those described at Section 15.3.2, are also likely to occur to the west of the Site at East Road (*e.g*. East Road, Church Street East, Irvine Court and Irvine Terrace).

The potential cumulative impact of the proposed Project, in-combination with developments permitted under DCC Reg. Ref. 3433/19, DCC Reg. Ref. 2143/20, ABP Ref. PL29N.304710 and DCC Reg. Ref. DSDZ2186/20, on sunlight access to lands in proximity to the Site at Sheriff Street Upper, East Road, Church Street East, Irvine Court and Irvine Terrace is likely to range from *"imperceptible*" to "*significant*". While, under a worst-case scenario, the potential cumulative impacts on these lands may be considered to be "*significant*", having regard to the scale of development permitted or constructed in the wider area and to local, regional and national planning policy for densification of the urban area, some may consider the impact to be consistent with emerging trends for development in the area or "moderate" in extent, particularly having regard to the scale of development already permitted outside the SDZ area (*e.g.* at Canon Hall and at No. 1-4 East Road).

Potential cumulative impacts on sunlight access to more distant lands to the north, such as houses to the northwest at Church Road or to the north/northeast at Merchant's Square are likely to range from none to *"imperceptible*" to *"moderate*".

The potential cumulative impact of the proposed Project, in-combination with nearby permitted development, on sunlight access to lands bounding the Site to the northeast is likely to range from "*imperceptible*" to *"significant*", although it is noted that these lands are in railway use serving Dublin Port.

Detailed Analysis of the Potential Cumulative Impact of the Proposed Project, In-Combination with Nearby Permitted Developments, on Sunlight Access within Existing Buildings outside the Site

This analysis assesses the potential impact of the proposed Project on all potential receptors surrounding the Site - these impacts are described in the section above. However, by way of example in order to illustrate briefly the findings outlined in the overview section, ARC conducted detailed analysis of the potential for the proposed Project, in-combination with nearby permitted developments, to result in impacts on sunlight access to a representative sample of sensitive receptors (i.e. rooms) in buildings in proximity to the Site, see Figure 15.3. The representative sample of buildings includes worst-case scenario examples, such as rooms at close proximity to the proposed Project and rooms at low levels of accommodation.

The results of ARC's analysis are set out in Table 15.6 below.

Table 15.6: Potential Cumulative Impact of the Proposed Project on Sunlight Access to Sample Windows** in Existing Buildings in Proximity to the Site

Zone	Floor	Annual Probable Sunlight Hours						Potential Impact
		Existing			Proposed			
		Annual	Summer*	Winter*	Annual	Summer*	Winter*	
1	Floor 01	12%	12%	0%	7%	7%	0%	5%
2	Floor 00	8%	8%	0%	6%	6%	0%	5%
3	Floor 01	11%	11%	0%	6%	6%	0%	4%
4	Floor 01	11%	11%	0%	5%	5%	0%	4%
5	Floor 01	11%	11%	0%	6%	6%	0%	5%
6	Floor 01	11%	11%	0%	6%	6%	0%	5%
7	Floor 01	0%	0%	0%	0%	0%	0%	0%
8	Floor 01	0%	0%	0%	0%	0%	0%	0%
9	Floor 01	10%	10%	0%	5%	5%	0%	5%
10	Floor 00	0%	0%	0%	0%	0%	0%	0%
11	Floor 00	11%	11%	0%	5%	5%	0%	5%
12	Floor 00	12%	12%	0%	5%	5%	0%	5%
13	Floor 00	10%	10%	0%	5%	5%	0%	5%
14	Floor 01	10%	6%	4%	7%	3%	4%	7%
	Floor 03	10%	6%	4%	7%	3%	4%	7%
	Floor 05	17%	7%	10%	14%	4%	10%	14%
	Floor 07	21%	7%	14%	20%	6%	14%	20%
	Floor 09	21%	7%	14%	21%	7%	14%	21%

Zone	Floor	Annual Probable Sunlight Hours						Potential Impact
		Existing			Proposed			
		Annual	Summer*	Winter*	Annual	Summer*	Winter*	
15	Floor 00	43%	35%	8%	18%	12%	6%	18%
	Floor 02	46%	35%	11%	25%	17%	8%	25%
	Floor 04	51%	35%	16%	35%	25%	11%	35%
16	Floor 00 A	35%	31%	4%	6%	5%	1%	6%
	Floor 00 B	19%	18%	1%	4%	4%	0%	3%
	Floor 02 A	37%	31%	6%	15%	14%	1%	15%
	Floor 02 B	20%	19%	1%	7%	7%	0%	6%
17	Floor 00	35%	32%	3%	30%	30%	0%	29%
18	Floor 00	53%	38%	15%	40%	34%	6%	40%
19	Floor 00	60%	44%	16%	47%	41%	6%	40%
20	Floor 00	55%	45%	10%	44%	43%	1%	35%
21	Floor 00	61%	43%	18%	50%	42%	8%	42%
22	Floor 00	56%	46%	10%	49%	46%	3%	38%
23	Floor 00	62%	45%	17%	57%	45%	12%	45%
24	Floor 00	64%	46%	18%	60%	46%	14%	48%
25	Floor 00	64%	46%	18%	61%	46%	15%	49%
26	Floor 00	64%	46%	18%	63%	46%	17%	51%
27	Floor 00	65%	63%	2%	64%	46%	18%	51%
28	Floor 00	65%	46%	19%	64%	46%	18%	52%

Zone	Floor	Annual Probable Sunlight Hours						Potential Impact
		Existing			Proposed			
		Annual	Summer*	Winter*	Annual	Summer*	Winter*	
29	Floor 00	65%	46%	19%	64%	46%	18%	51%
CB3 1a	Floor 01	5%	5%	0%	4%	4%	0%	1%
	Floor 03	5%	5%	0%	4%	4%	0%	3%
CB3 1b	Floor 00	9%	9%	0%	8%	8%	0%	5%
	Floor 02	9%	9%	0%	8%	8%	0%	5%
CB3 1c	Floor 00	4%	4%	0%	4%	4%	0%	1%
	Floor 02	5%	5%	0%	5%	5%	0%	2%
CB3 1d	Floor 00	9%	9%	0%	8%	8%	0%	5%
	Floor 02	10%	10%	0%	9%	9%	0%	7%

* For the purposes of this calculation, summer is taken to mean the period between March and September, and winter is considered to be the period between September and March.

** Survey information of all structures on private lands surrounding the application site was not available. Where insufficient survey information was available and window sizes/locations could not be informed by information available from the Dublin City Council online planning register or from aerial photography, window sizes/locations were estimated by ARC.

15.4.4 Mitigation Measures

15.4.4.1 Construction Phase

The subject application proposes the major redevelopment of a brownfield site situated in an urban location characterised by medium and high density development. In these circumstances, scope for mitigation measures during the Construction Phase, which would preserve a sustainable level of density, is limited.

15.4.4.2 Operational Phase

The subject application proposes the major redevelopment of a brownfield site situated in an urban location characterised by medium and high density development. In these circumstances, scope for mitigation measures during the Operational Phase, which would preserve a sustainable level of density, is limited.

15.4.5 Residual Impacts

15.4.5.1 Demolition & Construction Phase

As no ameliorative, remedial or reductive measures are now proposed, the residual impact of the proposed Project on sunlight access is likely to be as described under Section 15.4.2.

15.4.5.2 Operational Phase

As no ameliorative, remedial or reductive measures are now proposed, the residual impact of the proposed Project on sunlight access is likely to be as described under Section 15.4.2.

15.4.5.3 Cumulative Impact

As no ameliorative, remedial or reductive measures are now proposed, the residual cumulative impact of the proposed Project in-combination with development already permitted on sunlight access is likely to be as described under Section 15.4.3.

15.4.6 'Do-Nothing' Impacts

In a '*do-nothing*' scenario, the existing sunlight environment within neighbouring buildings and open spaces will remain unchanged.

15.4.7 Interactions

As is always the case where a development will result in a change to the sunlight environment of an area, the impacts of the proposed Project on sunlight access will result in interactions with **climate**, **cultural heritage**, **population and human health** and **landscape.**

15.5 Monitoring

Monitoring of avoidance, remedial and mitigation measures is not relevant to the assessment of impacts on daylight and sunlight access in the case of the subject application.

15.6 Reinstatement

Reinstatement is not relevant to the assessment of impacts of the proposed Project on daylight and sunlight access in the case of the subject application. It is intended that the proposed Project will be permanent.

15.7 Difficulties Encountered in Compiling the Chapter

It was neither possible nor practical for the Design Team to gain unfettered access to every parcel of private property within the study area surrounding the Site in order to carry out measured building survey. Therefore, while ARC has confidence that the three dimensional model used in the assessment of the impact of the proposal on daylight access achieves a high degree of accuracy, it should be noted that some level of assumption was necessary in completing the model.

As noted above, in assessing sunlight and daylight access, Irish practitioners tend to refer the BRE Guide[164] (2011 and 1991 publications). However, it is noted that the BRE Guide does not set out rigid standards or limits and is preceded by the following very clear warning as to how the design advice contained therein should be used: *"The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design."* [Emphasis added.]

That the recommendations of the BRE Guide are not suitable for rigid application to all developments in all contexts is of particular importance in the context of national and local policies for the consolidation and densification of urban areas or when assessing applications for highly constrained sites (*e.g.* lands in close proximity or immediately to the south of residential lands). Specifically, adherence to the recommendations of the BRE Guide with regard to achieving a Vertical Sky Component of 27% for adequate daylighting has been shown to lead to densities of development, which would be very considerably too low to be sustainable and would be inconsistent with the local, regional and national statutory planning policy (please see the Technical Appendix). The BRE Guide acknowledges this. Appendix F of the BRE Guide[165] states: *"Sections 2.1, 2.2 and 2.3 give numerical target values in assessing how much light from the sky is blocked by obstructing buildings. These values are purely advisory and different targets may be used based on the special requirements of the proposed development or its location... Whatever the targets chosen for a particular development, it is important that they should be self-consistent. Table F1 can be used to ensure this."* The lowest Vertical Sky Component figure

[164] Littlefair, PJ. (1991 & 2011).
[165] *Setting Alternative Target Values for Skylight and Sunlight Access.*

set out in Table 1 is a Vertical Sky Component of 13% - assuming a street width of 12.5m (*e.g.* 3 m wide footpath + 3.25m lane + 3.25m lane + 3m wide footpath, as set out in the *Design Manual for Urban Roads and Streets*), a 13% Vertical Sky Component would occur in ground floor rooms of opposing buildings of approximately five storeys in height. Given that the *Urban Development and Building Height Guidelines* recommend a minimum of six storeys in city centre areas, the results of assessment of the impact of development on daylight access using Vertical Sky Component must be interpreted with caution.

16 Microclimate - Wind

16.1 Introduction

This Chapter of the EIAR was prepared by ARUP and assesses the impact of the proposed Strategic Housing Development (SHD) (referred to as "*the proposed Project*") on the wind conditions affecting activities in areas within and surrounding the development. The Site of the proposed Project is located at Sheriff Street Upper and East Road, Dublin 1.

The proposed Project will consist of the demolition of all structures on the Site and the construction of a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a childcare facility and residential tenant amenity. The proposed Project will also accommodate car parking spaces, bicycle parking, storage, services and plant areas. More details on the background and Site history is provided in Chapter 5 (Description of the Proposed Project).

This Chapter describes the methods used to assess these impacts in terms of pedestrian comfort and safety. The presence of taller buildings among lower buildings provides the potential for windiness in surrounding areas. The windiness depends on both the massing of the buildings within their surroundings, their orientation with respect to the wind, and the local climate.

This study is based on drawings and computer-generated imagery provide by O'Mahony Pike (OMP) Architects, an evaluation of aerial views of the site, local climate conditions and Arup's previous extensive experience of wind studies around buildings.

During the design process, the influence of the proposed Project of the local wind microclimate and its impact on the quality of the pedestrian environment was examined. This Chapter describes the methods used to assess these impacts in terms of pedestrian comfort and safety and outlines how the findings informed the design process.

This Chapter assesses the impact of the proposed Project on the wind conditions affecting pedestrian activities in areas within and surrounding the Site of the proposed Project. The erection of new buildings may alter the flow of the wind in the surrounding area. The windiness depends on both the massing of the buildings within their surroundings, their orientation with respect to the wind, and the local climate. It is necessary to ascertain if the proposed Project enhances or reduces the quality of the public realm. The assessment of discomfort and distress of pedestrians has been carried out in accordance with the Lawson Comfort Criteria[166].

[166] Lawson, TV. (1990).

16.2 Methodology

It is important to understand the wind microclimate around a 'proposed development' in order to understand the level of pedestrian comfort within the development. The assessment has been undertaken in the following key locations:

- pedestrian thoroughfares;
- entrances;
- public spaces;
- balconies; and
- terraces.

In addition, the study has examined if any additional mitigation measures, such as screens and landscaping, can be adopted to further enhance the amenity value of the space.

16.2.1 Objectives

The objectives of the wind assessment are as follows:

- to ascertain the level of pedestrian wind comfort at sensitive receptors (*i.e.* walkways, entrances, public spaces and balconies) within and in the vicinity of the apartment/commercial blocks within the proposed Project;
- to propose potential mitigation measures and evaluate their effectiveness, as appropriate; and
- to report on the environmental wind conditions associated with the proposed Project for incorporation into a planning report.

16.2.2 Lawson Comfort Criteria

The criteria used to describe windiness in this study are those of TV Lawson of Bristol University, extracted from "*The evaluation of the windiness of a building complex before construction*", TV Lawson, London Docklands Development Corporation. These are used widely in Ireland, UK and around the world.

The acceptability of windy conditions is subjective and depends on a number of other factors, including but not limited to, normal clothing for the time of the year, expectations of the wind environment, air temperature, humidity and sunshine and most notably the activities to be performed in the area being assessed. The Lawson Criteria describe acceptability for particular activities in terms of '*comfort*' and '*distress*' (or safety). Acceptable conditions for various activities in order of increasing windiness are described in Table 16.1.

Gusts cause the majority of cases of annoyance and distress and are assessed in addition to average wind speeds. Gust speeds should be divided by 1.85 and these "*gust equivalent mean*" (GEM) speeds are compared

to the same criteria as for the mean hourly wind speeds. This avoids the need for different criteria for mean and gust wind speeds.

Table 16.1: Comfort Criteria as Defined by TV Lawson

Activity	Description
'sitting'	Regular use for reading a newspaper and eating and drinking.
'standing'	Appropriate for bus stops, window shopping, building entrances, and public amenity spaces such as parks.
'strolling'	General areas of walking and sightseeing.
'business walking'	Local areas around tall buildings where people are not expected to linger.

Note: *A classification of 'business walking' does not mean that a location will never be suitable for 'sitting', however, it is likely to occur relatively infrequently.*

16.2.2.1 Comfort Levels

The onset of discomfort depends on the activity in which the individual is engaged and is defined in terms of a mean hourly wind speed (or GEM, see above) which is exceeded **for 5% of the time**. The conditions, as described in Table 16.1, are the limiting criteria for comfort. For ideal conditions, the windiness will be a category better than outlined above. For more sensitive activities, such as regular use for external eating, conditions should be well within the 'sitting' category. Ireland is a windier climate than the UK, where these criteria were developed. It is generally accepted that residents in windier climates are more resilient to stronger winds. Therefore, a slight exceedance of the limiting criteria for comfort is not considered significant.

16.2.2.2 Distress Levels

There is a criterion to define the onset of distress. For the '*General Public*', this is equivalent to an hourly mean speed of 15m/s and a gust speed of 28m/s to be exceeded **less often than once a year**. This is intended to identify wind conditions which less able individuals or cyclists may find physically difficult. Conditions in excess of this limit, may be acceptable for optional routes and routes which less physically able individuals are unlikely to use.

There is a further limiting distress criterion beyond which even '*able-bodied*' individuals may find themselves in difficulties at times. This corresponds to a mean speed of 20m/s and a gust speed of 37m/s to be exceeded less often than once a year. Aerodynamic forces may exceed body weight in stormy conditions, which makes it difficult for anyone to remain standing. Where wind speeds exceed these values, pedestrian access should be limited.

Table 16.2: Distress Criteria as Defined by TV Lawson

Activity	Description
General Public Access	Above which the less able and cyclists may at times find conditions physically difficult.
Able-bodied Access	Above which it may become impossible at times for an able bodied person to remain standing.

Table 16.3: Lawson Comfort Criteria

Beaufort Scale	Wind Effects on the Environment	Wind Speed (m/s)		Activity			
		At 10m	threshold	'sitting'	'standing'	'strolling'	'business walking'
0 - 1	Calm – no significant wind	<1.5					
2	Wind felt on the face, leaves rustle	1.5 – 3.3					
3	Leaves and twigs move, wind carries small flags	3.4 – 5.4	**4.0**				
4	Dust and papers raised from the ground, small branches are agitated	5.5 – 7.9	**6.0**				
5	Wind is felt on the body, small trees move	8.0 – 10.7	**8.0**				
6	Difficult to walk straight, umbrellas are difficult to use, large branches begin to move	10.8 – 13.8	**10.0**				
7	Difficult to walk into the wind, trees are completely moving	13.9 – 17.1					
8	Storm – walking is hampered, branches break	17.2 – 20.7	**15.0**				
9	Storm – risk of losing balance, dangerous to walk	> 20.8	**20.0**				

Recreational Area | Entrances | Access Route

Legend

- **Acceptable**
- Tolerable
- Unacceptable
- Dangerous – General Public including Cyclists
- Dangerous – Able-bodied Pedestrians

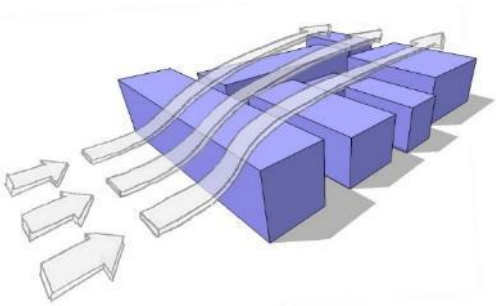
Comfort Criteria

Distress Criteria

16.2.3 Key Flow Mechanisms

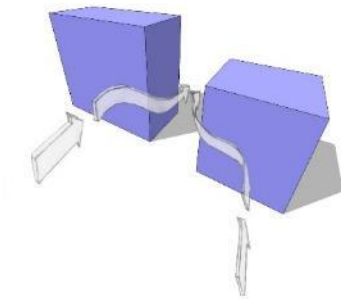
There are certain flow patterns that can result in increased flow velocities. The main flow mechanisms of concern are described as:

1. Exposure and Shelter



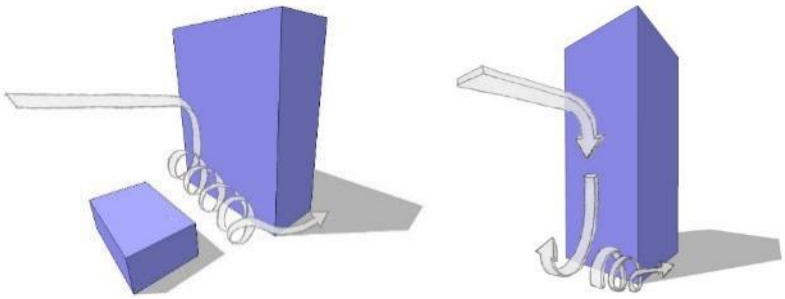
When buildings of similar height are in close proximity to each other, the first line of buildings can shelter the buildings behind from the wind. However, if the gap is relatively large, the building upstream may not provide adequate shelter. In this case, the higher velocity high level wind from above may descend to ground and therefore, this may create an inclement environment for pedestrians.

2. Funnelling



When the gap between buildings is relatively narrow in comparison to their overall width, a large volume of wind is forced through the narrow opening. It is necessary for the wind speed to increase through the opening, which can result in discomfort for pedestrians.

3. Downdraft



When buildings are considerably taller than the other buildings in their surroundings, they can re-direct the high speed winds that they interact with at a high level down to ground in the form of a downdraft. The downdraft effect can be further exacerbated by lower level buildings in close proximity upstream.

16.2.4 Computational Fluid Dynamics (CFD)

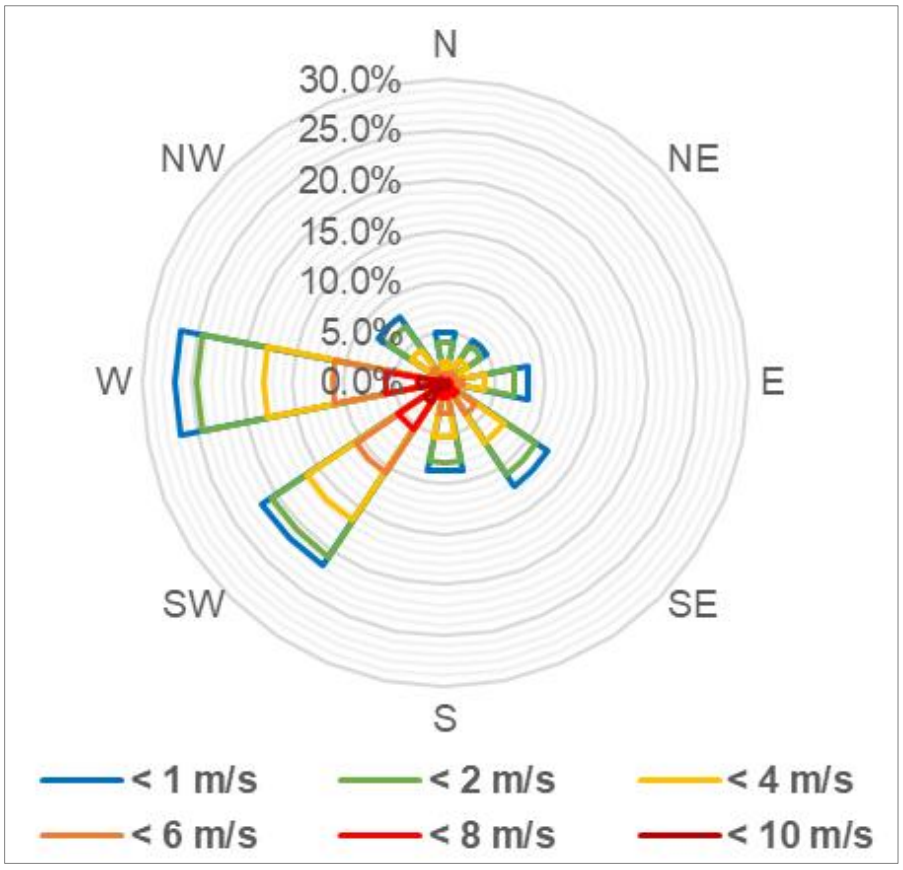
Computational Fluid Dynamics (CFD) is a numerical technique to simulate fluid flow, heat and mass transfer, chemical reaction and combustion, multiphase flow, and other phenomena related to fluid flows. Modelling in CFD includes three main stages: pre-processing, simulation and post-processing. Computational Wind Engineering (CWE) is a branch of CFD concerned with behaviour of wind flow through an urban environment and the effect of a 'proposed development' on the local wind microclimate.

16.3 Baseline Environment

16.3.1 Wind Microclimate

Met Éireann's meteorological station at Dublin Airport is the closest meteorological station to Dublin and to the Site. The expected statistics for wind strength and direction are based on historic wind data recorded at this weather station. The meteorological data, which was associated with the hourly wind speeds recorded over a 30-year period between 1988 and 2018, was analysed. The data is recorded at a weather station at the airport, which is located 10m above ground or 71mOD.

Figure 16.1: Dublin Airport Wind Rose



The expected statistics for wind strength and direction are based on historical wind data recorded at this weather station. The prevailing wind in Dublin is from the southwest. These are relatively warm and often bring rain. The winds from the east are not as common as the westerlies, however, they are relatively cold, which can make them as annoying as the stronger westerlies. The Wicklow Mountains to the south of Dublin influence the wind microclimate in the vicinity of Dublin.

In this study, winds were considered to approach from eight distinct sectors. A Weibull distribution was fitted to the wind data for each sector through the adoption of an appropriate **dispersion parameter, c,** and **shape parameter, k**, provided in Table 16.4 below. The 95th percentile and '*once-a-year*' wind speeds were derived from the subsequent cumulative Weibull distributions.

In order to account for differences in topography and terrain exposure, the local wind data from Dublin Airport was transposed to the Site using the ESDU (Engineering Sciences Data Unit) methodology, which is compatible with Irish practice for wind loading. The transformation considers the exposure of the Site, which is a measure of the terrain roughness (*i.e.* size and number of obstacles) upstream of the Site. The exposure is dependent on the direction of the oncoming wind. The local transformation factors used in this study are outlined in Table 16.5.

Table 16.4: Weibull Distribution Parameters (based on wind speed in m/s)

Wind Direction	N	NE	E	SE	S	SW	W	NW
Directional probability, p	5.76%	5.20%	9.05%	12.82%	9.19%	22.12%	27.60%	8.26%
Dispersion parameter, c	3.9	5.0	4.5	5.3	5.7	6.9	6.3	4.7
Shape parameter, k	1.5	1.95	1.65	1.85	1.8	2.2	1.85	1.9

Table 16.5: Local Wind Transformation Factors

Wind Direction	N	NE	E	SE	S	SW	W	NW
'Open' terrain at 10m to East Road at 10m								
Mean wind speed	6	6.8	11.6	8.1	8	8.15	8.2	5.9
Gust Speed	6.97	9.27	9.22	8.91	9.60	10.35	10.79	7.86

16.3.2 Existing Pedestrian Comfort

The pedestrian comfort along existing thoroughfares adjacent to the Site of the proposed Project, *i.e.* Sheriff Street Upper and East Road, has been investigated. It revealed that the junctions of Sheriff Street may expect some windiness due to the arrangement and orientation existing and permitted developments alone.

16.4 Characteristics of the Proposed Project

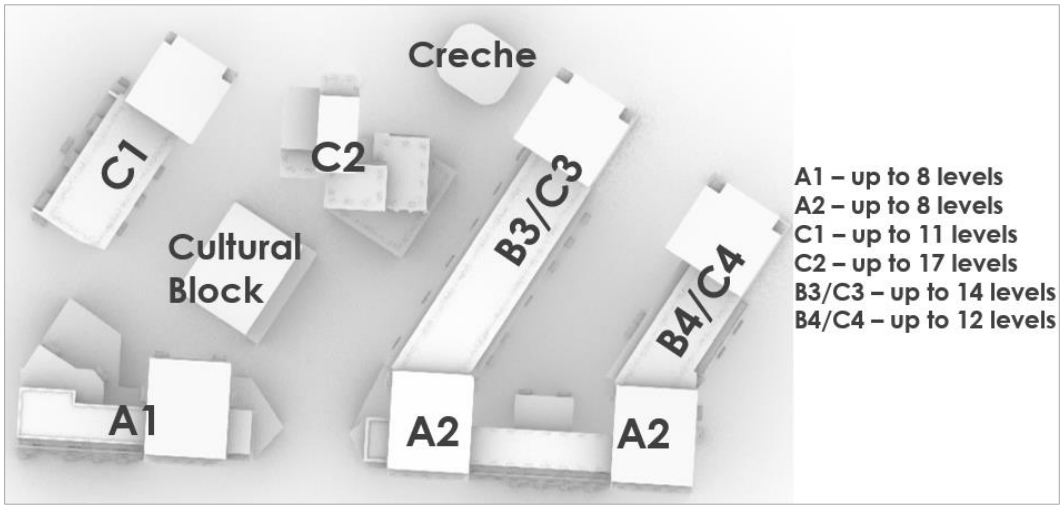
See Section 16.1 and Chapter 5 (Description of the Proposed Project) for full details on the proposed Project.

The residential buildings are arranged around a central open space (at ground level) and raised residential courtyards at upper ground level over part basement level. Ground floor level uses located onto Sheriff Street and into the central open space include a cultural/community building, retail/restaurant/cafe units, and tenant amenity space.

Two vehicular access points are proposed along Sheriff Street, and the part basement car parking is split into two areas accordingly, accommodating bicycle parking spaces, car parking spaces, plant, storage areas and other associated facilities.

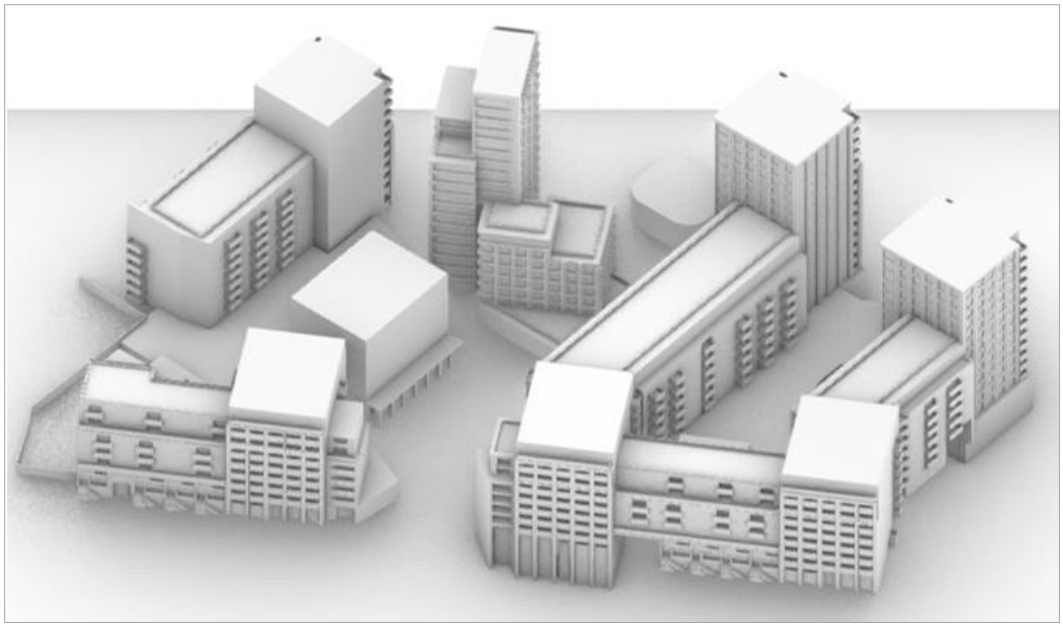
The main pedestrian access is located centrally along Sheriff Street with additional access points from East Road and from the eastern end of Sheriff Street.

Figure 16.2: Block Numbering Layout



This planning application also includes for a temporary pocket park on the corner of Sheriff Street Upper and East Road to be provided as a temporary development prior to additional future development on this part of the Site. A detailed development description is set out in the Statutory Notices.

Figure 16.3: Proposed Project - 3D View



16.4.1 Thoroughfares

16.4.1.1 Sheriff Street Upper

At the southern boundary of the proposed Project, Sheriff Street Upper provides connectivity between the proposed Project and its surroundings. Pedestrians and cyclists will use Sheriff Street to access other places in the City. There are entrances directly accessing the development from Sheriff Street:

- two vehicular accesses to the Site of the proposed Project; and
- pedestrian access to the central plaza of the proposed Project.

Sheriff Street is a single carriageway road with on-street parking and pedestrian footpaths on either side of the road and therefore, it will be used as a thoroughfare by pedestrians.

16.4.1.2 East Road

The proposed Project abuts to East Road at the western boundary. There is only one pedestrian entrance to the Site of the proposed Project from East Road. The road consists of a single carriageway with pedestrian footpaths on either side and therefore, it will be used as a thoroughfare by pedestrians and cyclists.

16.4.2 Public Spaces

The residential blocks are arranged around a central pedestrian plaza and two elevated communal amenity courtyards.

16.4.2.1 Central Plaza

The central plaza is a multi-functional space, which includes:

- access into the development for pedestrians;
- access to the west raised courtyard;
- access to residential blocks via entrances;
- amenity and leisure spaces for pedestrians;
- café/restaurant/retail units; and
- new cultural/community building.

16.4.2.2 Western Courtyard and Car Park to the West

Western courtyard can be accessed from the central plaza via stairs and from East Road at the west boundary of the proposed Project. There is also a vehicular access from Sheriff Street Upper. It facilitates access into the surrounding blocks through designated entrances as well as acting as amenity and leisure space for occupants.

16.4.2.3 Eastern Courtyard

Eastern courtyard is a multi-functional courtyard on a raised podium on the eastern side of the proposed Project. The courtyard can be accessed from the central plaza via ramps and stairs and from the thoroughfare at the eastern side of the proposed Project. It facilitates access into the surrounding blocks through designated entrances as well as acting as amenity and leisure space for occupants.

16.5 Potential Impact of the Proposed Project

16.5.1 Construction Phase

The potential effects on wind microclimate at the Site during the Construction Phase have not been assessed as they depend on the phasing of the proposed Project.

Depending on the order of the development, windiness may be greater than in the final condition. If it is the intention for parts of the proposed Project to become operational before construction is completed, then temporary mitigation may be needed or desirable to achieve safe access. It is appropriate, however, to seek guidance on this as the detailed phasing is known.

16.5.2 Operational Phase

In general, the proposed Project is likely to provide a comfortable and an attractive environment for pedestrians and occupants for the majority of wind conditions. The prevailing winds are easterly and westerly which have the potential, on occasions, to cause conditions that pedestrians may find distressing without the appropriate mitigation measures in place.

Figure 16.4: Lawson Wind Speeds (m/s) at Ground Level (left) and Terraces (right) without Wind Mitigation

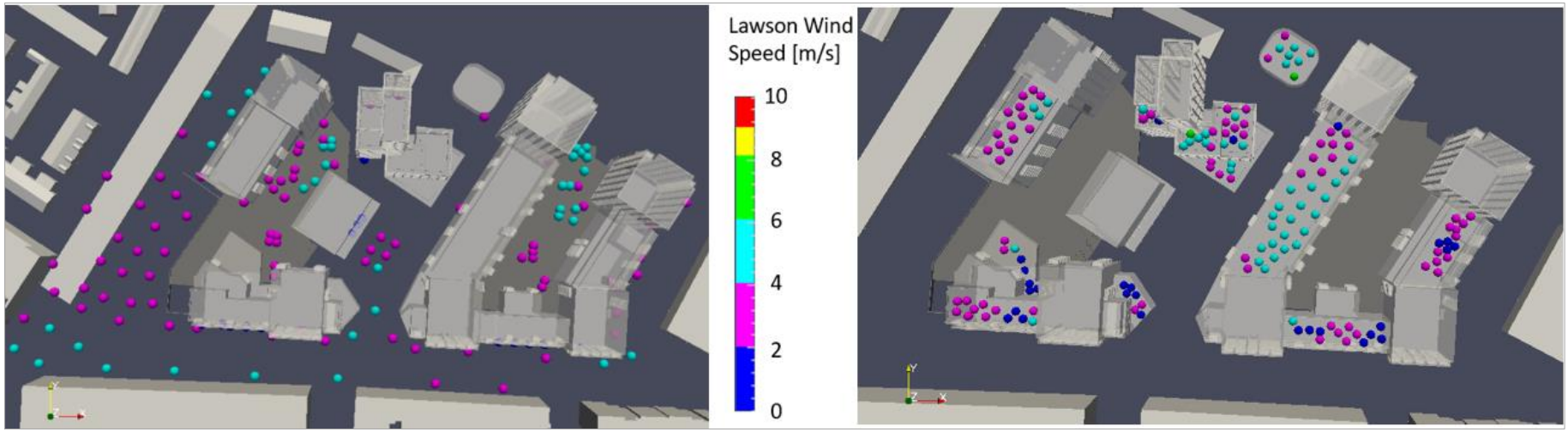


Figure 16.5: Lawson Wind Speeds (m/s) at Balconies without Wind Mitigation

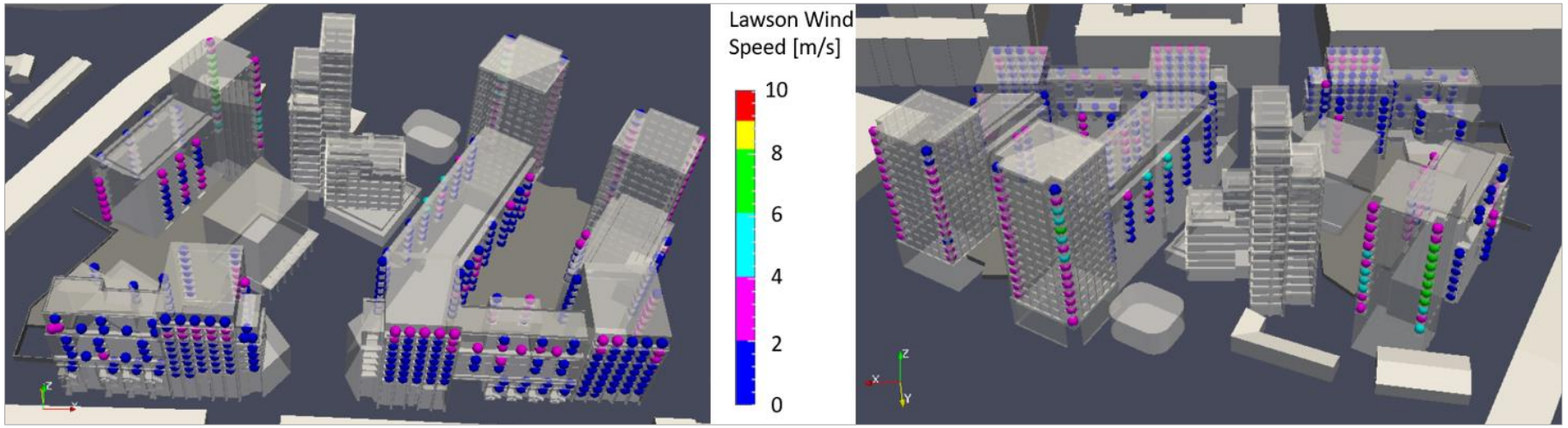
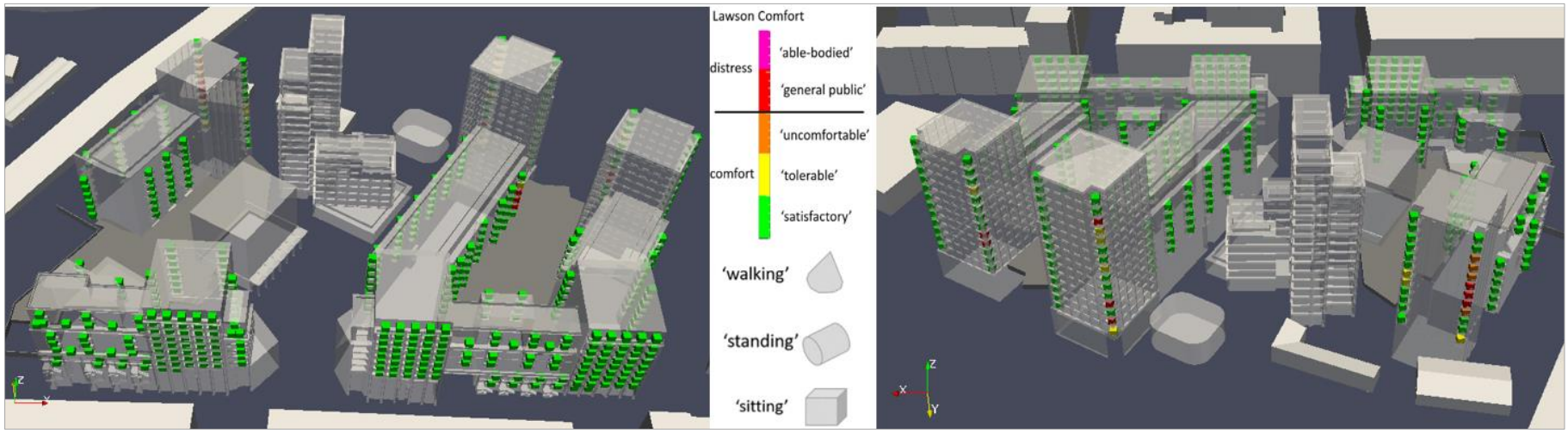


Figure 16.6: Lawson Comfort Criteria at Ground Level (left) and Terraces (right) without Wind Mitigation

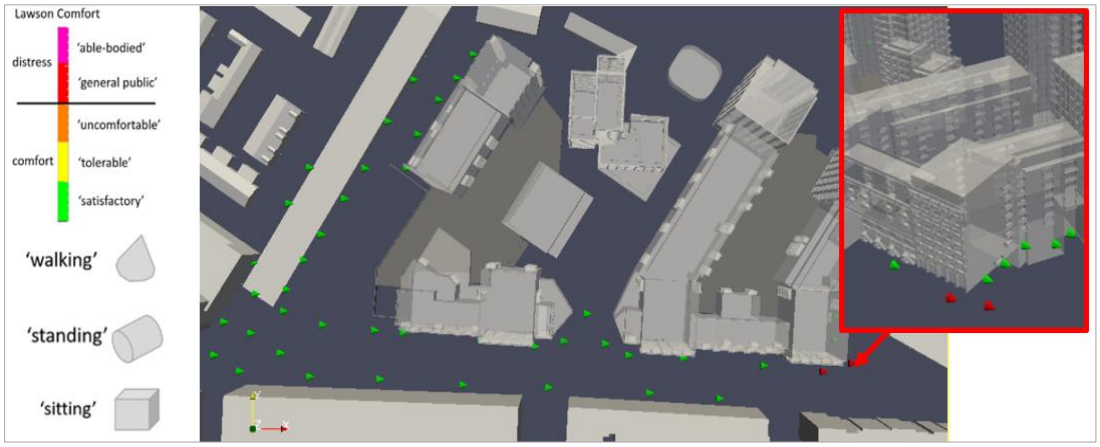
Figure 16.7: Lawson Comfort Criteria at Balconies without Wind Mitigation



16.5.2.1 Thoroughfares

In general, the thoroughfares in and around the proposed Project are sheltered from the wind. The blocks along Sheriff Street and East Road are similar in height to the adjacent existing and permitted developments. This assists in sheltering the thoroughfares below from the prevailing winds from the south and west. The wind conditions along expected in the 'standing' range and therefore, they are considered suitable for their intended use.

Figure 16.8: Lawson Comfort at Thoroughfares without Wind Mitigation

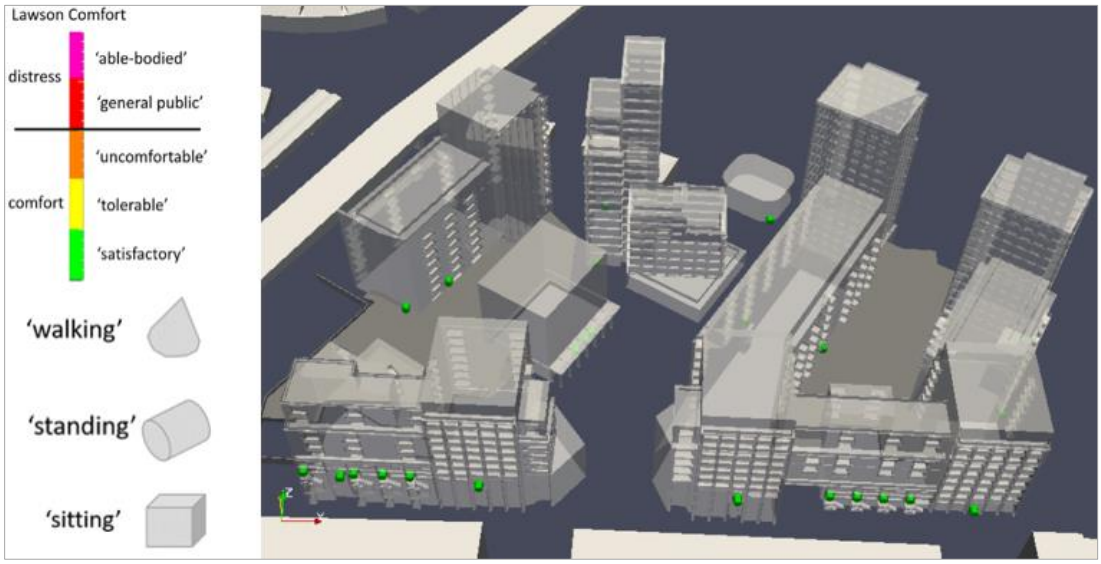


Sheriff Street Upper

Sheriff Street is sheltered from most wind directions due to its orientation and width in conjunction the adjacent developments of similar height. In general, the wind conditions are expected in the 'standing' range (i.e. wind speeds <6m/s). The south-eastern corner of Block A2 may be windy at times due to easterly winds funnelling down Sheriff Street. Wind conditions may lead to more vulnerable pedestrians feeling some distress, although these conditions will likely be prevalent for fewer than 15 hours a year (i.e. 0.17% of the time).

The provision of trees and other landscaping features along Sheriff Street as proposed will be helpful in disrupting the wind and providing more localised shelter for pedestrians.

Figure 16.9: Lawson Comfort at Entrances without Wind Mitigation



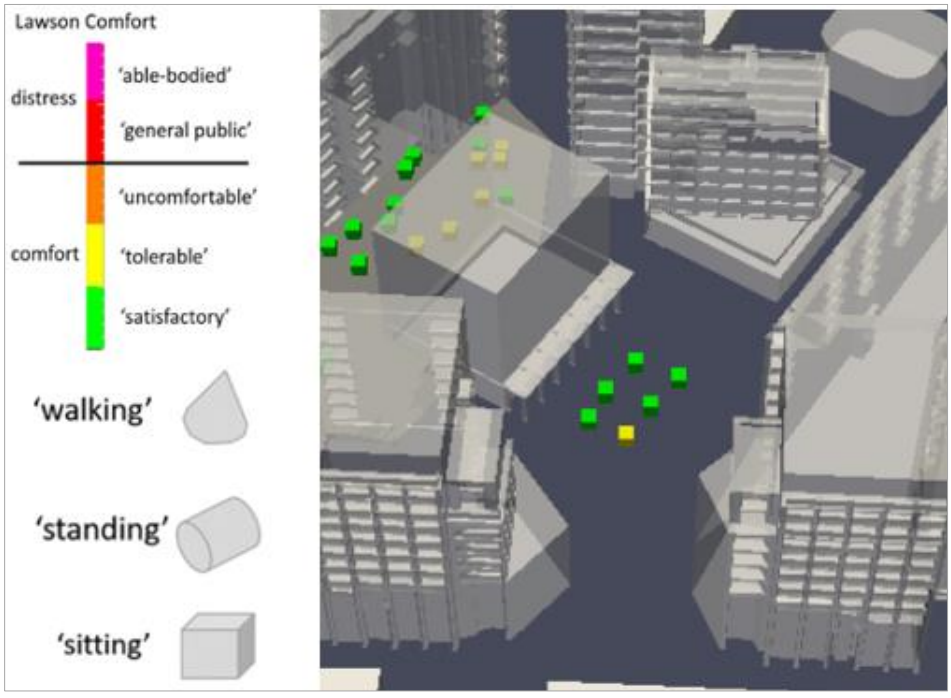
16.5.2.2 Entrances

The entrances are located near the centre of the buildings and away from the corners of the blocks, where the higher speed winds are more likely to occur. The wind conditions will be comfortable for 'standing' and therefore, the entrances are considered suitable for their proposed use.

16.5.2.3 Public Spaces

The residential blocks are arranged around a central pedestrian plaza and two elevated communal amenity courtyards.

Figure 16.10: Lawson Comfort at Central Plaza without Wind Mitigation



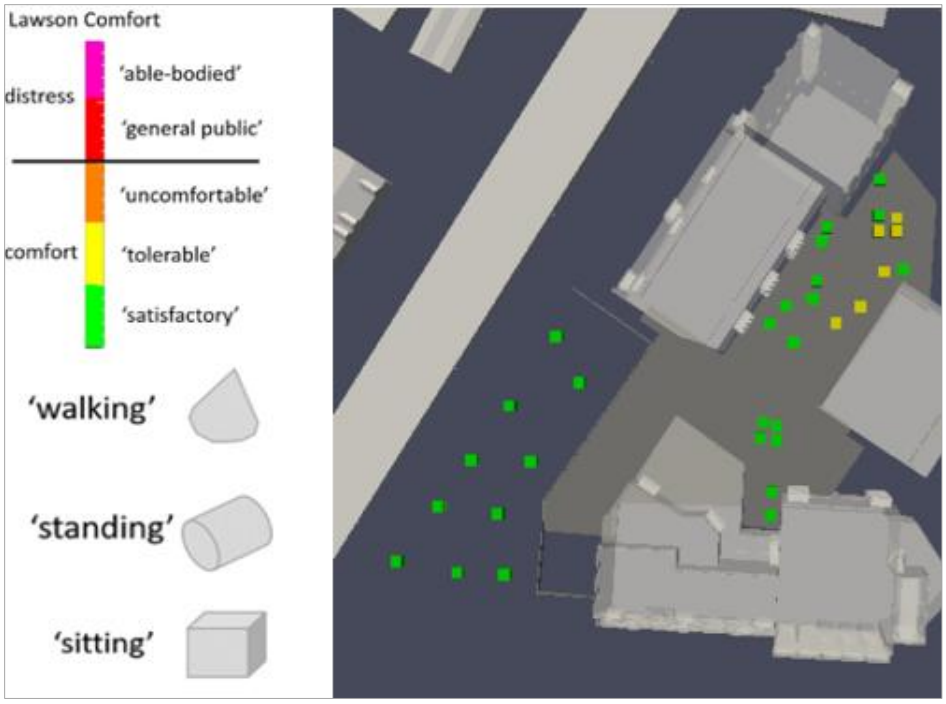
Central Plaza

The Central Plaza is well sheltered from all wind directions by Blocks A1, B1, C2, B3/C3 and Cultural Block. Wind speeds remain within the 'sitting and 'standing' ranges. Therefore, the Central Plaza is considered suitable for its intended use. The proposed landscape will be beneficial in providing more shelter to the central plaza users and ensuring pleasant environment for the occupants.

Western Podium and Car Park to the west

The Western Courtyard can be accessed from the central plaza via stairs and from East Road at the west boundary of the development or through the car park through vehicular access on Sheriff Street Upper. It facilitates access into the surrounding blocks through designated entrances as well as acting as amenity and leisure space for occupants. It also provides for public permeability through to East Road.

Figure 16.11: Lawson Comfort at Western Podium and Car Park without Wind Mitigation

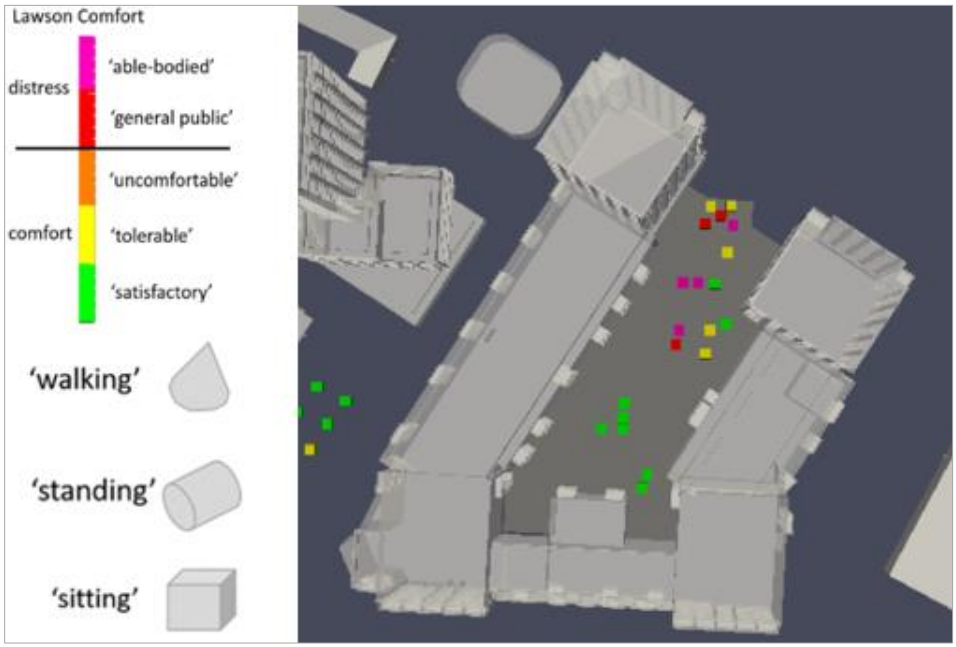


The courtyard is well sheltered by the surrounding blocks with expected wind conditions in 'sitting' to 'standing' range. This courtyard is considered to be appropriate for the intended use. The provision of landscaping will be beneficial in order to enhancing this pleasant environment for pedestrians and occupants.

East Podium

The Eastern Podium is a multi-functional courtyard on a raised podium on the eastern side of the proposed Project, between Blocks A2, B3/C3 and B4/C4. It facilitates access into the surrounding blocks through designated entrances as well as acting as amenity and leisure space for occupants.

Figure 16.12: Lawson Comfort at Eastern Podium without Wind Mitigation



In general, the southern side of the podium is sheltered, and it is only exposed to calm to moderate breezes (wind speeds <4m/s). This makes it an attractive space for 'sitting'. However, northern end is more exposed as it is open to the adjoining railyard. At times, strong easterly winds penetrate into the courtyard generating considerable windiness. The winds at the north-eastern and are anticipated in the 'standing' range and may even cause distress for a few hours each year. The provision of screens and denser more robust landscaping, as discussed in Section 16.6, is required in obstructing and disrupting the wind to alleviate the worst effects of these winds.

16.5.2.4 Terraces

Due to their elevation, the roof terraces are more exposed to the wind and are expected to be windy as a consequence. The windiest conditions will likely coincide with the most adverse weather events. It is recommended that the management company would limit or restrict access to the external roof terraces, where required (*e.g.* if Met Éireann issue a notification of a yellow, orange or red wind warning event).

Entrances

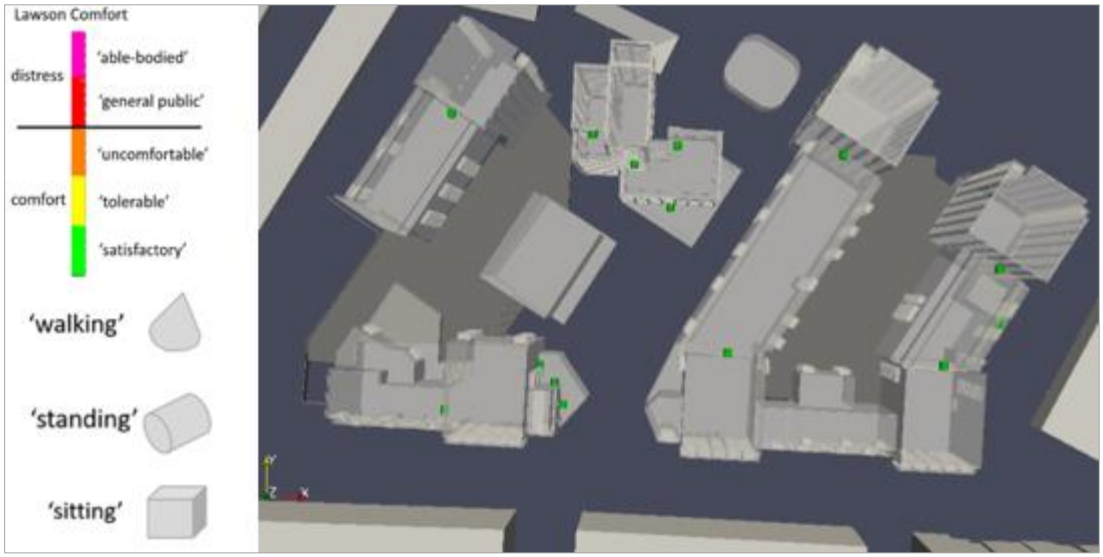
The entrances providing access to the terraces are located near the centre of the buildings and away from the corners of the blocks, where the higher speed winds occur. The wind conditions are suitable for 'sitting' to 'standing' activities and therefore, the entrances are considered suitable for their proposed use.

Blocks A1 & A2

Terraces on Blocks A1 and A2 are expected to be suitable for sitting in general due to the relative height of the blocks in comparison to their surroundings. The wind speeds on the terraces are expected to be suitable for sitting (*i.e*. wind speeds <4m/s) (see Figure 16.1). There are two isolated spots on the Block A1 lower eastern

terrace which might experience wind conditions in the 'standing' range. This terrace will benefit from landscape provision.

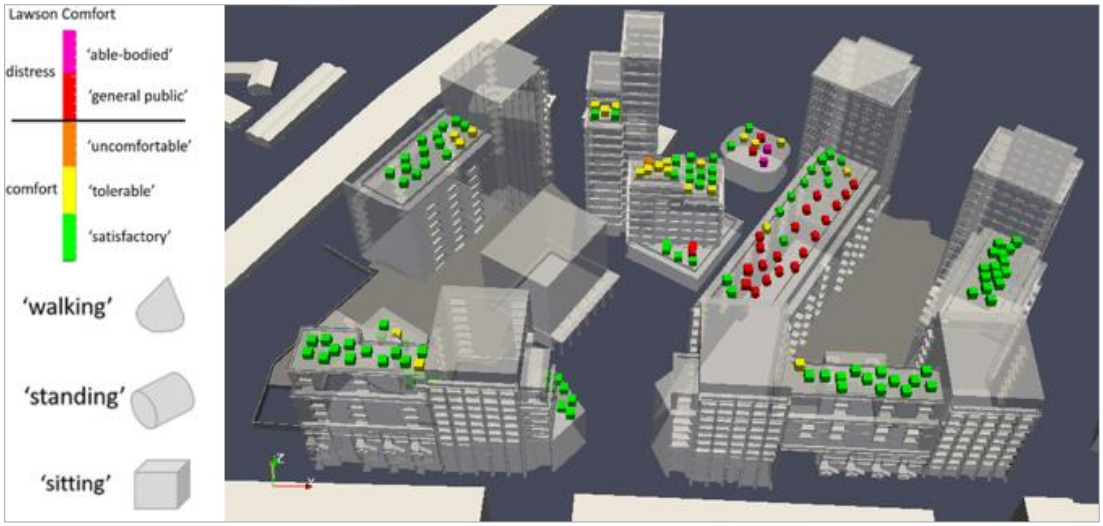
Figure 16.13: Lawson Comfort at Terrace Entrances without Wind Mitigation



Block C1

Wind conditions anticipated on the larger portion of Block C1 terrace is expected to be suitable for 'sitting' activities, although there are a few isolated spots more suited for 'standing'. In general, the terrace is expected to be suitable for its intended use and landscape treatment will further enhance the space for occupants.

Figure 16.14: Lawson Comfort at Terrace Entrances without Wind Mitigation



Block C2

Block C2 has four terraces on the 2nd, 6th, 8th and 12th floor levels. In general, these terraces are mostly suited to their intended use.

The Terrace on the 2nd level is well sheltered and benefits from its orientation. The wind conditions on this terrace are expected to be suitable for 'sitting' activities.

The sixth floor terrace benefits from the buildings to the west, which provide shelter to this terrace from prevailing southwest and west winds. This terrace is protected from easterly winds by the taller Blocks B3/C3.

The exposure of the 8th floor terrace results in a windy space. The provision of better wind shielding and landscape treatments, such as hedges and trees, are required to produce a space more suited for 'sitting'.

The 12th floor terrace, while higher, benefits from the nearby tower to the east, which affords it shelter. Wind conditions on this terrace are expected to be in the 'sitting' to 'standing' range.

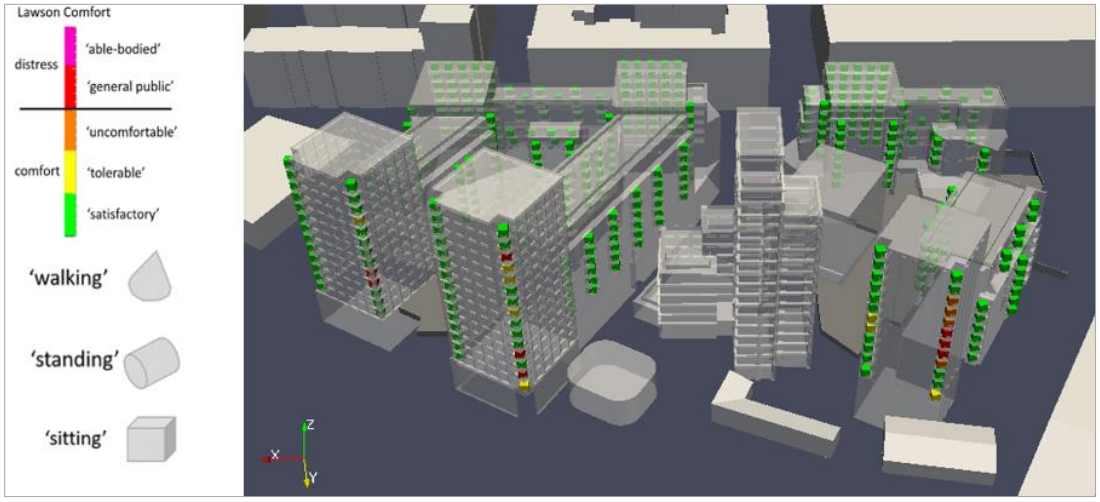
Blocks B3/C3

The Blocks B3/C3 terrace is exposed to east and west winds due to its height. While the terrace is more appropriate for 'standing', significant windiness may be encountered on the terrace on occasion. The primary function of this space is for active and recreational uses and under these circumstances, the space is considered suitable for its intended use for the majority of the wind conditions.

Block B4/C4

The wind screens on the upper terrace on the Block B4/C4 provide adequate protection from the wind and wind conditions are appropriate for 'sitting' activities. The lower terrace is windier due to a downdraft off Block C4 above. This terrace is more suited for 'standing', although stronger winds may be present at limited times.

Figure 16.15: Lawson Comfort at Balconies without Wind Mitigation



16.5.2.5 Balconies

Blocks A1 and A2 and B4/C4

In general, these balconies are well positioned and sheltered as wind conditions are expected to experience wind conditions suitable for 'sitting' activities. The balconies are considered suitable for their intended use.

Block C1

Majority of the balconies at block C1 are expected to be suitable for their intended use as wind conditions are expected to be in the 'sitting' range. Few balconies on the northwest and northeast corners are expected to

experience more windy conditions as they are located at the corners where high wind speeds may occur. These corners balconies will be comfortable for 'sitting' less often than desirable, however, they will continue to be attractive spaces for more than 85% of the year.

Blocks B3/C3

In general, the Block B3/C3 balconies are expected to be suitable for their intended use as the anticipated wind conditions are in the 'sitting' range. High level corner balconies may experience more windiness. These corners balconies will be comfortable for 'sitting' less often than desirable, however, they will continue to be attractive spaces for more than 85% of the year.

16.6 Mitigation Measures

Design stage mitigation measures which have been incorporated into the scheme in order to improve the wind conditions at the Site include the following:

- A 2.4m height glass winter garden balustrade along the northeast side of the eastern podium.
- The provision of trees and other landscaping features along main thoroughfares, podiums and terraces would be helpful to disrupt the wind and provide some localised shelter for pedestrians.

Figure 16.16: Proposed Landscape Design with 2.4m Height Glass Balustrade on the North End of Eastern Podium

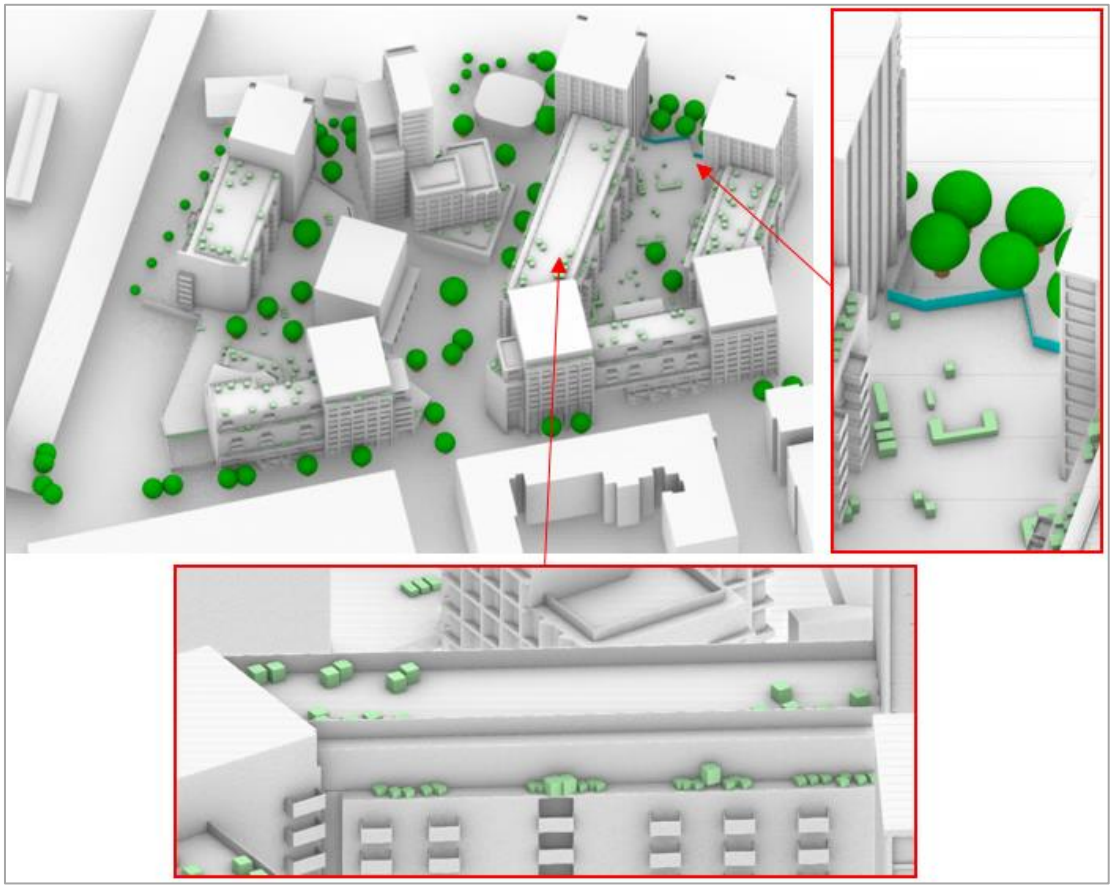


Figure 16.17: Lawson Wind Speeds (m/s) at Ground Level (left) and Terraces (right) with Wind Mitigation Measures

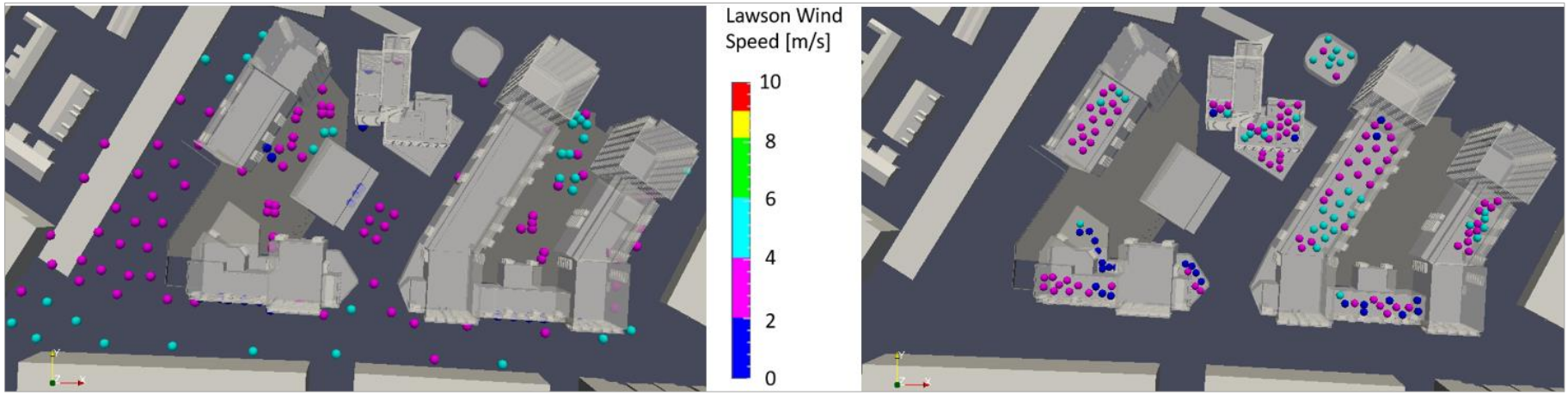


Figure 16.18: Lawson Wind Speeds (m/s) at Balconies with wind Mitigation Measures

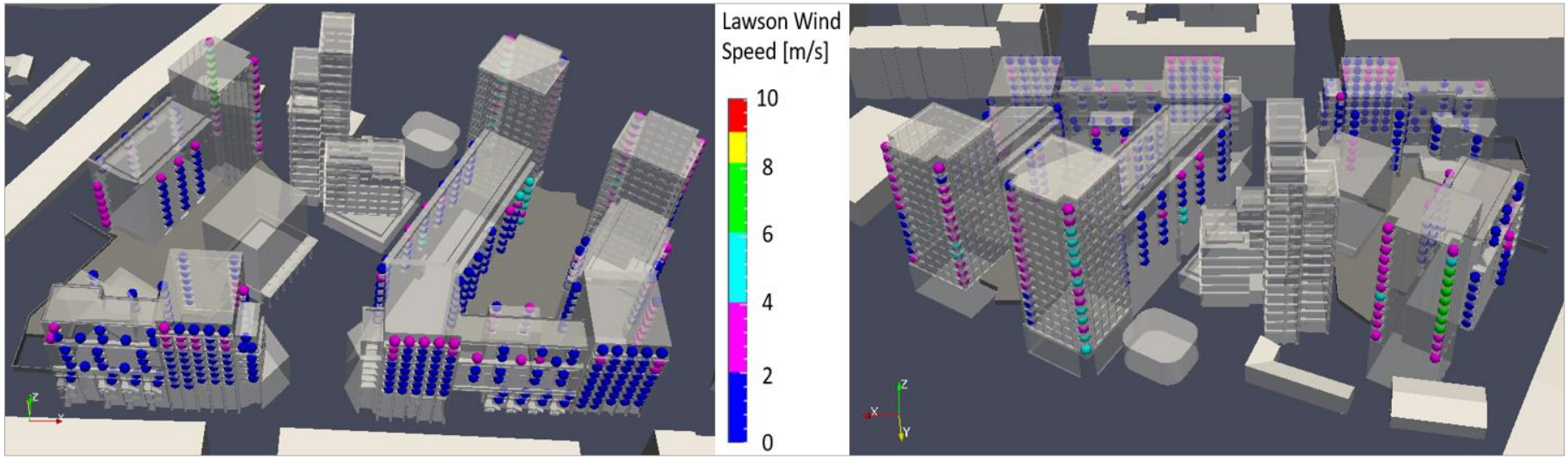


Figure 16.19: Lawson Comfort at Ground Level (left) and Terraces (right) with Wind Mitigation Measures

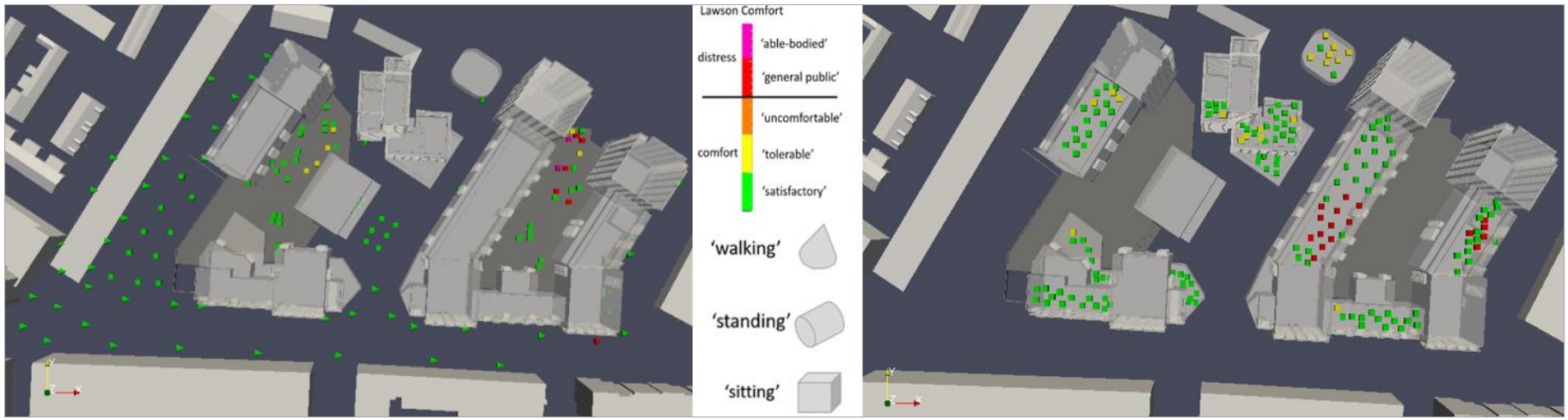
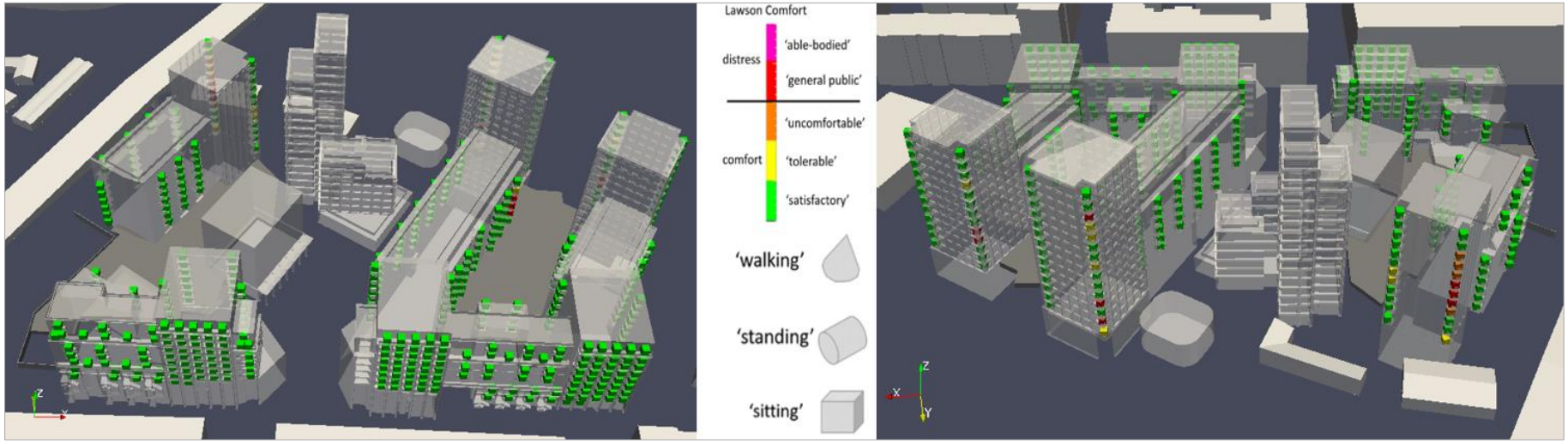


Figure 16.20: Lawson Comfort at Balconies with Wind Mitigation Measures



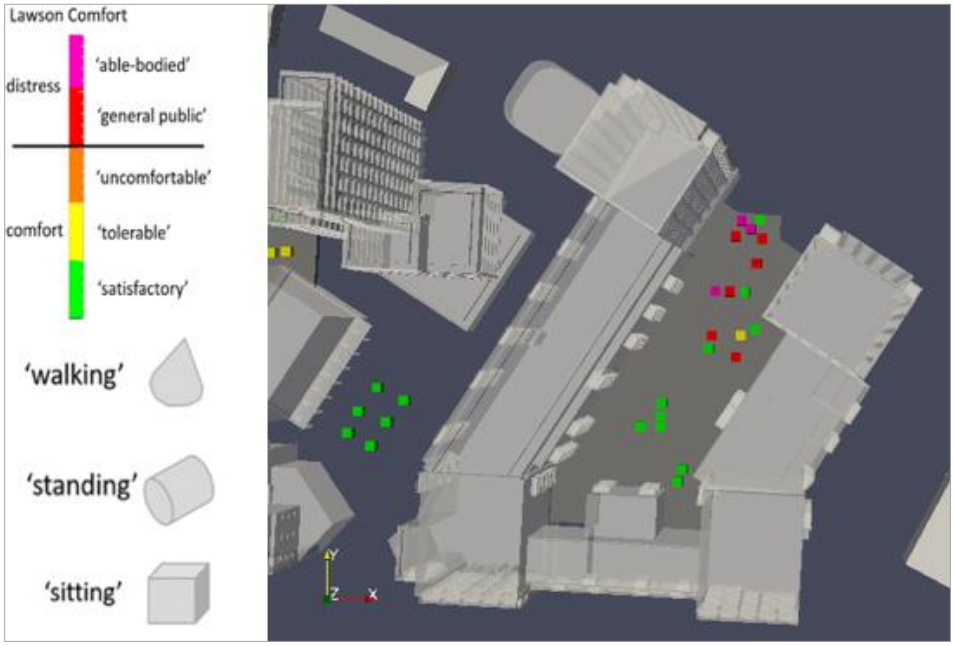
16.6.1 Thoroughfares

The provision of landscape along the Sheriff Street will provide some localised shelter from the wind. This helps to reduce some windiness at the south-eastern corner of Block A2 while it is anticipated it does not mitigate the wind conditions completely. There is an isolated location where more vulnerable pedestrians may find wind conditions distressing on the occasion, although these conditions will likely be prevalent for fewer than 15 hours a year (*i.e.* 0.17% of the time).

16.6.2 Eastern Podium

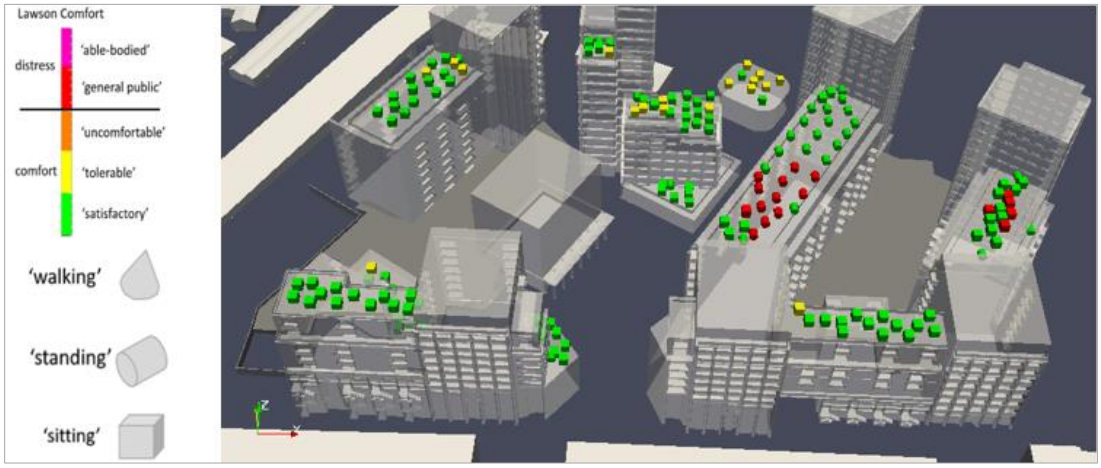
The provision of dense hedging and raised planters as well with 2.4m high glass winter garden balustrade around the eastern podium does provide some localised shelter from the wind. This helps to reduce some windiness at the northern end of the courtyard. However, it is insufficient to alleviate the issue completely and some less desirable windiness will remain, although less often than without the wind mitigation measures.

Figure 16.21: Lawson Comfort at Eastern Podium with Wind Mitigation



It should be noted that the stronger winds will only occur for a few hours each year. It is expected that more vulnerable pedestrians may experience distress fewer than 52 hours a year (i.e. 0.59% of the time). These events are likely to coincide with adverse weather conditions when pedestrians unlikely to use the sitting area. Moreover, there are other spaces on the same podium will remain more suited to 'sitting' even during these adverse weather events.

Figure 16.22: Lawson Comfort at Terraces with Wind Mitigation



16.6.3 Terraces

The provision of landscape along the terraces assist in providing localised protection from the wind and helps creating a more comfortable environment for 'sitting' activities, however, some general windiness will remain on Blocks B3/C3 and B4/C4. The primary function of this space is for active and recreational uses and under these circumstances, the space is considered suitable for its intended use for the majority of the wind conditions.

It is expected that more vulnerable user may experience distress fewer than 15 hours a year (*i.e.* 0.17% of the time). These events are likely to coincide with adverse weather conditions when terraces are unlikely to be used and it is recommended that the management company should restrict access.

16.7 Residual Impacts

A study of the proposed Project was carried out to help assess the windiness in and around the development in terms of suitability for pedestrian activities. The prevailing wind in Dublin is from the southwest.

In general, the proposed Project is likely to provide a comfortable and an attractive environment for pedestrians and occupants. Without suitable mitigation, the winds can produce wind conditions that pedestrians may find distressing in certain areas of the Site. It is anticipated that the proposed mitigation measures will help alleviate distress that could be encountered on occasion in certain areas of the Site.

16.8 Monitoring

The building heights are relatively low-to-medium level ranging from four storeys to twenty-one storeys across the Site of the proposed Project. It is anticipated that the proposed Project will be constructed using conventional methods. It is recommended that the local weather conditions should be reviewed routinely, particularly for construction works carried out at a height. It is not considered necessary to undertake any formal wind speed and direction monitoring on-site during the Construction or Operational Phases.

16.9 Reinstatement

There is no reinstatement required in accordance with this study.

16.10 Interactions

The main interaction relating to Wind is **Population and Human Health**. During the Operational Phase the proposed Project will impact on the wind microclimate within and around the Site, which ultimately can impact negatively on people's health and well-being. The wind microclimate has the potential to impact on the level of pedestrian comfort and safety within the development.

16.11 Cumulative Impacts

A comprehensive analysis of cumulative impact of proposed Project and planned development of hotel and commercial office building located immediately to the east and hotel to the west has been undertakes.

The commercial office and hotel building to the east of proposed Project will be beneficial in sheltering the corner of Block A1 and disrupting east wind effect in general.

The hotel to the west will provide additional shelter to the western courtyard.

Overall, the proposed Project will benefit and will be additionally sheltered by planned developments to the west and east.

Figure 16.23: Provision of Hotel and Office Units at the Eastern Corner of the Proposed Project

Figure 16.24: Lawson Wind Speeds (m/s) at Ground (left) and Terraces (right) Level with Cumulative Impact

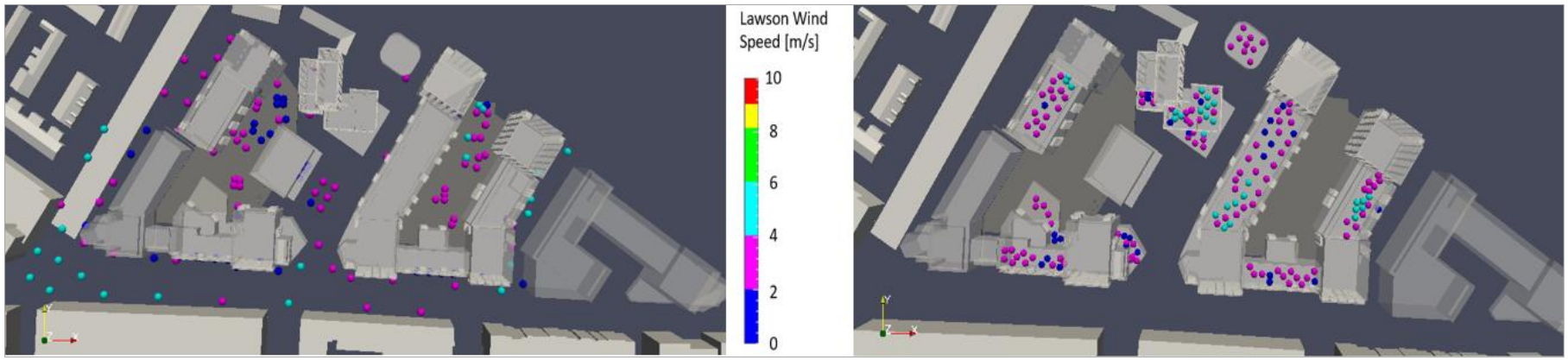


Figure 16.25: Lawson Wind Speeds (m/s) at Balconies with Cumulative Impact

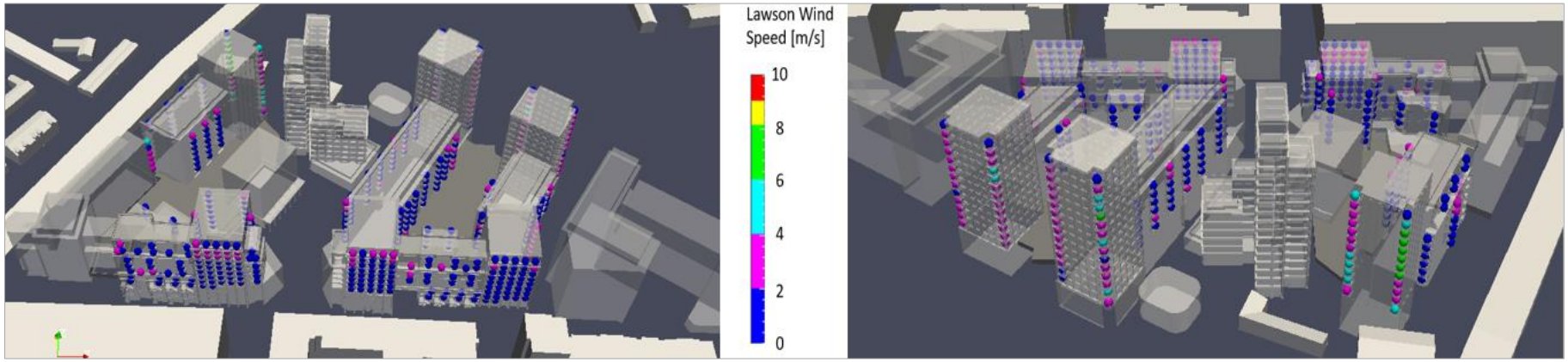


Figure 16.26: Lawson Comfort at Ground (left) and Terraces (right) Level with Cumulative Impact

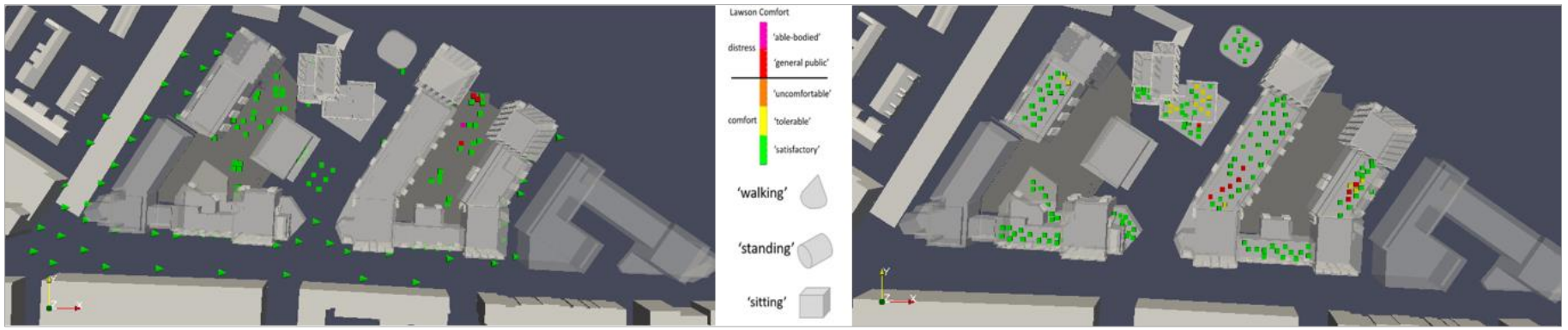
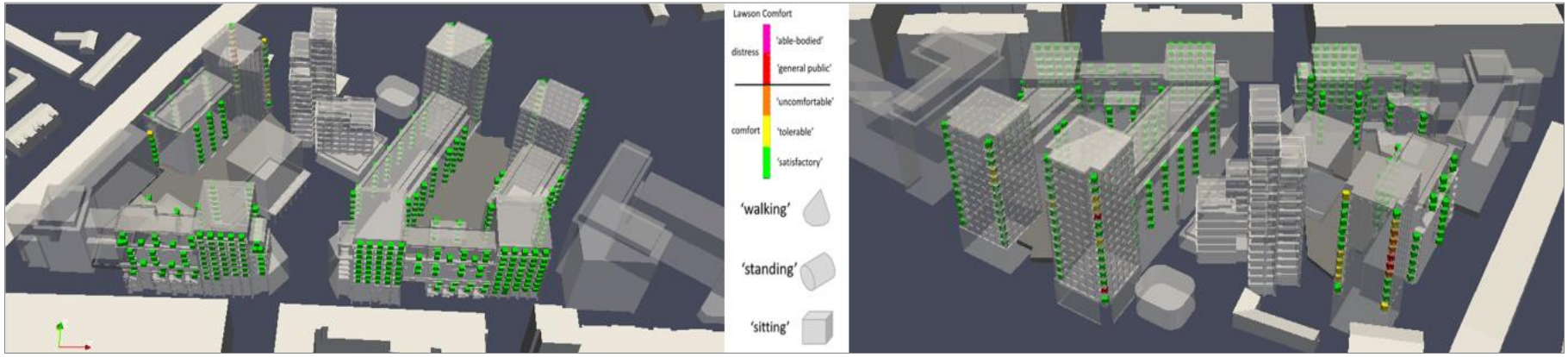


Figure 16.27: Lawson Comfort at Balconies with Cumulative Impact



16.12 'Do-Nothing' Impact

A '*do-nothing'* scenario is not considered valid, as the lands are currently zoned for redevelopment under the Development Plan.

However, in the '*do-nothing'* scenario the Site would not be redeveloped and therefore there would be no adverse impacts from wind microclimate conditions affecting areas within and surrounding the Site of the proposed Project.

16.13 Difficulties Encountered in Compiling the Chapter

No difficulties were encountered in compiling this Chapter of the EIAR.

17 Traffic and Transportation

17.1 Introduction

This Chapter of the EIAR was prepared by DBFL Consulting Engineers and assesses and evaluates the likely impact of the proposed Strategic Housing Development (SHD) (referred to as "*the proposed Project*"), on the existing transportation system in the vicinity of the Site, at Sheriff Street Upper and East Road, Dublin 1.

This Chapter identifies proposed mitigation measures to minimise any identified impacts arising from the proposed Project at Sheriff Street Upper, Dublin 1.

The material assets considered in this traffic section include pedestrian, bicycle, public transport (bus, light and heavy Rail) infrastructure and associated services in addition to the local road network and associated junction nodes.

The proposed Project will consist of the demolition of all structures on the Site and the construction of a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a standalone three storey childcare facility and residential tenant amenity. The proposed Project will also accommodate car parking spaces, bicycle parking, storage, services and plant areas. More details on the background and Site history is provided in Chapter 5 (Description of the Proposed Project).

17.2 Methodology

The purpose of this assessment is to quantify the existing transport environment and to detail the results of assessment work undertaken to identify the potential level of transport impact generated as a result of the proposed Project. The scope of the assessment covers transport and sustainability issues including vehicular access and pedestrian, cyclist and public transport connectivity. Recommendations contained within this Chapter are based on existing and proposed road layout plans, site visits, traffic observations and junction vehicle turning count data. Our methodology incorporated a number of key inter-related stages, including;

- Site Audit: A Site audit was undertaken to quantify existing road network characteristics and identify local infrastructure management arrangements, in addition to establishing the level of accessibility to the Site in terms of walking, cycling and public transport. An inventory of the local road network was also developed as this stage of the assessment.
- Preplanning Meeting: A preplanning meeting was undertaken with officers of Dublin City Council (DCC) including representatives of the Transport Planning Department.
- Traffic Counts: Junction turning counts were undertaken and analysed with the objective of establishing local traffic characteristics in the immediate area of the proposed Project.

- **Trip Generation:** A trip generation exercise has been carried out to establish the potential level of vehicle trips generated by the proposed Project.
- **Trip Distribution:** Based upon existing traffic characteristics and anticipated travel patterns of the proposed Project, a trip distribution exercise has been undertaken to assign site generated trips across the local network.
- **Network Analysis:** Undertook detailed computer simulations to assess the operational performance of key junctions in the post development 2022 Opening Year and 2037 Design Year development scenarios in accordance with the NRA/TII document '*Traffic and Transport Assessment Guidelines*'[167].

The assessment of effects of the proposed Project on material assets are assessed in **terms of quality** (*positive*, n*eutral* or *negative effects*), **significance** (im*perceptible, not significant, slight, moderate, significant, very significant or profound effects)*, **extent, context, probability** (*likely, unlikely effects*) and **duration** (*temporary, short term, long term or permanent effects*) in line with the criteria set out in Table 3.3 '*Description of Effects*' of the Draft EPA Guidelines[168].

17.3 Baseline Environment

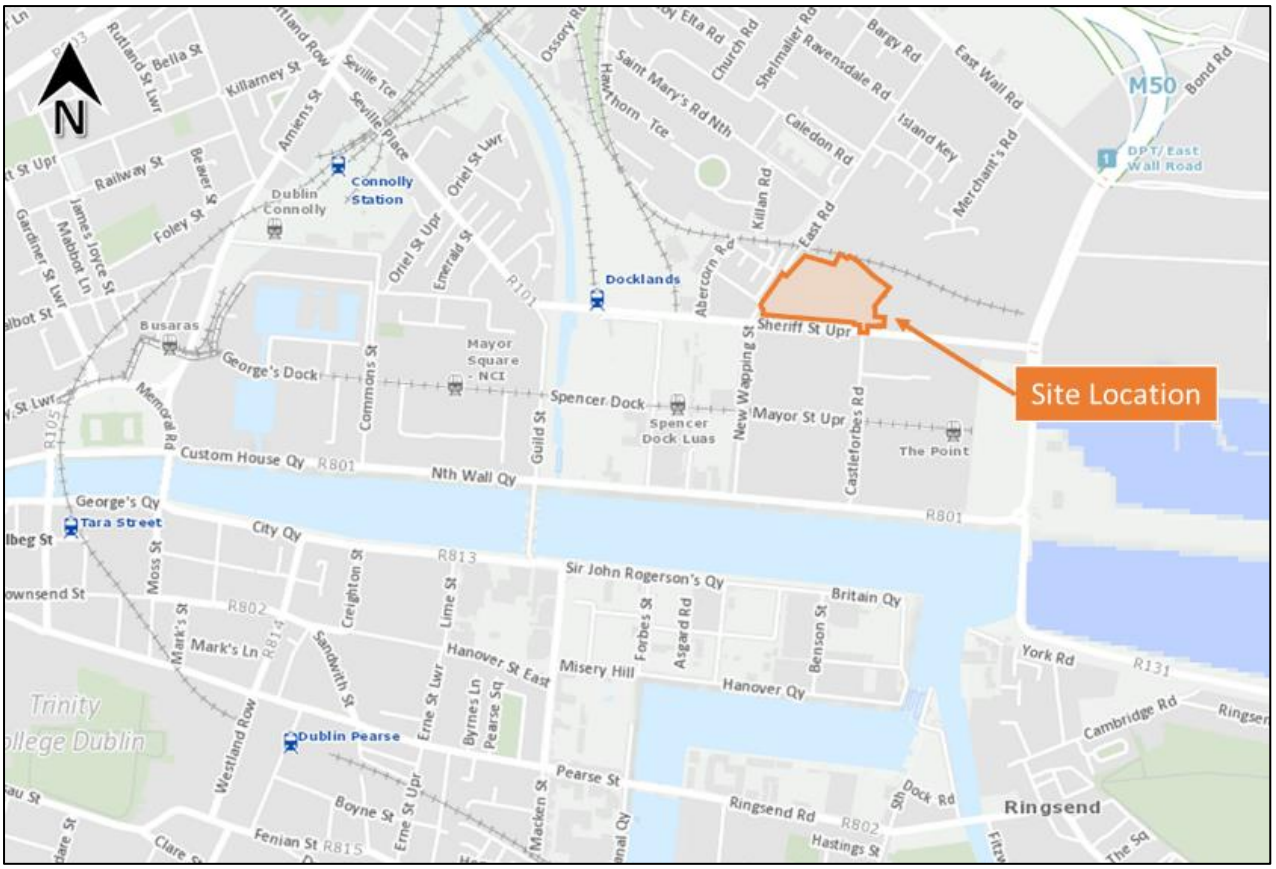
17.3.1 Site Location

The Site of the proposed Project is located in the North Wall district which forms the eastern edge of Dublin City Centre. The Site is bounded to the south by Sheriff Street Upper and to the north and east by lands in the control of Irish Rail. Sheriff Street Upper terminates to the east at a signal-controlled junction with East Wall Road with links to North Wall Quay to the south. East Wall Road provides a direct connection to the strategic M50 and M1 Motorways via the Dublin Port Tunnel. To the west, Sheriff Street Upper provides access to Docklands train station, Connolly and Busáras Transportation Hubs, to North Circular Road via Seville Place and to Sir John Rogerson's Quay via Samuel Beckett Bridge.

The general location of the Site of the proposed Project in relation to the surrounding road network is illustrated in Figure 17.1 below.

[167] NRA (2014).
[168] EPA (2017).

Figure 17.1: Site Location[169]



17.3.2 Existing Cycling and Pedestrian Facilities

All pedestrian routes leading to/from the Site of the proposed Project benefit from the provision of street lighting in addition to good quality pedestrian footways. There are controlled pedestrian crossing facilities available adjacent to the Site at the Sheriff Street Upper/North Wall Avenue junction and to the East at the East Road/R101 Sheriff Street Upper/New Wapping Street junction.

[169] Source: GeoHive

Figure 17.2: View of Sheriff Street Upper Looking East[170]

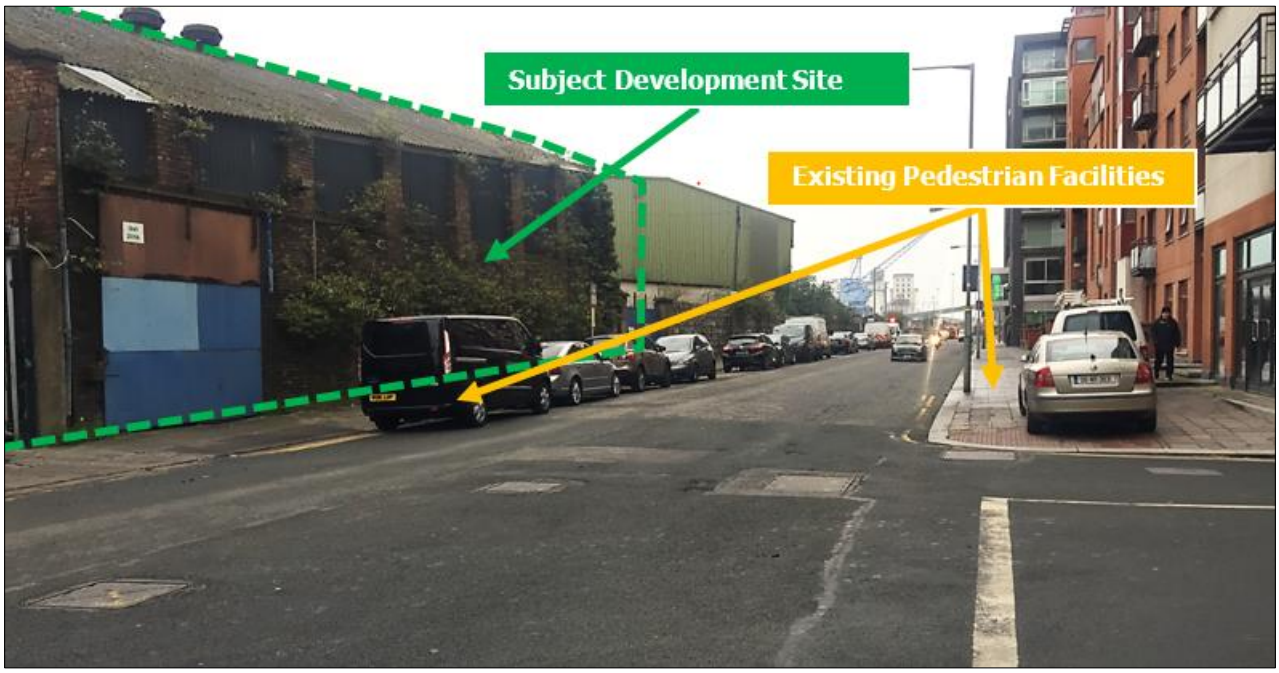
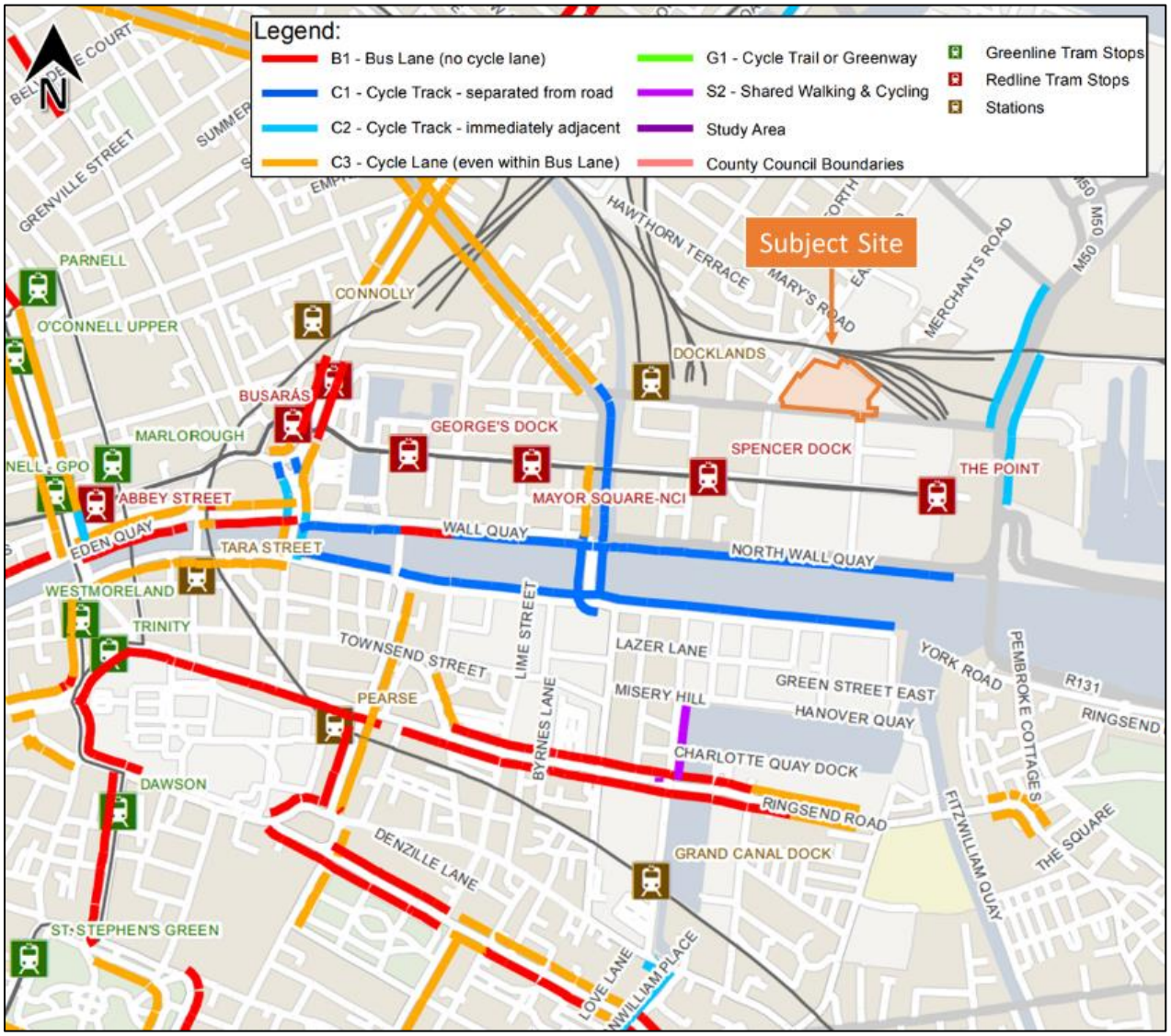


Figure 17.3: View of Sheriff Street Upper Looking West[170]

In the immediate vicinity of the Site of the proposed Project, cyclists must share the carriageway with general vehicular traffic. Nonetheless, cyclists traveling to/from the Site from the surrounding area can benefit from the provision of a variety of cycle facilities (cycle lanes/tracks) along Seville Place/Guild Street (550m to the west), and the Quays (400m to the south). The NTA's Cycle Network Plan for the Greater Dublin Area includes proposals for the provision of a secondary cycle route along East Road adjacent to the Site, see Figure 17.4.

[170] Source: Google Maps

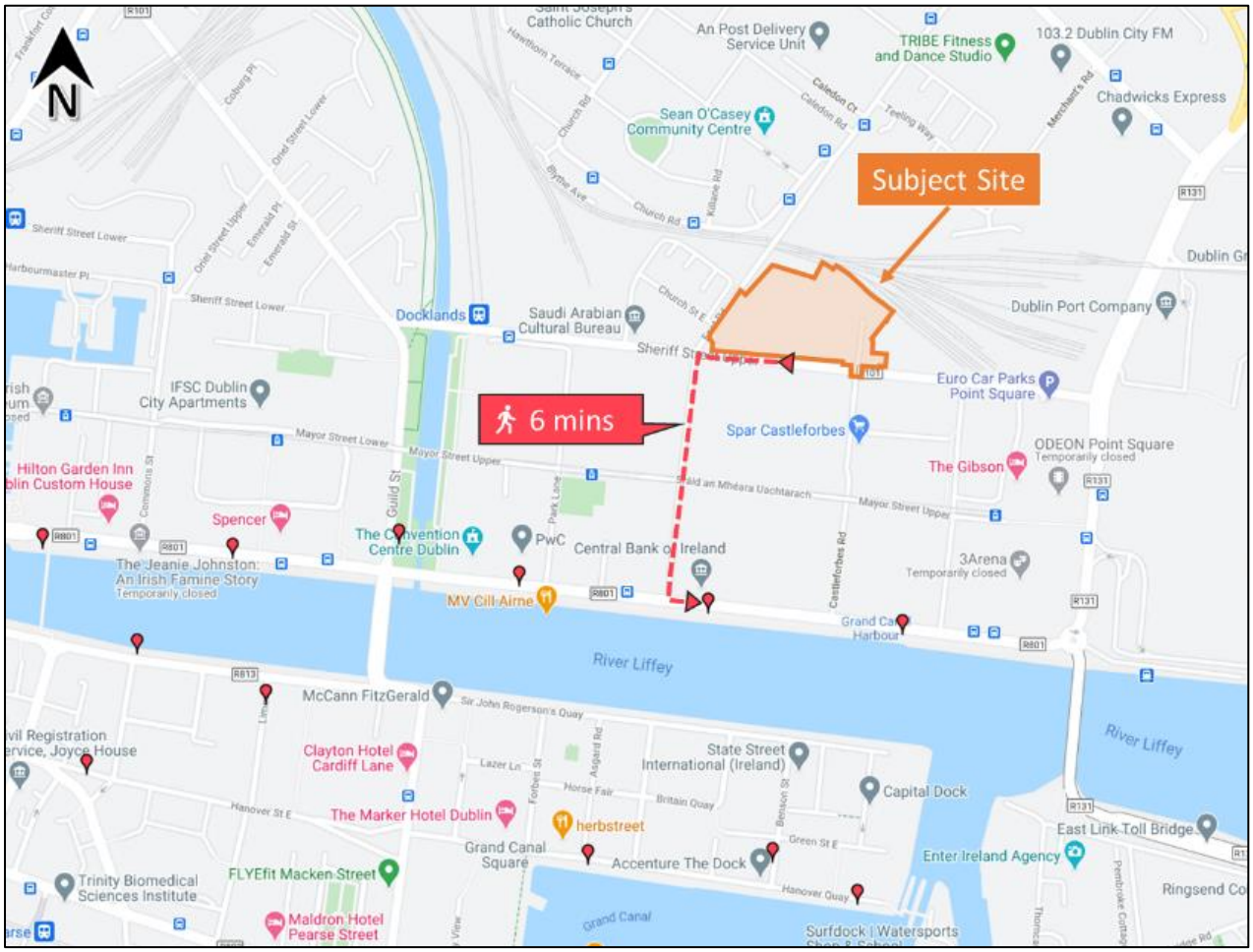
Figure 17.4: Existing Cycle Facilities[171]



There are also a number of Dublinbikes stations (see Figure 17.5 below) located surrounding the Site area on North Wall Quay, Custom House Quay and City Quay. The bike station on North Wall Quay is accessible within circa. (c.) 500m walking distance of the Site of the proposed Project.

[171] Sheet E1 GDA Cycle Network Plan.

Figure 17.5: Dublinbikes Stations[172]



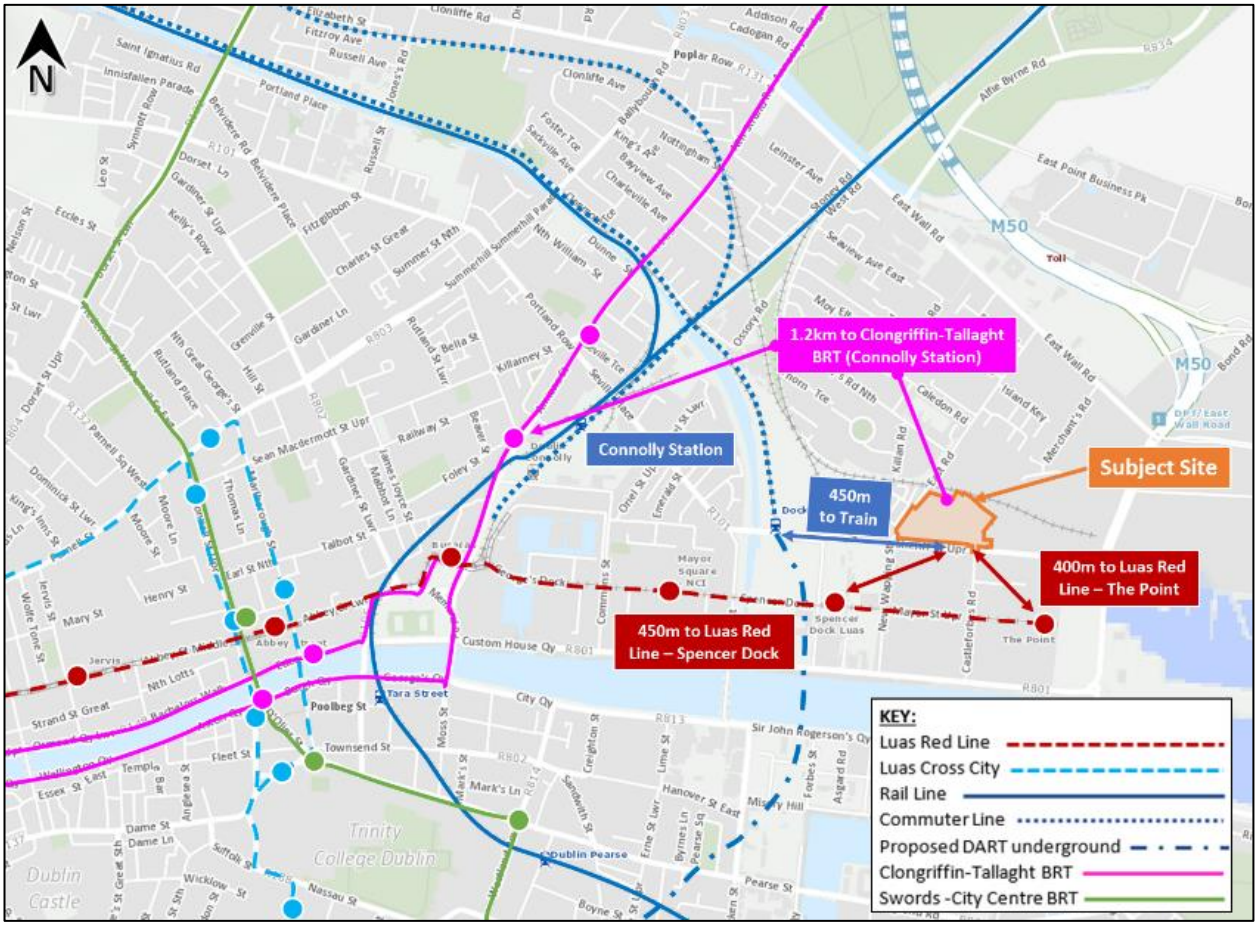
17.3.3 Public Transport

As graphically illustrated in Figure 17.6 below, the Site is ideally situated to benefit from a comprehensive range of transport connections which result in the site achieving excellent accessibility levels for all modes of travel. Furthermore, the range and proximity of a number of existing (and emerging) public transport interchanges further enhances the sustainability characteristics of the Site of the proposed Project.

These include both the Docklands Rail Station and the LUAS Red Line (The Point and Spencer Dock interchanges) being only 400m and 450m respectively from the proposed Project. In addition, Connolly Station and the proposed Clongriffin-Tallaght BRT interchange are within 1.2km from the Site, whilst the proposed interchange for the Dart Underground is located at the Docklands Rail Station, approximately 450m from the Site.

[172] Source: Dublinbikes

Figure 17.6: Existing & Proposed Public Transport Rail and BRT Connections



17.3.3.1 Bus

Dublin Bus operates route numbers 53 and 151 along the East Road corridor, travelling in both directions providing links between Dublin City Centre and Dublin Ferryport and also Foxborough and the Docklands. Routes 33d, 33x, 41x, 142 and 151, in addition to Airlink bus routes 747 and 757 operate along the R801 North Wall Quay (to the south of the Site of the proposed Project) providing links to/from a range of additional destinations including Dublin City Centre and Dublin Airport.

Route numbers 53 and 151 are highly accessible with the closest interchange opportunities within 500m of the Site access whilst route numbers 33b, 33x, 41x, 142, 747 and 757 are accessible within 550m of the Site access as detailed in Figure 17.7.

Figure 17.7: Bus Interchange Locations[173]

The Swords Express, which operates daily services, is also accessible along the R131 East Wall Road c. 500m northeast of the Site. These Dublin Bus operated bus services operate on a daily basis and offer relatively frequent schedules as summarised in Table 17.1.

[173] Source: DublinBus

Table 17.1: Dublin Bus Service Frequency - No. of services[174]

Route No.	Route	Mon – Fri	Sat	Sun
33d	Custom House Quay/St. Stephen's Green to Portrane	1*	-	-
	Portrane to Custom House Quay/St. Stephen's Green	1*	-	-
33x	Custom House Quay/St. Stephen's Green to Skerries	5*	-	-
	Skerries to Custom House Quay/St. Stephen's Green	5*	-	-
41x	UCD Belfield to Knocksedan	3*	-	-
	Knocksedan to UCD Belfield	7*	-	-
53a	Talbot Street to Sheriff Street Upper	5	-	-
	Sheriff Street Upper to Talbot Street	5	-	-
53	Talbot Street to Dublin Ferryport	14	13	7
	Dublin Ferryport to Talbot Street	13	13	7
142	Portmarnock to UCD Belfield	11	-	-
	UCD Belfield to Portmarnock	10	-	-
151	Docklands (East Road) to Foxborough (Balgaddy Road)	48	46	31
	Foxborough (Balgaddy Road) to Docklands (East Road)	51	48	34
747	Heuston Rail Station to Dublin Airport	99	74	61
	Dublin Airport to Heuston Rail Station	100	70	61
757	Camden Street (Charlotte Way) to Dublin Airport	38	38	35
	Dublin Airport to Camden Street (Charlotte Way)	39	39	35

**excluding Bank Holidays*

17.3.3.2 Heavy Rail Network

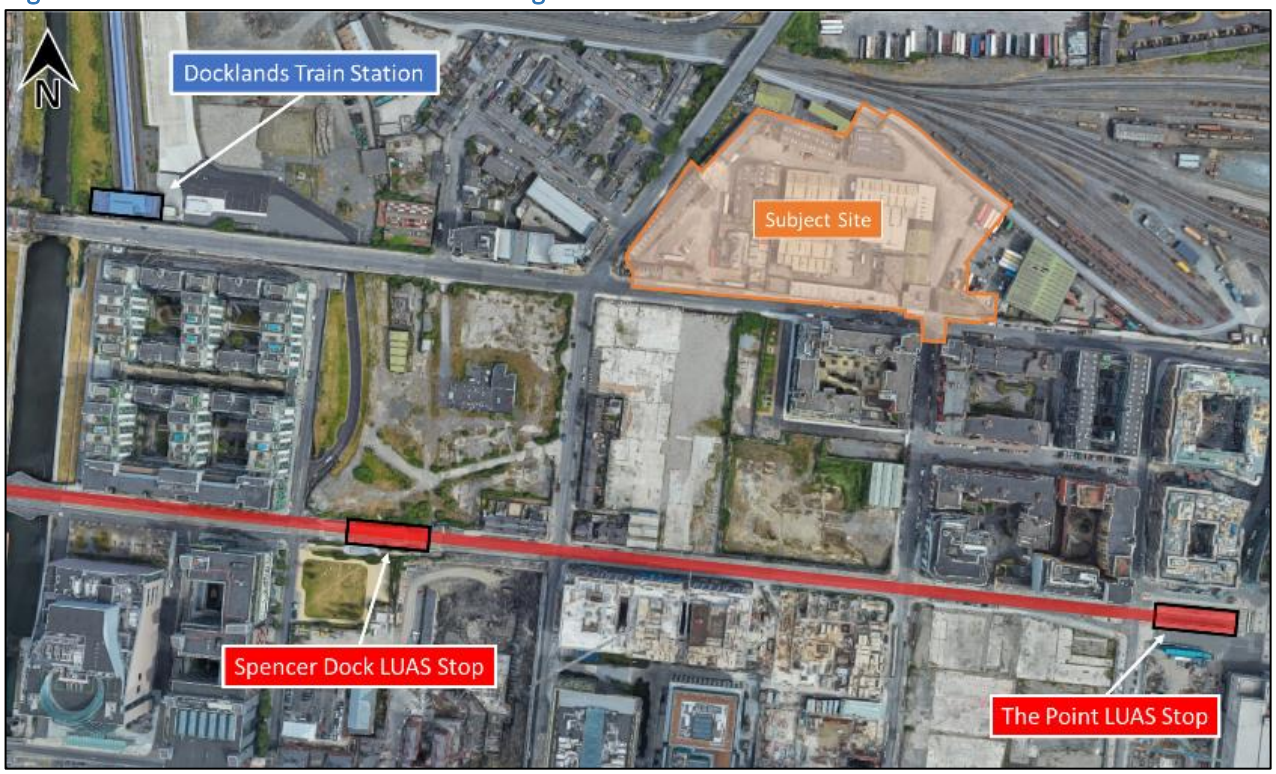
The Docklands Train Station is located c. 450m (6-minute walk) walking distance to the west of the Site, as shown in Figure 17.8 below. This interchange provides access to DART and regional Commuter rail services. Furthermore, Connolly Station is only 1.2km to the west where additional DART and regional commuter services are available in addition to intercity services, whilst Heuston Station is accessible via the LUAS Red Line connection.

17.3.3.3 LUAS

The LUAS Red Line is also accessible with the 'The Point' interchange located within c. 400m (5-minute walk) walking distance to the southeast of the Site. The LUAS Red Line currently provides access to Busáras, Connolly Station, Dublin City Centre, Heuston Railway Station, Tallaght and Saggart in addition to other intermediate destinations along its route.

[174] Source: DublinBus

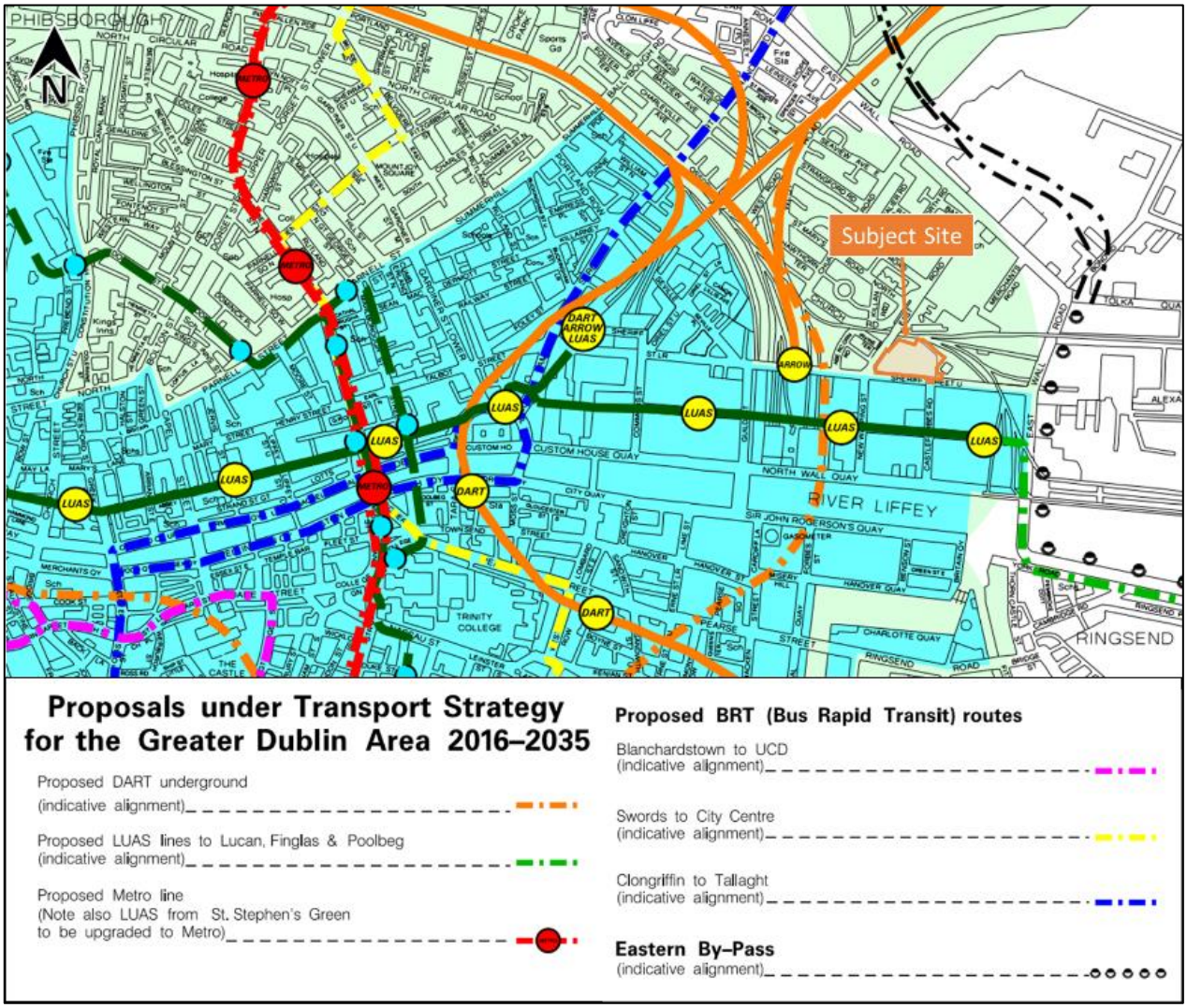
Figure 17.8: Train Station and LUAS Interchange Locations



17.3.4 Proposed Transport Infrastructure

Map J of the *Dublin City Development Plan 2016-2022* presents both the existing and proposed public transport routes in the region. An extract of this map illustrating the existing and proposed routes in the vicinity of the Site of the proposed Project is presented in Figure 17.9.

Figure 17.9: DCC Existing & Proposed Public Transport Routes in the Vicinity of the Site[175]



17.3.4.1 Cycle Network Proposals

The Site of the proposed Project is located within the *'Dublin City Centre Sector'* within the Greater Dublin Area Cycle Network Plan (2013). According to the GDA Plan *'The Dublin City Centre Sector is defined by the Royal Canal and Grand Canal ring on the northern, eastern and southern side. The western boundary is taken as about 0.5km west of a north-south line between Phibsborough and Harold's Cross, and includes areas such as Pimlico, Thomas Street, Manor Street and Grangegorman. This area includes the commercial heart of the city where most employment is concentrated. It excludes the mostly residential areas within the canal ring further west, as these are in effect inner suburbs that do not attract significant numbers of non-local inward trips. On the other hand, the recently redeveloped Docklands area spreads a little way east of the canal ring and has been included in the City Centre sector as it contains significant employment'.*

In the vicinity of the Site the following route additions are proposed (see Figure 17.10):

[175] Extract of Mapset J DCC Development Plan.

- **Secondary Route 1E** (adjacent to the Site): "*branches off Route 1A at Clontarf Road and provides an alternative link to the Docklands area via East Wall*";
- **Primary Route 5**: "*Docklands to the North West Sector along the Liffey Quays to Heuston Station, and then through the Phoenix Park to Castleknock and Blanchardstown*";
- **Royal Canal Greenway**: "*from Sheriff Street in the Docklands to Drumcondra Road past Croke Park stadium (partly in place west of North Strand)";*
- **Primary Route NO1**: "*North Circular Route at the outer edge of the city centre, from Route 1 at Five Lamps westwards to Phibsborough and eastwards to the Docklands*"; and
- **Secondary Route C8**: "*North Circular Road East: From Royal Canal Bank at Phibsborough eastward to Docklands*".

Figure 17.10: Proposed Cycle Network Enhancements[176]

17.3.4.2 BusConnects

In 2017 the National Transport Authority (NTA) in collaboration with Dublin Bus and other key stakeholders began work on reviewing the Dublin Area bus network. This culminated in a draft BusConnects Network being

[176] Extract of Sheet N1a GDA.

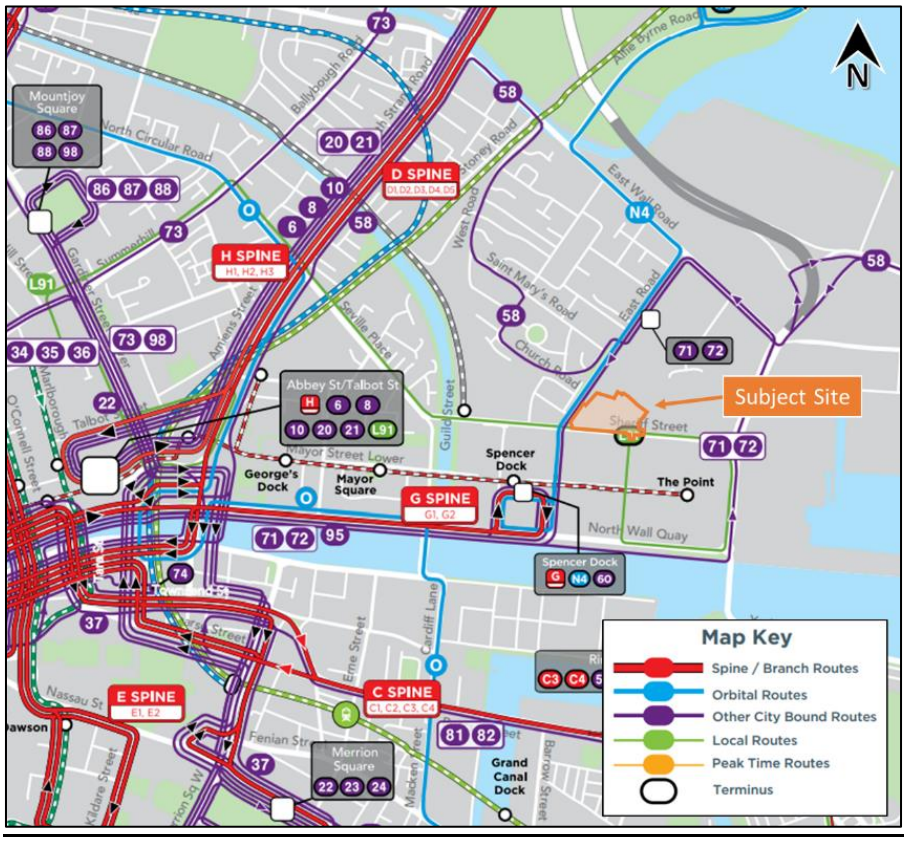
published in 2018. The Dublin Area Bus Network Redesign proposals sought to introduce a number of significant changes to the bus services within Dublin including:

- *"Services to be arranged along seven cross-city super-frequent spines.*
- *Dramatic increase in the numbers of orbital services.*
- *Increase in the number of all-day high-frequency services.*
- *Move to a simplified two-fare system.*
- *A new route numbering system".*

"Under the proposals, the level of bus service will increase by 27%. This includes services on 11 brand-new orbital routes that will operate on a 15-minute frequency or better, in the north, south and west of the network area."

Since then, three rounds of public consultation regarding the Bus Network Redesign proposals and BusConnects have taken place. The proposed bus network was subsequently revised in light of the feedback received and the final version of the network proposals have recently been published (September, 2020) and are shown in Figure 17.11. This indicates the proposed bus service routes in the vicinity of the Site of the proposed Project, following the BusConnects network redesign.

Figure 17.11: Proposed Public Transport Services (weekday midday frequency)[177]



[177] BusConnects Final Bus Network Map 2020.

Under the BusConnects proposals, the following routes will operate at the following frequencies within the immediate vicinity of the Site:

- Spine Branch Route G1: From Spencer Dock to Red Cow Luas via City Centre, Inchicore and Ballyfermot, operating every 12-15 minutes;
- Spine Branch Route G2: From Spencer Dock to Liffey Valley via City Centre, Ballyfermot and Neilstown, operating every 12-15 minutes;
- Orbital Route O: Inner orbital route along the North and South Circular Roads, operating every 8-15 minutes;
- Orbital Route N4: From Spencer Dock to Blanchardstown via East Wall, Whitehall, DCU and Finglas, operating every 10 minutes;
- Route L91: From Sheriff Street to Talbot Street, operating every 60 minutes from 10am to 2pm;
- Route 71: From East Wall to Tallaght via City Centre, Ballymount and Warrenmount, operating every 30 minutes;
- Route 72: From East Wall to Drimnagh via City Centre and Warrenmount, operating every 30 minutes;
- Route 58: From Dublin Port to Rathcoole via East Wall, Islandbridge, Red Cow and Saggart, operating every 60 minutes; and
- Route 60: From Spencer Dock to Red Cow via City Centre, Inchicore, Cherry Orchard and Ballyfermot, operating every 60 minutes.

As part of the BusConnects public consultation, maps are available to show how the proposed changes will affect each area. Figure 17.12 indicates the areas reachable within 30, 45 and 60-minute journey times. The travel times of 30, 45 and 60 minutes are based upon the following parameters:

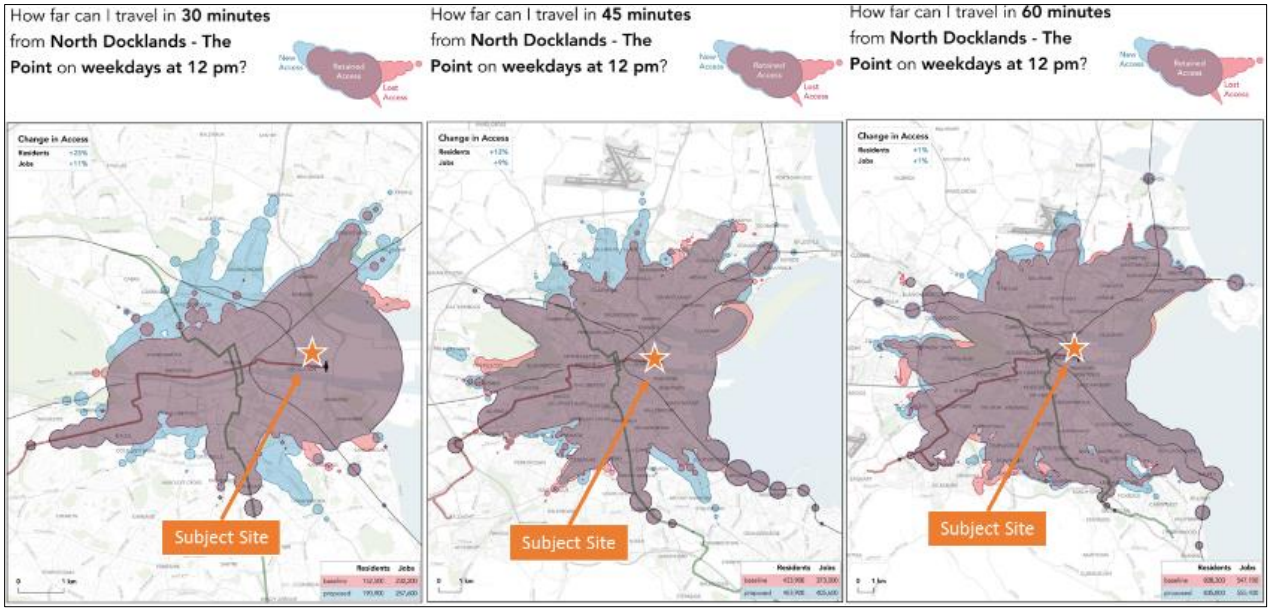
- The times/distances are based upon the public transport frequencies between 09:00-15:00 weekdays;
- There is the assumption that the waiting time for a particular service is half the time of the bus frequency (i.e. if the frequency of the bus is 20 minutes, there is an estimated 10-minute wait time); and
- There are higher frequencies available on some routes during the AM and PM peak hour periods, however this is not applicable to the routes which are within walking distance of the Site.

The maps also provide information regarding how many more jobs that are accessible from a particular location within the 30, 45 and 60-minute travel time. It can be seen from Table 17.2, that residents of the Site will have the benefit of being able to gain convenient access to an additional 25,400 jobs within a 30-minute travel when compared to the existing bus services.

Table 17.2: Percentage Change in Number of Jobs Accessible before/after BusConnects Implementation

How Many More Jobs Can I Reach?			
Travel Time	Jobs in Existing	Jobs in Proposed	% Change
30 mins	232,200	257,600	+11%
45 mins	373,000	405,600	+9%
60 mins	547,700	555,400	+1%

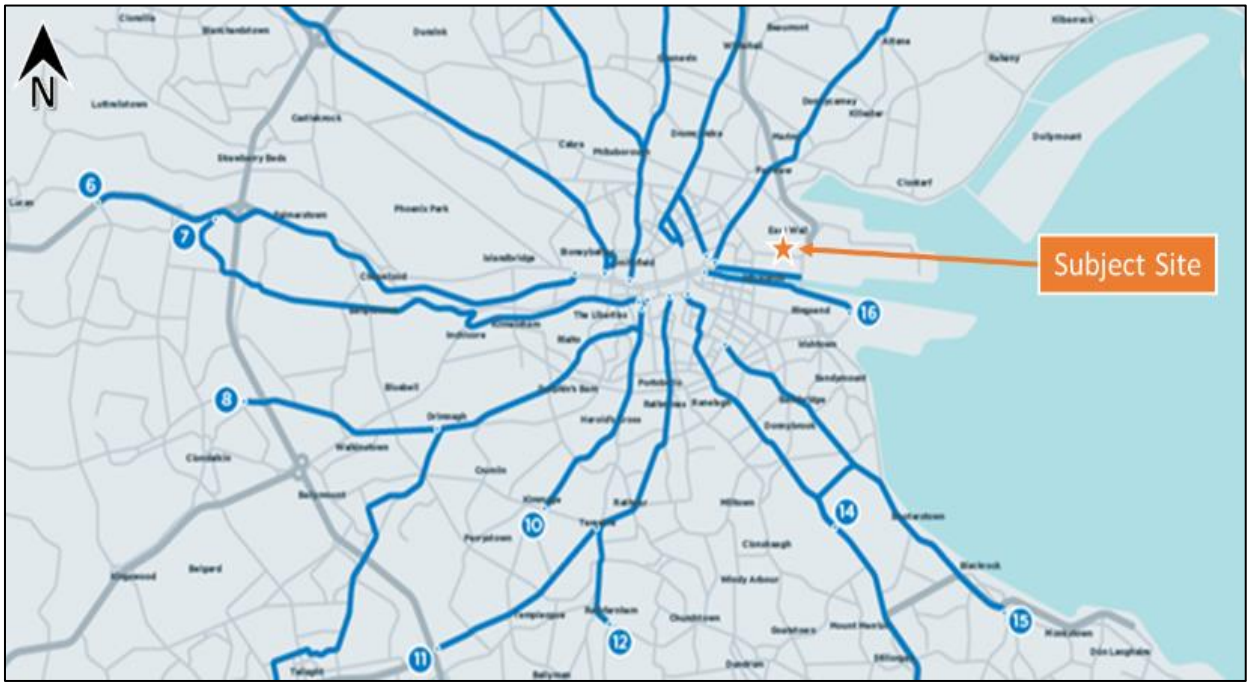
Figure 17.12: Areas Reachable Within 30, 45, and 60 minutes by Bus



The Site on the R101 Sheriff Street Upper is ideally located to benefit from the enhanced accessibility levels delivered by the BusConnects proposals. Figure 17.13 illustrates the bus radial infrastructural corridors to be implemented as part of the BusConnects initiative.

In relation to the Site, the proposed Project is c. 550m from the nearest bus stop which will serve the radial core bus corridor of Ringsend to City centre where bus journey time is anticipated to be c. 18 minutes along the 5km route, once constructed.

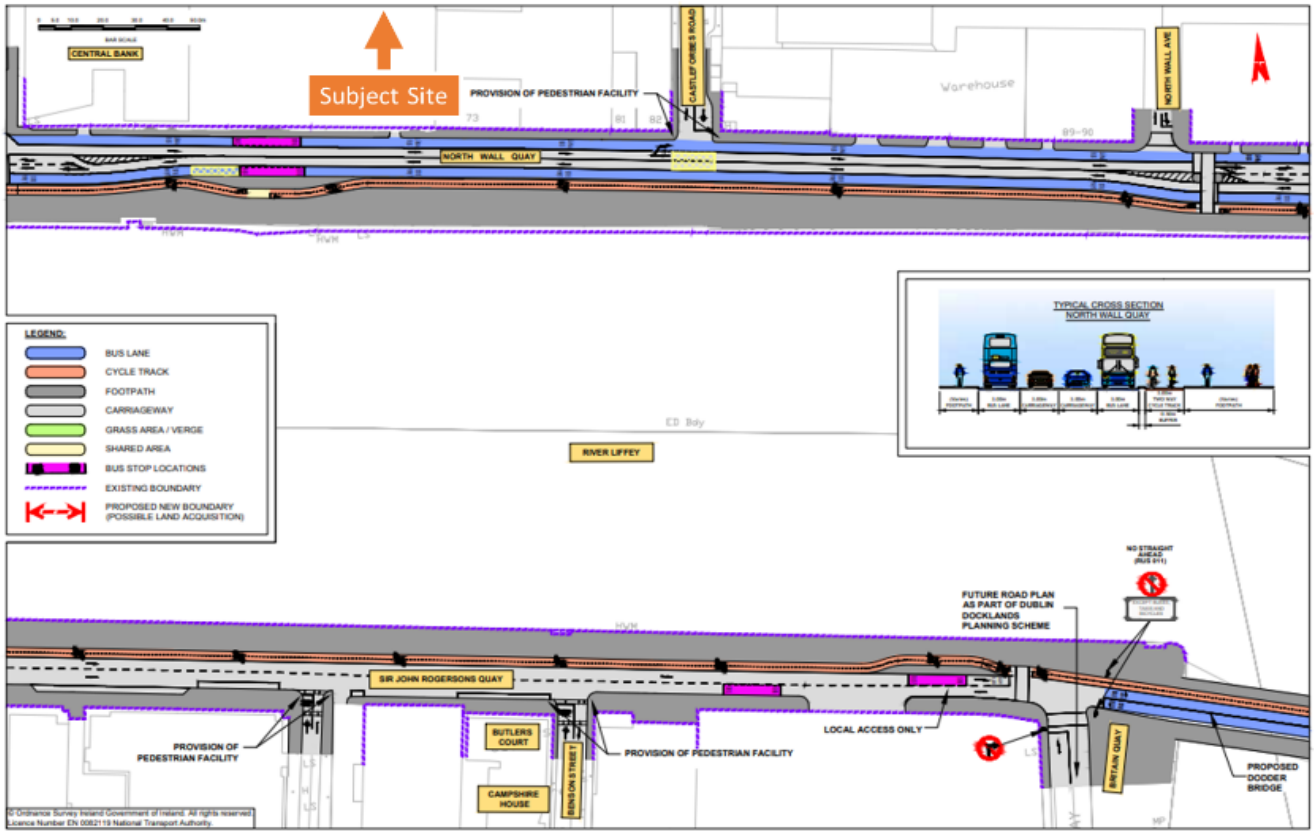
Figure 17.13: Proposed Radial Core Bus Corridors[178]



Shown in Figure 17.14 is the proposed cross-section for the Core Bus Corridor Route 16, Ringsend to City centre, at the R801 North Wall Quay, 550m south from the Site. The BusConnects CBC scheme will enable further enhancements to the existing cycle track on the R801 North Wall Quay as well as ensuring an elevated level of service and shorter journey times for the buses travelling on these routes.

[178] Source: BusConnects

Figure 17.14: Emerging Preferred Route for Core Bus Corridor 16[179]



17.3.4.3 DART Proposals

The DART+ Programme will see the DART system expanded, providing fast, high-frequency electrified services to Drogheda on the Northern Line, Hazelhatch on the Kildare Line, Maynooth and M3 Parkway on the Maynooth Line, while continuing to provide DART services on the Coastal Line as far south as Greystones, see Figure 17.15.

A location for a DART+ West station has been proposed for the existing Docklands Train Station, located approximately within 5-minutes walking distance from the subject site. Figure 17.16 shows the route map for the proposed DART+ West Line.

[179] Source: BusConnects

Figure 17.15: DART+ Programme[180]

Figure 17.16: DART+ West Line Route Map[180]

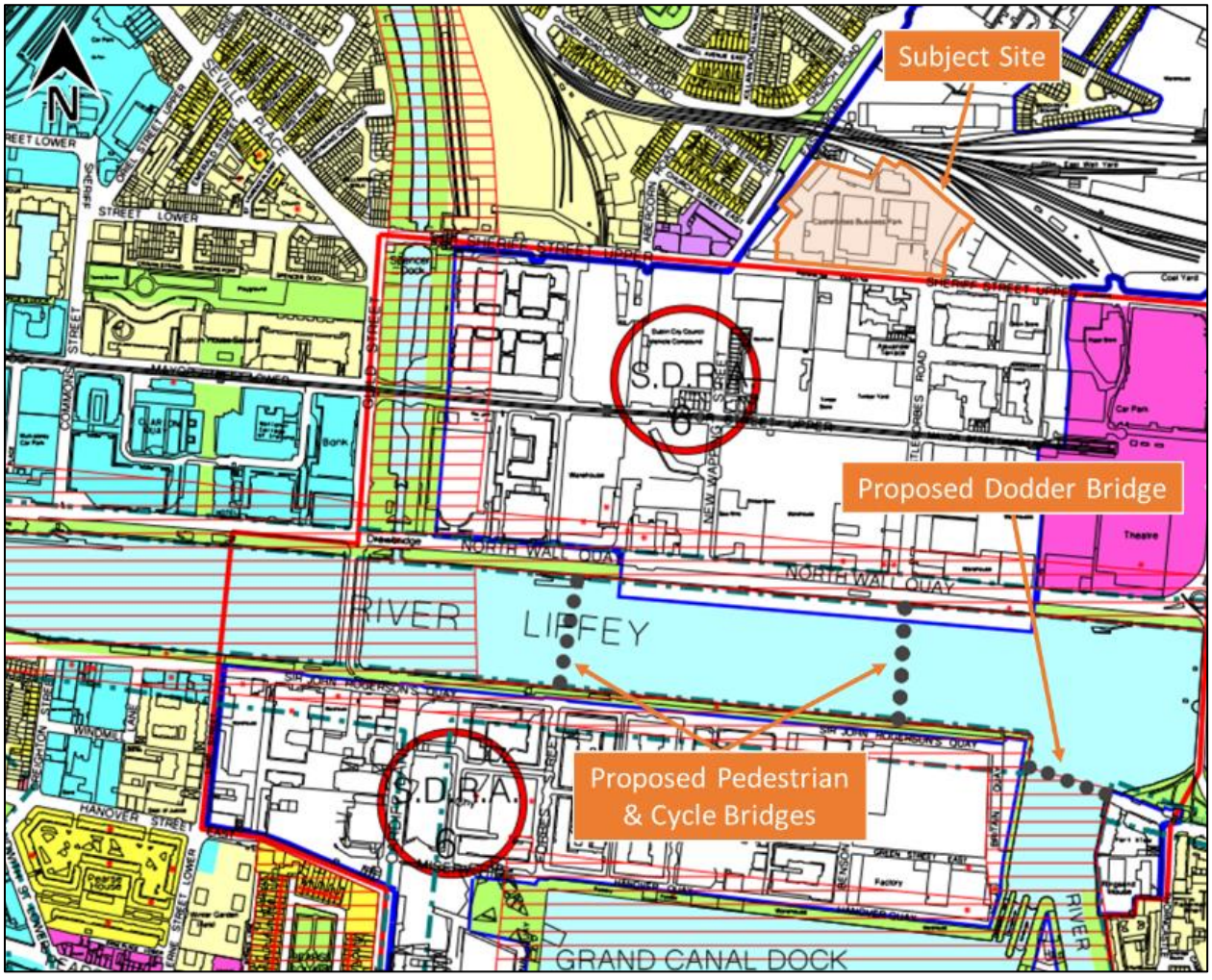
[180] Source: Irish Rail

17.3.4.4 Road & Bridge Infrastructure Proposals

As outlined within both the Dublin City Council Development Plan (2016-2022), and the North Lotts & Grand Canal Dock Planning Scheme 2014, there are objectives for the provision of the following road and bridge infrastructure/improvement schemes within the six-year period of the Development Plan, see Figure 17.17.

- **Roads**
  - East Wall Road/Sheriff Street to North Quays.
- **Bridges**
  - Two new bridges proposed as part of the North Lotts and Grand Canal Dock SDZ, plus Dodder Bridge.

Figure 17.17: Proposed Bridge Infrastructure[181]



17.3.4.5 Proposed Amendments to North Lotts and Grand Canal Planning Scheme 2014 (February 2018)

In February 2018, Dublin City Council made a request to ABP to make amendments to the North Lotts and Grand Canal Planning Scheme 2014 stating: '*The proposed amendments would allow for the effective*

[181] DCC Development Plan Map E.

relocation of two pedestrian/cycle bridges from the locations shown in the Planning Scheme document, and in response to changed circumstances'.

As indicated in Figure 17.17, the North Lotts and Grand Canal Dock SDZ Planning Scheme contains objectives to provide two separate pedestrian/cycle bridges across the River Liffey, at Forbes Street and Castleforbes Road.

In 2019 permission was sought from ABP to relocate the proposed bridges, which was refused in September 2020 as there is a *"logical and clear desire line for pedestrians and cyclists between north and south of the River Liffey"* from the originally proposed bridge locations.

17.4 Potential Impact of the Proposed Project

17.4.1 Construction Phase

17.4.1.1 Management of Construction Phase Activities

All Construction Phase activities on-site will be governed by a Construction Traffic Management Plan (CTMP), the details of which will be agreed in full with Dublin City Council prior to the commencement of construction activities on-site.

The principal objective of the CTMP is to ensure that the impacts of all building activities generated during the construction of the proposed Project upon both the public (off-site) and internal (on-site) workers environments, are fully considered and proactively managed/programmed respecting key stakeholders thereby ensuring that both the public's and construction workers safety is maintained at all times, disruptions minimised and undertaken within a controlled hazard free/minimised environment. The impact of the Construction Phase will be *temporary* in nature.

17.4.1.2 Construction Traffic

Construction Phase traffic will only be generated on weekdays (08:00-19:00, subject to conditions of a planning permission) and will consist of the following two principal categories:

- Private vehicles owned and driven by Site construction staff and by full time supervisory staff.
- Excavation plant, dumper trucks and delivery vehicles involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready-mix concrete and mortar, concrete blocks, miscellaneous building materials, etc.

On-site employees will generally arrive before 08:00, thus avoiding the morning peak hour traffic. These employees will generally depart after 19:00. It should be noted that a large proportion of construction workers are anticipated to arrive in shared transport. Considering the sensitivity of the Site, opportunities for remote

off-site compound parking will be explored. Deliveries will be actively controlled and subsequently arrive at a dispersed rate during the course of the working day.

Based upon the experience of similar developments, a development of this type and scale would at a maximum necessitate c. 400 staff on-site at any one time, subsequently generating no more than 100 two-way vehicle trips during the peak AM and PM periods over the period of the phased construction works.

It is anticipated that the proposed Project would be constructed over a period of c. 48 months (four years). 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. For this scale of development, we do not expect HGV vehicle movements to exceed four vehicles per hour during the busiest period of construction 'build' works.

A significant level of demolition and waste material removal has already been completed on-site. Based on a preliminary review of the existing survey data and proposed Site levels we estimate that c. 13,100 tonnes of material will require excavation. Whilst an element of the material will be reused on-site (2000m^3) it is still predicted that c. 11,100m^3 of material will be require removal during the Construction Phase earthworks. This equates to 1,269 no. truckloads depending upon HGV characteristics. At 24 no. loads removed per day this equates to 53 days of earthmoving works as part of the adopted worst-case assessment to clear the entire Site in one single construction activity.

An appropriate control and routing strategy for HGVs can also be implemented for the duration of site works as part of the CTMP. It is not proposed to utilise any roads with weight/height restrictions as part of the routing of HGVs during the Construction Phase.

A significant benefit of the proposed Project Site's characteristics is that all construction traffic vehicle parking demands can be accommodated on-site thereby minimising the impact upon the operational performance and safety levels of the adjacent public road network.

Considering the Site's proximity to the strategic road network and following the implementation of an appropriately detailed CTMP, it is concluded that construction traffic will not give rise to any significant traffic concerns or impede the operational performance of the local road network and its surrounding junctions. The level of significance of the above findings are categorised in Section 17.6.1.

17.4.2 Operational Phase

17.4.2.1 Committed Development Trip Generation

Following a review of DCC online planning portal, DBFL have established the extent of existing third party developments, as located within the area of influence of the Site of the proposed Project, which currently benefit from a planning permission but have yet to be constructed/occupied. DBFL have subsequently included

the following third-party development proposals as '*committed developments*' within the network assessment.

Spencer Place Residential Block 2 (Ref: DSDZ 4111/19)

On New Wapping Street, off of the R101 Sheriff Street Upper, a residential development is proposed comprising 326 no. residential apartment units and 78 no. car parking spaces to serve the development. The vehicle trips associated with the committed development were retrieved from the Traffic and Transport Assessment (TTA) submitted as part of the development's planning application. These vehicle trips were included in the subject development's Traffic Model in order to assess the impact of the Spencer Place residential development on the surrounding road network in addition to the proposed Project's impact.

Spencer Place Commercial Development (Ref: DSDZ 4184/18)

Also on New Wapping Street, with frontage onto the R801 North Wall Quay is a proposed commercial development. The development comprises 48,436m^2 of office space, as well as a 204-room hotel and retail units. DBFL consider that the permitted commercial development on New Wapping Street may generate an impact on the local road network and as such it is included as a committed development.

In order to determine the level of traffic generated by this third-party commercial development, DBFL utilised the same trip rates as those utilised for the proposed Project for the retail land uses. Trip rates for the committed development's hotel and offices were generated as shown in Table 17.3.

Table 17.3: Committed Development (Ref: DSDZ 4184/18) Hotel & Office Trip Rates

Land Use	Units/GFA	AM Peak Hour			PM Peak Hour		
		Arr.	Dep	Total	Arr.	Dep	Total
Hotel	Per 100m^2	0.185	0.358	**0.543**	0.243	0.132	**0.374**
Office	Per 100m^2	1.072	0.106	**1.178**	0.057	0.743	**0.800**

Table 17.4 summarises the predicted peak hour AM and PM traffic generated by the committed residential development.

Table 17.4: Committed Development (Ref: DSDZ 4184/18) Traffic Generation

Land Use	GFA	AM Peak Hour			PM Peak Hour		
		Arr.	Dep	Total	Arr.	Dep	Total
Offices	48,436m^2	52	5	**57**	3	36	**39**
Hotel	8,926m^2	17	32	**48**	22	12	**33**
Retail/Restaurant	1,138m^2	17	12	**29**	17	22	**39**
Total		**86**	**49**	**135**	**42**	**70**	**111**

As this development is currently being constructed, in order to provide a robust assessment, DBFL have assumed that the entire development will be occupied by the adopted Opening Year of 2022.

City Block 9 Developments (Refs: DSDZ 3779/17, DSDZ 3780/17)

To the south of the proposed Project, on Castleforbes Road, two committed developments have been permitted on City Block 9 of the Dublin docklands. The residential development (Ref: DSDZ 3779/17) comprises of 420 no. residential apartment units and an adjoining crèche as well as retail and café uses. The commercial development (Ref: DSDZ 3780/17) comprises 4 no. offices with a total area of 35,883m^2. The developments have a car parking provision of 288 no. spaces for the residential development and 90 no. spaces for the commercial development.

The vehicle trips associated with both the committed developments were retrieved from the TTAs submitted as part of the developments' planning applications. These vehicle trips were included in the proposed Project's Traffic Model in order to assess the impact of the City Block 9 committed developments on the surrounding road network in addition to the proposed Project's impact.

City Block 3 Residential Development (Ref: DSDZ 4112/19)

On New Wapping Street at City Block 3, a residential scheme is proposed comprising 449 no. residential apartment units across 6 no. blocks. A café and crèche are also proposed as part of the development as well as 100 no. car parking spaces to serve the site.

The vehicle trips associated with the committed development were retrieved from the Engineering Assessment Report submitted as part of the development's planning application. These vehicle trips were included in the proposed Project's Traffic Model in order to assess the impact of the City Block 3 residential development on the surrounding road network in addition to the proposed Project's impact.

City Block 3 Commercial Development (Ref: DSDZ 4087/19)

A development has been permitted at Coopers Cross, City Block 3 for 2 no. commercial blocks over 2 no. basement levels. The total gross floor area for the commercial development is 45,328m^2 of predominantly office space, with 2 no. retail/café/restaurant units as well as provision for 91 no. car parking spaces to serve the site. The proposed site access/egress will be provided on the Castleforbes Road.

The vehicle trips associated with the committed development were retrieved from the Traffic Assessment and Mobility Management Plan submitted as part of the development's planning application. These vehicle trips were included in the proposed Project's Traffic Model in order to assess the impact of the City Block 3 residential development on the surrounding road network in addition to the proposed Project's impact.

City Block 8, Project Wave Development (Refs: DSDZ 4558/18, DSDZ 3452/19, DSDZ 4157/17, DSDZ 2489/18)

Project Wave is a commercial office and residential development originally permitted under Ref. DSDZ 3550/15 and currently under construction at City Block 8 of North Wall Quay. The development consists of 63,697m^2 of office space, 283 no. residential apartments, 965m^2 gym, 280m^2 café and 275m^2 of retail. A total of 431 no. car parking spaces are proposed as part of the development which will be accessible via a basement car park with access/egress on the Castleforbes Road.

The site is divided into four character blocks, each with their associated planning permissions, but the transportation assessment considers the entire masterplan for the site. The vehicle trips associated with the Project Wave development were retrieved from the Traffic Impact Assessment (TIA) submitted as part of the development's planning application.

The EXO Building Commercial Development (Ref: DSDZ 3754/18)

The EXO commercial building at City Block 10 has been permitted under Ref. DSDZ 3632/15 and has been subsequently amended by other planning permissions. The development will be served by 42 no. car parking spaces, which will be provided within The Point Village Car Park. A pedestrian link will be provided for employees of the EXO building between the underground car park and the commercial building located on the R131 East Wall Road.

In order to determine the level of traffic generated by this third-party commercial development, DBFL utilised the same trip rates as those utilised for the proposed Project for the restaurant land uses. The same office trip rates were used as those utilised for the previous committed development (Ref. DSDZ 4184/18) as shown in Table 17.3. Table 17.5 summarises the predicted peak hour AM and PM traffic generated by the committed commercial development.

Table 17.5: Committed Development (Ref: DSDZ 3754/18) Traffic Generation

Land Use	GFA	AM Peak Hour			PM Peak Hour		
		Arr.	Dep	Total	Arr.	Dep	Total
Offices	19,263m^2	21	2	**23**	1	14	**15**
Restaurant	519.4m^2	0	0	**0**	9	4	**13**
Total		**21**	**2**	**23**	**10**	**19**	**29**

As this development is currently being constructed, in order to provide a robust assessment, DBFL have assumed that the entire development will be occupied by the adopted Opening Year of 2022.

East Road Development (Ref: ABP-304710-19)

The proposed East Road site will consist of 560 no. residential apartment units, café, retail, enterprise space, crèche and various other mixed uses. A car parking provision of 241 no. car parking spaces is proposed to serve the entire development.

The vehicle trips associated with the committed development were retrieved from the Traffic Model previously completed by DBFL as part of the development's planning application. These vehicle trips were included in the subject development's Traffic Model in order to assess the impact of the East Road mixed-use development on the surrounding road network in addition to the proposed Project's impact.

Student Accommodation Development (Ref: DSDZ 4332/18)

Two student accommodation blocks are proposed on the site at Upper Mayor Street, City Block 5, providing 970 no. bed spaces. The development was originally permitted under Ref. DSDZ 3689/15 and has been subsequently amended by others.

It is not anticipated that the development will generate a material impact on the surrounding road network as other than 2 no. mobility impaired car parking spaces there is no private car parking provision associated with the development. As such, the student accommodation development has not been included in the proposed Project's Traffic Model.

Castleforbes Office & Hotel Commercial Development (Ref: 3433/19)

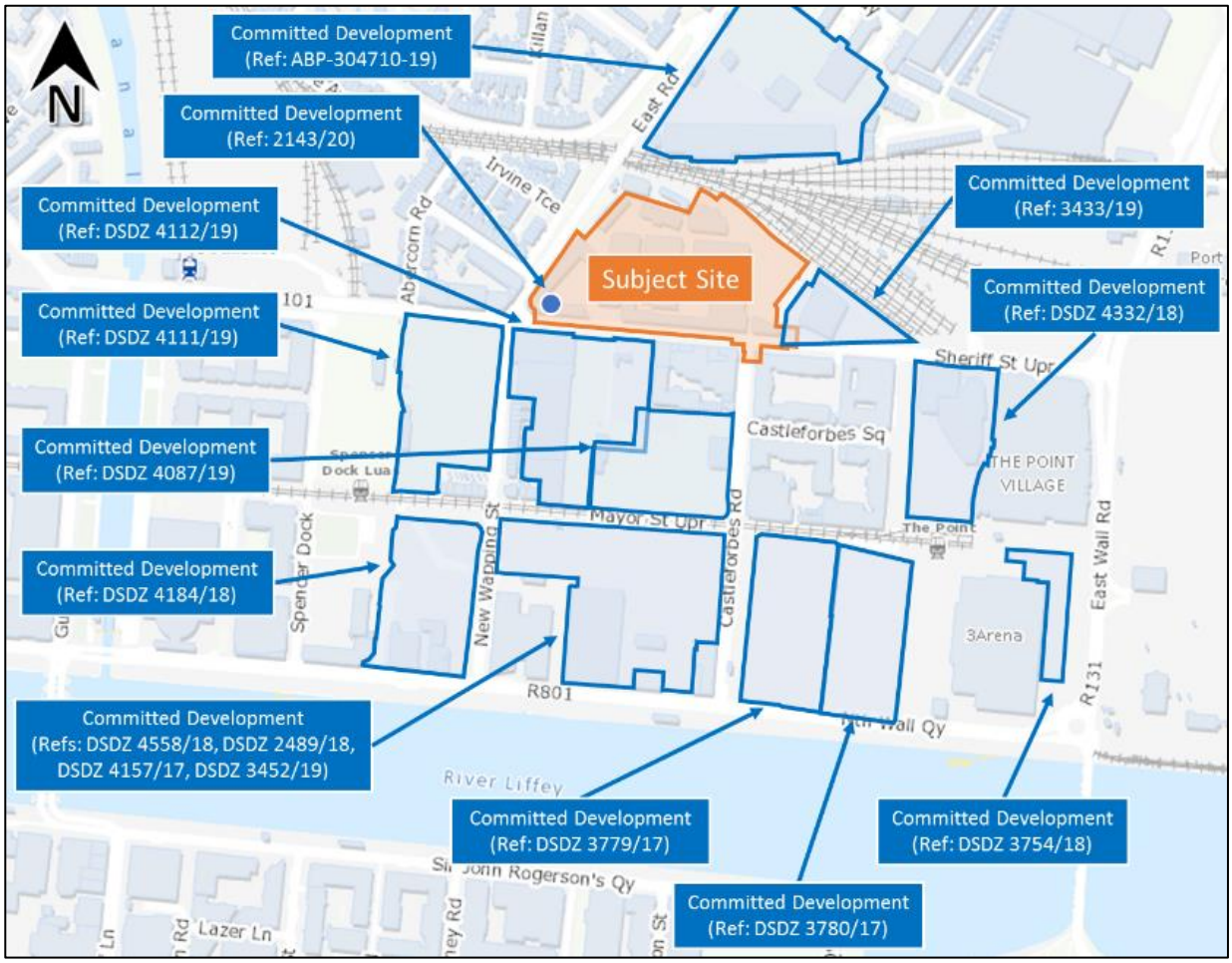
As the initial phase to the development of the Castleforbes Business Park, directly adjoining the Site of the proposed Project to the east is the permitted commercial development for a 270 no. bed hotel and 10,265m^2 of office space. As above, the development has no private car parking provision and as such it is not included within the proposed Project's Traffic Model as the development will not generate a material impact on the surrounding road network.

Castleforbes Hotel Development (Ref: 2143/20)

Also part of the Castleforbes Business Park is a permitted hotel development on the western extent of the subject site boundary. As the 219 no. bed hotel development does not include any car parking proposals it is not included within the subject development's Traffic Model as the development will not generate a material impact on the surrounding road network.

The location of the aforementioned committed developments relative to the Site of the proposed Project is shown on Figure 17.18 below.

Figure 17.18: Location of Committed Developments[182]



17.4.2.2 Proposed Project Trip Generation

A review of trip generation factors contained within the TRICS database was carried out. TRICS data is primarily UK based, although a number of Irish sites have recently been included and the number of Irish sites continues to expand. Nevertheless, we consider that TRICS will provide a reasonable indication of traffic generation from the proposed Project should on-site car parking be unrestrained *e.g.* as per development standards.

Data supplied for inclusion in TRICS undergoes a procedure of validation testing, and there is no evidence from this procedure suggesting that data from Ireland bears any significant fundamental differences to that from the other countries included. Consequently, we consider that TRICS will provide a reasonable indication of unrestrained traffic generation from the proposed Project.

Table 17.6 includes the predicted vehicle trip rates of the potential unrestrained traffic flows in and out of the proposed Project during the morning and evening peak hour periods using data from TRICS. As these trip rates have not been discounted to reflect the *'low car allocation'* characteristics of the proposed Project, the

[182] GeoHive

utilisation of these rates represent a worst case analysis of the development's traffic generation with the actual level of Site generated traffic predicted to be less than the corresponding vehicle trip levels detailed in Table 17.7.

Table 17.6: Proposed Project Trip Rates (TRICS)

Land Use	Units/GFA	AM Peak Hour			PM Peak Hour		
		Arr.	Dep	Total	Arr.	Dep	Total
Apartments	Per Unit	0.043	0.108	**0.151**	0.113	0.068	**0.181**
Retail	Per 100m^2	1.533	1.022	**2.555**	1.515	1.935	**3.450**

Based on the above trip rates, potential peak hour traffic generation is calculated based on 702 No. apartments, and 1,154m^2 of retail. The community and cultural uses within the proposed Project are not anticipated to generate notable external vehicle trips as they will be predominately catering towards the residents of the Site of the proposed Project and the local catchment within the community. Table 17.7 summarises the predicted peak hour AM and PM vehicle trips generated by the proposed Project.

Table 17.7: Proposed Project Vehicle Trips

Land Use	GFA/Units	AM Peak Hour			PM Peak Hour		
		Arr	Dep	Total	Arr	Dep	Total
Apartments	702	30	76	106	80	47	127
Retail	1,154m^2	18	12	30	17	22	39
Total		**48**	**88**	**136**	**97**	**69**	**166**

17.4.2.3 Trip Distribution

The proposed Project's associated vehicle trips have been assigned to the surrounding road network based on the surveyed traffic movements passing the Site.

In the Opening Year 2022, we have assumed that all 702 no. residential apartments will be complete and occupied as well as the retail components. Accordingly, the following distribution profiles have been adopted in this 2022 scenario based on the distribution of the baseline traffic flows:

- 25% of all New Trips will travel to/from the Site via the Western Site Access, travelling west on the R101 Sheriff Street Upper;
- 25% of all New Trips will travel to/from the Site via the Western Site Access, travelling east on the R101 Sheriff Street Upper;
- 25% of all New Trips will travel to/from the Site via the Eastern Site Access, travelling east on the R101 Sheriff Street Upper; and
- 25% of all New Trips will travel to/from the Site via the Eastern Site Access, travelling west on the R101 Sheriff Street Upper.

The distribution of the nine committed developments' site generated vehicle movements have been assigned to the local road network as per the information submitted as part of the respective development's planning application documentation and influenced by the distribution of the baseline traffic flows.

17.4.2.4 Traffic Growth

In response to the applicant's proposed construction schedule, this TTA adopts an Opening Design Year of 2022, an Interim Future Design Year of 2027 (+5 years) and a long-term Future Design Year of 2037 (+15 years) as per TII guidelines. Although traffic growth may not increase at the rates once predicted, to ensure a robust analysis of the impact of traffic upon the local road network we have adopted growth rates using the Transport Infrastructure Ireland (TII) "Travel Demand Projections".

Table 6.1 within the TII *Project Appraisal Guidelines Units 5*.3 provides Link-Based Annual Traffic Growth Factors for the different metropolitan areas within Ireland. The Site lies within 'Dublin' with the growth factors as outlined within Table 17.8.

Table 17.8: Link-Based Growth Rates: Annual Growth Factors[183]

Metropolitan Area	Low Sensitivity Growth				Central Growth				High Sensitivity Growth			
	2016-2040		2030-2040		2016-2040		2030-2040		2016-2040		2030-2040	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
Dublin	1.0146	1.0280	1.0034	1.0116	1.0162	1.0295	1.0051	1.0136	1.0191	1.0328	1.0087	1.0172

Applying the annual factors (central growth) as outlined in Table 17.8 for the adopted Opening Year of 2022, the Interim Year of 2027 and Future Design Year of 2037 (+15 years), the following growth rates have been adopted to establish corresponding 2022, 2027 and 2037 baseline network flows:

- 2019 to 2022 - 1.0493 (or 4.94%);
- 2019 to 2027 - 1.1371 (or 13.72%); and
- 2019 to 2037 - 1.2231 (or 22.31%).

Additionally, the following growth rate has been adopted to establish the 2019 baseline network to growth the 2018 survey results for the two signalised junctions on the East Road to reflect a 2019 traffic network:

- 2018 to 2019 - 1.0162 (or 1.62%).

17.4.2.5 Assessment Scenarios

Two different traffic scenarios have been assessed, namely (a) the 'Base' (Do-Minimum) traffic characteristics and (b) the 'Post Development' (Do-Something) traffic characteristics.

[183] Extract from Table 6.1 PAG Unit 5.3

The 'Base' traffic scenario takes into account the potential level of traffic that could be generated by the committed developments, in addition to the existing flows travelling across the network.

The proposed Project traffic is then added to the network's 'Base' (Base + Committed Developments) traffic flows to establish the 'Post Development' traffic flows.

In summary, the following network modelling scenarios are considered:

Do Minimum

- A1 - 2022 Opening Year Traffic Flows + Committed Developments.
- A2 - 2027 Interim Year Traffic Flows + Committed Developments.
- A3 - 2037 Future Design Year Traffic Flows + Committed Developments.

Do Something

- B1 - 2022 Do Minimum (A1) + Proposed Mixed-Use Development (702 no. residential units, 1,154m^2 retail).
- B2 - 2027 Do Minimum (A2) + Proposed Mixed-Use Development (702 no. residential units, 1,154m^2 retail).
- B3 - 2037 Do Minimum (A3) + Proposed Mixed-Use Development (702 no. residential units, 1,154m^2 retail).

17.4.2.6 Assessment Periods

The local road network's area wide AM and PM peak hour flows have been identified as occurring between 08:00 to 09:00 and 17:15 to 18:15 respectively.

The following figures present the vehicle flows across the local road network for each of the adopted development scenarios:

- Figure 20 - 2022 Do Minimum (A1)
- Figure 22 - 2027 Do Minimum (A2)
- Figure 24 - 2037 Do Minimum (A3)
- Figure 21 - 2022 Do Something (B1)
- Figure 23 - 2027 Do Something (B2)
- Figure 25 - 2037 Do Something (B3).

17.4.2.7 Network Impact

These same thresholds are reproduced in the NRA/TII document entitled *Traffic and Transport Assessment Guidelines*[184] provides thresholds in relation to the impact of a proposed development on the local road

[184] NRA (2014). *Traffic and Transport Assessment Guidelines.*

network. It is considered material when the level of traffic it generates surpasses 10% and 5% on normal and congested networks respectively. When such levels of impact are generated a more detailed assessment should be undertaken to ascertain the specific impact upon the network's operational performance.

For the key local junctions, it can be seen in Table 17.9, that the proposed Project upon full completion would have a material effect on the following three junctions in the adopted worst case scenario:

- **Junction 4:** Priority Control - R101 Sheriff Street Upper/Proposed Western Site Access;
- **Junction 5:** Priority Control - R101 Sheriff Street Upper/Proposed Eastern Site Access; and
- **Junction 6:** Priority Control - R101 Sheriff Street Upper/Castleforbes Road.

Table 17.9: Network Impact through Key Junctions (2022 DS, 2027 DS and 2037 DS)

Ref	Junction Location	2022		2027		2037	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
1	R131 East Wall Road/East Road	0.40%	0.47%	0.37%	0.44%	0.35%	0.41%
2	R101 Sheriff Street Upper/Seville Place/Guild Street	2.19%	2.61%	2.03%	2.42%	1.89%	2.26%
3	R101 Sheriff Street Upper/East Road/New Wapping Street	3.82%	5.09%	3.56%	4.75%	3.35%	4.45%
4	R101 Sheriff Street Upper/Proposed Western Site Access	13.74%	17.18%	12.90%	16.10%	12.16%	15.17%
5	R101 Sheriff Street Upper/Proposed Eastern Site Access	13.70%	16.00%	12.86%	14.98%	12.12%	14.10%
6	R101 Sheriff Street Upper/Castleforbes Road	2.54%	6.14%	2.00%	5.53%	1.52%	4.99%
7	R101 Sheriff Street Upper/R131 East Wall Road	1.61%	2.05%	1.49%	1.90%	1.39%	1.77%
8	R131 East Wall Road/East Road	1.64%	2.24%	1.52%	2.09%	1.43%	1.96%
9	R101 Sheriff Street Upper/Seville Place/Guild Street	2.03%	2.66%	1.90%	2.48%	1.79%	2.34%

Based on the scale of impact generated in the adopted worst case scenario, more detailed assessments in regards to the nodes operational performance have been undertaken at Junction 4 and Junction 5, the Site access junctions. Furthermore, due to the proximity of the proposed Project to Junction 6, more detailed assessments have also been undertaken on this key node of the local transport network.

17.5 Mitigation Measures

17.5.1 Construction Phase

A preliminary Construction Management Plan (pCMP) has been prepared as part of the planning application with an associated Construction Traffic Management Plan (CTMP) which incorporates a range of integrated control measures and associated management activities with the objective of minimising the construction activities associated with the proposed Project. The following initiatives will be implemented to avoid, minimise and/or mitigate against the anticipated Construction Phase impacts:

- During the Pre-Construction Phase, the Site will be securely fenced off from adjacent properties, public footpaths and roads.
- Appropriate on-site parking and compound area will be provided to prevent overflow onto the local network.
- It is likely that some numbers of the construction team will be brought to/from the Site in vans/minibuses, which will serve to reduce the trip generation potential.
- Delivery vehicles to and from the Site will be spread across the course of the working day, therefore, the number of HGVs travelling during the peak hours will be relatively low.
- Truck wheel washes will be installed at construction entrances and any specific recommendations with regard to construction traffic management made by Dublin City Council will be adhered to.
- Potential localised traffic disruptions during the Construction Phase will be mitigated through the implementation of industry standard traffic management measures. These traffic management measures shall be designed and implemented in accordance with the Department of Transport's *Traffic Signs Manual*, Chapter 8[185] and *Guidance for the Control and Management of Traffic at Roads Works*[186].
- Site entrance point/s from the public highway will be constructed with a bound, durable surface capable of withstanding heavy loads and with a sealed joint between the access and public highway. This durable bound surface will be constructed for a distance of 10m from the public highway.
- Material storage zones will be established in the compound area and will include material recycling areas and facilities.
- 'Way finding' signage will be provided to route staff/deliveries into the Site and to designated compound/construction areas.

[185] Department of Transport (2019).
[186] Department of Transport (2010).

- Dedicated construction haul routes will be identified and agreed with Dublin City Council prior to commencement of activities on-site.
- On completion of the works, all construction materials, debris, temporary hardstands etc. from the Site compound will be removed off-site and the Site compound area reinstated in full on completion of the works.

17.5.2 Operational Phase

A package of integrated mitigation measures has been identified to off-set the additional local demand that the proposed Project at the Site could potentially generate as a result of the forecast increase in vehicle movements by residents of the scheme. The identified measures and associated timescale for their implementation are summarised as follows:

- Management - A preliminary Mobility Management (MMP) has been compiled (and accompanies this planning application pack) with the aim of guiding the delivery and management of co-ordinated initiatives by the scheme promotor to be implemented upon occupation of the Site. The MMP will ultimately seek to encourage sustainable travel practices for all journeys to and from the proposed Project.
- Car Parking Management Strategy - A management regime will be implemented by the development's management company to control access to the on-site car parking spaces thereby actively managing the availability of on-site car parking for residents and commercial occupants of the proposed Project. This provision equates to a car parking ratio of c. 0.25 car parking spaces per residential unit. The signing of a rental agreement for one of the proposed residential apartments will NOT include access to a designated on-site parking space. All potential residents (prior to signing rental agreement) will be notified that the proposed scheme is a '*low car allocation*' development with no access (or guarantee thereof) to either (i) the limited on-site residents car parking provision or (ii) apply to Dublin City Council for a residents parking permit (to park on-street in one of the neighbouring streets).

  Nevertheless, all residents of the proposed Project will have the opportunity to apply to the on-site management company for a resident's car parking permit (updated weekly, fortnightly, monthly, quarterly or annually) and subsequently access to a dedicated (assigned) on-site basement car parking space. A charge will be applied to obtain a permit with the objective of covering the associated management costs and discouraging long term usage of the car parking space.
- Infrastructure - Infrastructure measures identified to reduce reliance of private vehicles include the provision of ample secure cycle parking on-site and ensuring a design which promotes permeability for pedestrians and cyclists to, through and from the proposed Project. The low level of car parking

provision for the proposed Project will also act as a powerful mobility management measure, ensuring against an overprovision of parking and a resultant over reliance on the private vehicle.

- Infrastructure - Junction enhancements have been identified and proposed at the R101 Sheriff Street Upper/Castleforbes Road junction with the objective of mitigating the additional traffic flows that the proposed Project is predicted to generate.
- Car Sharing - The provision of three dedicated car share (GoCar) spaces in the basement parking facilities for the use of the scheme's residents and staff. The availability of these on-site provide a viable alternative to residents needing to own a private vehicle whilst still having access to a car as and when required.

17.6 Residual Impacts

17.6.1 Construction Phase

Provided the above mitigation measures and management procedures are incorporated during the Construction Phase, the residual impact on the local receiving environment will be *temporary* in nature and *neutral* in terms of quality and effect.

The significance of each of the projected impacts are detailed in Table 17.10 for the following key junctions:

- Junction 1: Signalised Junction - R131 East Wall Road/East Road;
- Junction 2: Signalised Junction - Sheriff Street Upper/Seville Place/Guild Street;
- Junction 3: Signalised Junction - R101 Sheriff Street Upper/East Road/New Wapping Street;
- Junction 4: Priority Control - R101 Sheriff Street Upper/Proposed Western Site Access;
- Junction 5: Priority Control - R101 Sheriff Street Upper/Proposed Eastern Site Access;
- Junction 6: Priority Control - R101 Sheriff Street Upper/Castleforbes Road;
- Junction 7: Signalised Junction - R101 Sheriff Street Upper/R131 East Wall Road;
- Junction 8: Signalised Junction - New Wapping Street/R801 North Wall Quay; and
- Junction 9: Priority Control - Castleforbes Road/R801 North Wall Quay.

The significance of the impacts has been determined in accordance with the classifications stipulated within the *EPA Draft Guidelines*[187].

[187] EPA (2017).

Table 17.10: Impact Significance - Construction Phase

Ref.	Environment Character	Quality/Scale of Impact	Impact Significance	Duration
1	Low Sensitivity	Neutral	Imperceptible	Temporary
2	Low Sensitivity	Negative - Low	Not Significant	Temporary
3	Medium Sensitivity	Negative - Low	Not Significant	Temporary
4	Low Sensitivity	Negative - Low	Not Significant	Temporary
5	Low Sensitivity	Negative - Low	Not Significant	Temporary
6	Low Sensitivity	Negative - Low	Not Significant	Temporary
7	Medium Sensitivity	Negative - Low	Not Significant	Temporary
8	Low Sensitivity	Neutral	Imperceptible	Temporary
9	Low Sensitivity	Neutral	Imperceptible	Temporary

17.6.2 Operational Phase

17.6.2.1 Network Performance

The Operational Phase assessment of the local road network has been undertaken using the Transport Research Laboratory (TRL) computer package PICADY for three priority junctions and TRANSYT for one signal-controlled junction.

When considering signalised junctions, a Degree of Saturation (DoS) of greater than 90% (0.90) would indicate a junction to be approaching capacity, as operation above this DoS value is poor and deteriorates quickly.

For the PICADY analyses a 90-minute AM and PM period has been simulated, from 07:45 to 9:15 and 17:00 to 18:30, respectively. Additionally, for the TRANSYT analysis a one-hour AM and PM period has been simulated, from 08:00 to 09:00 and 17:15 to 18:15 respectively. For the PICADY and TRANSYT analyses traffic flows were entered using an Origin-Destination table for the peak hours.

In order to analyse and assess the impact of the proposed Project on the surrounding road network, a traffic model of the junctions was analysed for the schemes following opening and future design years:

- 2022 - Opening Year;
- 2027 - Interim Design Year (Opening Year + 5 year); and
- 2037 - Future Design Year (Opening Year + 15 years).

The following three key junctions have been analysed:

- **Junction 4** - Priority Control - R101 Sheriff Street Upper/Proposed Western Site Access;

- **Junction 5** - Priority Control - R101 Sheriff Street Upper/Proposed Eastern Site Access; and
- **Junction 6** - Priority Control (Do-Nothing)/Signalised Junction (Do-Something) - R101 Sheriff Street Upper/Castleforbes Road.

The evaluation of the Operational Phase performance of the key off-site junctions following the implementation of the proposed Project is summarised below for the Do-Nothing (DN) and the Do-Something (DS) scenario.

- **Existing** – Do-Nothing (DN): The potential level of traffic generated by committed developments and the existing baseline flows travelling across the network.
- **Proposed** – Do-Something (DS): The original development traffic in addition to the Base scenario (Existing – Do-Nothing).

The evaluation of the operational performance of the key junctions across the local road network both prior to and following the implementation of the proposed Project are summarised in Table 17.11 based upon the findings of the PICADY and TRANSYT based junction assessments.

Table 17.11: Junction Operational Performance Evaluation (RFC/DoS values)

Scenario		Junction 4			Junction 5			Junction 6		
		2022	2027	2037	2022	2027	2037	2022	2027	2037
Do Nothing	AM	-	-	-	-	-	-	32%	34%	35%
	PM	-	-	-	-	-	-	32%	33%	34%
Do Something	AM	10%	10%	10%	9%	10%	10%	44%	46%	49%
	PM	7%	7%	7%	7%	7%	7%	56%	57%	59%

For **Junction 4**, the western Site access, the results of the PICADY assessment indicate that the priority-controlled junction will operate within capacity for all "Do-Something" scenarios, with a maximum RFC value of 10% for the 2022, 2027 and 2037 Do-Something AM peak hours.

For **Junction 5**, the eastern site access, the results of the PICADY assessment indicate that the priority-controlled junction will operate within capacity for all "Do-Something" scenarios, with a maximum RFC value of 10% for the 2027 and 2037 Do-Something AM peak hours.

For **Junction 6**, the R101 Sheriff Street Upper/Castleforbes Road junction, the results of the PICADY assessment indicate that the priority-controlled junction will operate within capacity for all "Do-Nothing" scenarios, with a maximum RFC value of 35% for the 2037 Do Nothing AM peak hour.

TRANSYT assessment of Junction 6 indicates that the R101 Sheriff Street Upper/Castleforbes Road junction does operate within capacity for all "Do-Something" scenarios, with a maximum DoS of 59% for the 2037 Do-Something PM peak hour being recorded.

17.6.2.2 Impact Significance

The implementation of the mitigation measures outlined above, including the MMP, will ensure that the residual effect on the local receiving environment is both managed and minimised. In reference to Table 17.12, the analysis predicts the scale of residual impact, during both the 2022 and 2037 design years, as being below 5% on the surrounding links, with the exception of following links as shown in Table 17.12.

Table 17.12: Links with Impact >5%

Link		Peak Hour	2022 Do Something	2037 Do Something
3	R101 Sheriff Street Upper/East Road/New Wapping Street	PM	5.09%	-
4	R101 Sheriff Street Upper/Proposed Western Site Access	AM	13.74%	12.16%
		PM	17.18%	15.17%
5	R101 Sheriff Street Upper/Proposed Eastern Site Access	AM	13.70%	12.12%
		PM	16.00%	14.10%
6	R101 Sheriff Street Upper/Castleforbes Road	PM	6.14%	5.53%

With regards to the TII thresholds, the 2037 analysis for the two Site access junctions demonstrates that the proposed Project will generate an impact greater than 10% or 5% on normal or congested networks respectively. As a result, the junctions have been subject to detailed analysis as discussed above in the previous paragraphs.

The significance of each of the projected impacts at each of the key nodes following the introduction of the identified mitigation works is detailed within the following tables for the adopted worst case (e.g. peak hours) 2037 Future Year scenarios.

Table 17.13: Impact Significance - 2037 Design Year (AM)

Ref	Environment Character	Quality/Scale of Impact	Impact Significance	Duration
4	Low Sensitivity	Negative - Low	Slight	Long-Term
5	Low Sensitivity	Negative - Low	Slight	Long-Term

Table 17.14: Impact Significance - 2037 Design Year (PM)

Ref	Environment Character	Quality/Scale of Impact	Impact Significance	Duration
4	Low Sensitivity	Negative - Low	Slight	Long-Term
5	Low Sensitivity	Negative - Low	Slight	Long-Term
6	Low Sensitivity	Negative - Low	Slight	Long-Term

17.7 Monitoring

17.7.1 Construction Phase

During the Construction Phase, the following monitoring exercises are proposed:

- Compliance with construction vehicle routing practices;
- Compliance with construction vehicle parking practices;
- Internal and external road conditions; and
- Timing of construction activities.

17.7.2 Operational Phase

As part of the MMP process, bi-annual post occupancy surveys are to be carried out in order to determine the success of the measures and initiatives as set out in the proposed MMP document. The information obtained from the monitoring surveys will be used to identify ways in which the MMP measures and initiatives should be taken forward in order to maintain and further encourage sustainable travel characteristics.

17.8 Reinstatement

17.8.1 Construction Phase

The Construction Phase works areas will be reinstated following completion of the proposed Project with landscaped areas provided where proposed. The works will be restricted to the footprint of the Site for the proposed Project. Excavated topsoil and subsoil will be reused in reinstatement and landscaping where appropriate or dealt with in the appropriate manner *i.e.* sent for soil recovery as appropriate.

17.8.2 Operational Phase

No reinstatement requirements have been identified in relation to the Operational Phase of the proposed Project.

17.9 Interactions

The volume of surplus soils generated by the scheme will influence Construction Phase traffic generation. Measures to optimise design and minimise material generation (**waste**) are detailed in Chapter 18 (Material Assets - Waste) whilst measures to mitigate against Construction Phase traffic impacts have been identified in Section 17.5.1.

Potential impact from traffic related emissions on **air quality** (Chapter 11). To confirm if the proposed Project satisfies the assessment criteria and what (if any) impact on air quality in *short/long-term*.

17.10 Cumulative Impacts

The analysis detailed above represents an appraisal in terms of potential cumulative impacts for a typical weekday as it is focused upon the key two busiest periods of the day (e.g. AM and PM peak hours). During the other 22 hours of the day, traffic flows are predicted to be significantly lower resulting in the network operating with additional reserve capacity to that forecast for the peak hour periods.

Furthermore, if any of the adjacent zoned lands in the area were to be developed, aside from those included as committed developments, this would have an effect on the local road network. However, the scale of any potential impact would be fully assessed during the planning procedures for any of these individual third-party developments (which currently do not benefit from planning permission). Nevertheless, the utilisation of TII's growth rates does take some account of the potential additional traffic that such third party site could generate.

Nevertheless, in reference to the findings of the network simulation and associated junction modelling analysis undertaken and detailed in the previous section, the proposed priority-controlled site access junctions and the new signalised layout for R101 Sheriff Street Upper/Castleforbes Road junction will have sufficient reserve capacity to accommodate the associated future increases in additional traffic movements.

17.11 'Do-Nothing' Impact

In the absence of the proposed Project, the overall operational performance of the existing junctions on the surrounding road network will be affected by the impact caused by the forecast background network traffic growth (should that growth arise) and the following committed developments:

- Spencer Place Residential Block 2 (Ref: DSDZ 4111/19).
- Spencer Place Commercial Development (Ref: DSDZ 4184/18).
- City Block 9 Developments (Refs: DSDZ 3779/17, DSDZ 3780/17).
- City Block 3 Residential Development (Ref: DSDZ 4112/19).
- City Block 3 Commercial Development (Ref: DSDZ 4087/19).
- City Block 8, Project Wave Development (Refs: DSDZ 4558/18, DSDZ 3452/19, DSDZ 4157/17, DSDZ 2489/18).
- The EXO Building Commercial Development (Ref: DSDZ 3754/18).
- East Road Development (Ref: ABP-304710-19).
- Student Accommodation Development (Ref: DSDZ 4332/18).
- Castleforbes Office & Hotel Commercial Development (Ref: 3433/19).
- Castleforbes Hotel Development (Ref: 2143/20).

17.12 Difficulties Encountered in Compiling the Chapter

There were no material difficulties encountered in compiling and assessing the data for this EIAR sufficient to prevent modelling of the likely transport effects of the proposed Project. The analysis reported within this Chapter is based upon the traffic survey data specifically commissioned for this appraisal and undertaken in 2019.

18 Material Assets - Waste

18.1 Introduction

This Chapter of the EIAR was prepared by AWN Consulting Ltd. and comprises an assessment of the likely impact of the proposed Strategic Housing Development (SHD) (referred to as "*the proposed Project*"), on the waste generated from the proposed Project as well as identifying proposed mitigation measures to minimise any impacts. The proposed Project is located at Sheriff Street Upper and East Road, Dublin 1.

A site-specific Construction and Demolition Waste Management Plan (C&D WMP) has been prepared by AWN Consulting to deal with waste generation during the Construction and Demolition Phases of the proposed Project and has been included as Appendix A18.1. The C&D WMP was prepared in accordance with the '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects*' document produced by the National Construction and Demolition Waste Council (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government[188].

A separate Operational Waste Management Plan (OWMP) has also been prepared for the Operational Phase of the proposed Project and is included as Appendix A18.2.

These documents will ensure the sustainable management of wastes arising at the proposed Project in accordance with legislative requirements and best practice standards.

The proposed Project will consist of the demolition of all structures on the Site and the construction of a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a standalone three storey childcare facility and residential tenant amenity. The proposed Project will also accommodate car parking spaces, bicycle parking, storage, services and plant areas. More details on the background and Site history is provided in Chapter 5 (Description of the Proposed Project).

18.2 Methodology

The assessment of the impacts of the proposed Project 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. A summary of the documents reviewed,

[188] Department of Environment, Heritage and Local Government (2006).

and the relevant legislation is provided in the C&D WMP and in the OWMP provided in Appendix A18.1 and A18.2.

This Chapter is based on the proposed Project, as described in Chapter 5 (Description of the Proposed Project) and considers the following aspects:

- Legislative context;
- Construction Phase (including Site preparation 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 Project have been calculated. 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, the two operating phases of this development, 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 Project 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 18.6.

A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 9 (Land, Soils, Geology and Hydrogeology). Chapter 9 of the EIAR also discusses the environmental quality of any soils which will have to be excavated to facilitate construction of the proposed Project.

18.2.1 Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation 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 Act 1996 (as amended).

In addition, the Irish government issues policy documents which outline measures aimed 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 *A Resource Opportunity – Waste Management Policy in Ireland*[189] and stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention.

The strategy for the management of waste from the construction phase is in line with the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* published in 2006. The guidance document *Construction and Demolition Waste Management*: *A handbook for Contractors and Site Managers*[190] was also consulted in the preparation of this assessment.

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 EMR Waste Management Plan 2015-2021, BS 5906:2005 Waste Management in Buildings – Code of Practice, 5. The Dublin City Council (DCC) *Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws 2018*, the EPA National Waste Database Reports 1998- 2012 and the EPA National Waste Statistics Web Resource.

18.3 Baseline Environment

In terms of waste management, the receiving environment is largely defined by Dublin City Council (DCC) 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 *Eastern-Midlands Region (EMR) Waste Management Plan 2015-2021.*

The waste management plan sets out the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; 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 Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of "*70% preparing for reuse, recycling and other recovery of construction and demolition waste*" (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

[189] DECLG (2012).
[190] FÁS and the Construction Industry Federation (CIF) (2002).

The National Waste Statistics update published by the EPA in December 2019 identifies that Ireland's current progress against this C&D waste target is at 71% and our progress against '*Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)*' is at 45%. Both of these targets are required to be met by 12 December 2020 in accordance with the requirements of the Waste Framework Directive.

The Dublin City Council Development Plan 2016-2022 also sets policies and objectives for the DCC area which reflect those set 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 Eastern-Midlands 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, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and two waste-to-energy facilities

18.4 Characteristics of the Proposed Project

A full description of the proposed Project can be found in Chapter 5 (Description of the Proposed Project). The characteristics of the proposed Project that are relevant in terms of waste management are summarised below.

18.4.1 Demolition Phase

There will be a quantity of waste materials generated from the demolition of the existing buildings and hardstanding areas on-site, as well as from the excavation of the building foundations.

Further detail on the waste materials likely to be generated during the Demolition Phase are presented in the project-specific C&D WMP in Appendix A18.1. The C&D WMP provides an estimate of the main waste types likely to be generated during the C&D Phase of the proposed Project. The reuse, recycling/recovery and disposal rates have been estimated using the *EPA National Waste Reports* and these are summarised in Table 18.1.

Table 18.1: Estimated off-site Reuse, Recycle and Disposal Rates for Demolition Waste

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	7.6	0	0.0	85	6.4	15	1.1
Concrete, Bricks, Tiles, Ceramics	477.2	85	405.6	5	23.9	10	47.7
Plasterboard	30.3	30	9.1	60	18.2	10	3.0
Asphalts	7.6	0	0.0	25	1.9	75	5.7
Metal	143.9	5	7.2	80	115.1	15	21.6
Timber	90.9	10	9.1	60	54.5	30	27.3
Total	**757.5**		**431.0**		**220.1**		**106.4**

18.4.2 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 required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

In addition gravel, clay and made ground will require excavation to facilitate basement completion and construction of foundations, along with the installation of underground services. As per Table 18.1, the Project Engineers[191] have estimated that c. 13,100m^3 of material will require excavation. It is envisaged that the majority of this material will be removed off-site in with only c. 2,000m^3 of material expected to be kept for on-site reuse. These estimates will be refined prior to commencement of construction. If the material that requires removal from 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 Article 27 classification (European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011).

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*[192]. Environmental soil analysis will be carried out prior to removal of

[191] DBFL Consulting Engineers.
[192] EPA (2015).

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 (waste paper, 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 infrequently 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 C&D WMP. The C&D WMP provides an estimate of the main waste types likely to be generated during the Construction Phase of the proposed Project and these are summarised in Table 18.2.

Table 18.2: Estimated off-site Reuse, Recycle and Disposal Rates for Construction Waste

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	1234.4	10	123.4	80	987.5	10	123.4
Timber	1047.4	40	419.0	55	576.1	5	52.4
Plasterboard	374.1	30	112.2	60	224.4	10	37.4
Metals	299.3	5	15.0	90	269.3	5	15.0
Concrete	224.4	30	67.3	65	145.9	5	11.2
Other	561.1	20	112.2	60	336.7	20	112.2
Total	**3740.6**		**849.1**		**2539.9**		**351.6**

18.4.3 Operational Phase

As noted in Section 18.1, an OWMP has been prepared for the proposed Project and is included as Appendix A18.2. The OWMP provides a strategy for segregation (at source), storage and collection of all wastes generated within the building during the Operational Phase including dry mixed recyclables, organic waste and mixed non-recyclable waste as well as providing a strategy for management of waste glass, batteries, WEEE, printer/toner cartridges, chemicals, textiles, waste cooking oil and furniture.

The total estimated waste generation for the proposed Project for the main waste types based on the AWN WGM is presented in Tables 18.3, and is based on the uses and areas as advised by the Project Architects[193].

Table 18.3: Estimated off-site Reuse, Recycle and Disposal Rates for Operational Waste

Waste type	Waste Volume (m^3/week)	
	Residential Units (Combined)	Commercial Units (Combined)
Organic Waste	9.74	1.42
DMR	66.63	4.99
Glass	1.89	0.19
MNR	38.73	4.96
Total	**116.99**	**11.56**

The residents and tenants will be required to provide and maintain appropriate waste receptacles within their units to facilitate segregation at source of these waste types. The location of the bins within the units will be at the discretion of the residents. As required, the residents and tenants will need to bring these segregated wastes from their units to their allocated Waste Storage Areas (WSAs). All WSA's can be viewed on the plans submitted with the application.

The OWMP seeks to ensure the proposed Project contributes to the targets outlined in the *EMR Waste Management Plan 2015-2021* and the DCC waste Bye-laws.

Mitigation measures proposed to manage impacts arising from wastes generated during the Operational Phase of the proposed Project are summarised below.

18.5 Potential Impact of the Proposed Project

This section details the potential waste effects associated with the proposed Project.

18.5.1 Construction Phase

The proposed Project will generate a range of non-hazardous and hazardous waste materials during site excavation, demolition and construction. General housekeeping and packaging will also generate waste materials as well as typical municipal wastes generated by construction employees including food waste. Waste materials will be required to be temporarily stored 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 proposed Project and on adjacent developments. The indirect effect of litter issues is the presence of vermin

[193] O'Mahony Pike (2020).

within the proposed Project and the surrounding areas. The effect on the local environment is likely to be *short-term, significant* and *negative.*

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste and result in indirect negative environmental impacts or 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. However, in the absence of mitigation, the effect on the local and regional environment is likely to be *short-term, significant* and *negative.*

Wastes arising will need to be taken to suitably registered/permitted/licenced waste facilities for processing and segregation, reuse, recycling, recovery, and/or disposal as appropriate. There are numerous licensed waste facilities in the Eastern Midlands region which can accept hazardous and non-hazardous waste materials and acceptance of waste from the proposed Project 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 demolition and construction materials are either recyclable or recoverable. When this is not undertaken the effect on the local and regional environment is likely to be *short-term, significant* and *negative.*

There is a quantity of excavated material which will need to be excavated to facilitate the proposed Project. A detailed review of the existing ground conditions on a regional, local site-specific scale are presented in Chapter 9 (Land, Soils Geology and Hydrogeology). It is anticipated that c. 11,100m^3 of excavated material will need to be removed off-site, however it is envisaged that c. 2,000m^3 tonnes of excavated material will be reused on-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 *short-term, significant* and *negative.*

18.5.2 Operational Phase

The potential impacts on the environment of improper, or a lack of, waste management during the Operational Phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill.

The nature of the proposed Project means the generation of waste materials during the Operational Phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable 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 is likely to lead to litter or pollution issues at the Site of the proposed Project and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the Site and the surrounding areas.

Waste contractors will be required to service the development on a regular basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or 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.

The potential impact of Operational Phase waste generation from the proposed Project is considered to be *long-term*, *not significant* and *negative.*

18.6 Mitigation Measures

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

18.6.1 Construction Phase

As previously stated, a project specific C&D WMP has been prepared in line with the requirements of the requirements of the guidance document issued by the DEHLG[194] and is included as Appendix A18.1. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the Demolition, Excavation and Construction Phases of the proposed Project. Prior to commencement, the appointed Contractor(s) will be required to refine/update the C&D WMP or submit an addendum to C&D WMP to DCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

A quantity of soil, stone and made ground which will need to be excavated to facilitate the proposed Project. Project Engineers[195] have estimated that c. 11,100m^3 of excavated material will need to be removed off-site, however it is envisaged that c. 2,000m^3 excavated material will be reused on-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.

[194] Department of Environment, Heritage and Local Government.
[195] DBFL Consulting Engineers.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to 'design out waste';
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated:
    - Concrete rubble (including ceramics, tiles and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and
    - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- 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);
- A waste manager will be appointed by the main Contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

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 Article 27 of the EC (Waste Directive) Regulations (2011). EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that Article 27 will be used.

These mitigation measures will ensure that the waste arising from the Construction Phase of the proposed Project is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, the EMR Waste Management Plan (2015-2021). It

will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

18.6.2 Operational Phase

As previously stated, a project specific OWMP has been prepared and is included as Appendix A18.2. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the Site of the proposed Project. 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 EMR Waste Management Plan 2015-2021 and abiding by the DCC waste bye-laws.

In addition, the following mitigation measures will be implemented:

- 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;
  - 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.
- 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;
- All waste collected from the Site of the proposed Project will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available; and
- 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 proposed Project is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997*, the *EMR Waste Management Plan (2015 - 2021)* and the DCC waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved

18.7 Residual Impacts

The implementation of the mitigation measures outlined in Section 18.6 will ensure that the high rate of reuse, recovery and recycling is achieved at the Site of the proposed Project during the Demolition, Excavation and Construction Phases as well as during the Operational Phase. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

18.7.1 Construction Phase

A carefully planned approach to waste management as set out in Section 18.6 and adherence to the C&D WMP during the Construction and Demolition Phases will ensure that the effect on the environment will be *short-term*, *imperceptible* and *neutral*.

18.7.2 Operational Phase

During the Operational Phase, a structured approach to waste management as set out in Section 18.6 will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the Operational Phase on the environment will be *long-term, imperceptible* and *neutral*.

18.8 Monitoring

The management of waste during the Construction Phase should be monitored to ensure compliance with relevant local authority requirements, and effective implementation of the C&D WMP including maintenance of waste documentation.

The management of waste during the Operational Phase should be monitored to ensure effective implementation of the OWMP by the building management company and the nominated waste contractor(s).

18.8.1 Construction Phase

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the Demolition, Excavation and Construction Phases where there is a potential for waste management to become secondary to progress and meeting construction schedule targets. The C&D WMP specifies the need for a waste manager to appoint who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the Construction and Demolition Phases of the proposed Project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

18.8.2 Operational Phase

During the Operational Phase, waste generation volumes should be monitored against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the WSAs where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contactor costs.

18.9 Reinstatement

In the event that the proposed Project is discontinued, there is not likely to be any significant impacts on waste management at the Site.

18.10 Interactions

Adherence to the mitigation measures outlined in Section 18.6 will ensure that there are no significant impacts on resource or waste management from the proposed Project. The management of waste during the Construction Phase in accordance with the C&D WMP and during the Operational Phase in accordance with the OWMP will meet the requirements of regional and national waste legislation and promote the management of waste in line with the priorities of the waste hierarchy.

18.10.1 Population and Human Health

The potential impacts on human beings in relation to the generation of waste during the Demolition, Construction and Operational Phases are that incorrect management of waste could result in littering which could cause a nuisance to the public and attract vermin. A carefully planned approach to waste management and adherence to the project specific C&D WMP and OWMP, will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects should be *long-term*, *imperceptible* and *neutral.*

18.10.2 Land and Soils

During the Construction Phase excavated soil, stone and made ground (c. 13,100m^3) will be generated from the excavations required to facilitate site levelling, construction of the basement and construction of new foundations. It is estimated that c. 11,100m^3 of excavated material will need to be removed off-site, however it is envisaged that c. 2,000m^3 material will be reused on-site. Where material has to be taken off-site it will be taken for reuse or recovery, where practical, with disposal as last resort. Adherence to the mitigation measures in Chapter 18 and the requirements of the C&D WMP, will ensure the effect is *long-term*, *imperceptible* and *neutral.*

18.10.3 Traffic

Local traffic and transportation 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 Project. 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 movement will be imperceptible in the context of the overall traffic and transportation increase and has been addressed in Chapter 17 (Traffic and Transportation). Provided the mitigation measures detailed in Chapter 17 and the requirements of the OWMP (included as Appendix A18.2) are adhered to, the effects should be *short to long-term, imperceptible* and *neutral*.

18.11 Cumulative Impacts

18.11.1 Construction Phase

If multiple permissions remain in place for both residential and commercial developments within the vicinity of the proposed Project. In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the Construction Phase. Due to the high number of waste contractors in the Dublin region there would be sufficient contractors available to handle waste generated from a large number of these sites simultaneously, if required. Similar waste materials would be generated by all the developments.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative effects associated with waste generation and waste management. As such the effect will be *short-term, not significant* and *negative*.

18.11.2 Operational Phase

If improper, or a lack of, waste management, was to occur during the Operational Phase of the proposed Project this would cause a diversion from the priorities of the waste hierarchy. This would lead to small volumes of waste being sent unnecessarily to landfill.

The nature of the development means the generation of waste materials during the Operational Phase is unavoidable. Waste estimations for the Operational Phase of the proposed Project are provided in Table 18.3. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. At present, there is sufficient capacity for the acceptance of the likely operational waste arisings at facilities in the region. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which are typically exported for conversion in recycled products (*e.g.* paper mills and glass recycling). At present, there is sufficient capacity for the acceptance of the likely operational waste arisings at facilities in Europe.

Waste contractors will be required to service the proposed Project on a regular basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or 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. The potential impact of operational waste generation from the proposed Project is considered to be *long-term*, *not significant* and *negative.*

18.12 'Do-Nothing' Impact

If the proposed Project was not to go ahead there would be no demolition, excavation or construction or operational waste generated at this Site. There will be a *neutral* effect on the environment.

18.13 Difficulties Encountered in Compiling the Chapter

No difficulties were encountered in compiling this Chapter of the EIAR.

19 Material Assets - Services

19.1 Introduction

This Chapter of the EIAR was prepared by Brady Shipman Martin and describes material assets that are potentially impacted with the proposed Strategic Housing Development (SHD) (referred to as "*the proposed Project*"), located at Sheriff Street Upper and East Road, Dublin 1.

Material assets are resources that are valued and intrinsic to the Site of the proposed Project and the surrounding area. Material assets may be of either natural or human origin and the value may arise for economic or cultural reasons.

This Chapter considers and assesses the effects of the proposed Project on the material assets, including the existing major utilities within and around the Site during the Construction and Operational Phases.

The proposed Project will consist of the demolition of all structures on the Site and the construction of a mixed-use residential development set out in 9 no. blocks, ranging in height from 1 to 18 storeys, above part basement/upper ground level, to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural/community building, a standalone three storey childcare facility and residential tenant amenity. The proposed Project will also accommodate car parking spaces, bicycle parking, storage, services and plant areas. More details on the background and Site history is provided in Chapter 5 (Description of the Proposed Project).

The EPA Draft Guidelines[196] state that:

> *'The meaning of this factor is less clear than others. In Directive 2011/92/EU it 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 roads infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils*.'

As such, the EIA Directive requires that Architectural and Archaeological Heritage (Cultural Heritage) is assessed as part of Material Assets. However, as this is an important element in Ireland, EIA best practice has established that it is important to address this issue separately and not part of the Material Assets section in the EIAR, see Chapter 14 (Cultural Heritage, Archaeology & Architectural) for more information.

The potential impacts associated with the proposed Project, if any, are assessed with regards to the following proposed built services:

- wastewater services;

[196] EPA (2017).

- water supply;
- gas and electricity supply; and
- telecommunications.

Furthermore, the impact on the surface water infrastructure and the road infrastructure are discussed in Chapter 10 (Hydrology) and Chapter 17 (Traffic and Transportation) respectively.

19.2 Methodology

The potential impacts to material assets as a result of the proposed Project were assessed through a desktop study of available information. The methodology is consistent with the following relevant guidance:

- EPA (2017). *Draft Guidelines on the Information to be Contained in EIARs*;
- EPA (2015). *Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* (2015); and
- National Roads Authority (NRA) (2008). *Environmental Impact Assessment of National Road Schemes - A Practical Guide*.

Receptors were assessed for sensitivity, magnitude and significance to provide an appropriate and adequate assessment of how they could be impacted by the Construction and Operational Phases of the proposed Project. The characteristic of an impact relates to the quality, significance and duration of the impact and are defined in Table 19.1 to Table 19.3, as per the EPA Draft Guidelines[197].

Table 19.1 defines *the* quality of effects from *positive* to *negative* on the environment.

Table 19.1: Quality of Effects

Quality of Effect	Description of Effect
Positive Effects	A change which improves the quality of the environment (for example, by increasing species diversity or improving the reproductive capacity of an ecosystem; or removing nuisances; or improving amenities).
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing a nuisance.

[197] EPA (2017).

Table 19.2 outlines the definitions of *significance of effects* which range from *imperceptible* to *profound* effects.

Table 19.2: Definitions of Significance of Effect

Significance of Effects	Description of Significance of Effects
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without noticeable consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.

Table 19.3 describes the *duration of effects*. Momentary effects lasting from *seconds* to *minutes* will often be less concerning than long term and permanent effects, depending on their severity.

Table 19.3: Describing Duration of Effects

Duration of Effects	Description of Duration of Effects
Momentary Effects	Effects lasting from seconds to minutes.
Brief Effects	Effects lasting less than a day.
Temporary Effects	Effects lasting less than a year.
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years.
Permanent Effects	Effects lasting over sixty years.

19.3 Baseline Environment

This Section provides a description of the relevant aspects of the baseline environment in relation to Material Assets, under the built services listed in Section 19.1.

19.3.1 Study Area

The Site is located within the administrative jurisdiction of Dublin City Council, in Dublin 1, in the North Dock area of Dublin City, c. 1.4km northeast of the City centre. The Site of the proposed Project is located on Sheriff Street Upper and East Road, Dublin 1. The application Site boundary has an area of 2.44 hectares (ha) and the proposed Project development area is 2.02ha.

The Site is a brownfield site that is occupied by Castleforbes Business Park, which includes several warehouses and associated yards. The land uses surrounding the Site of the proposed Project are a mix of office, hotel and residential blocks.

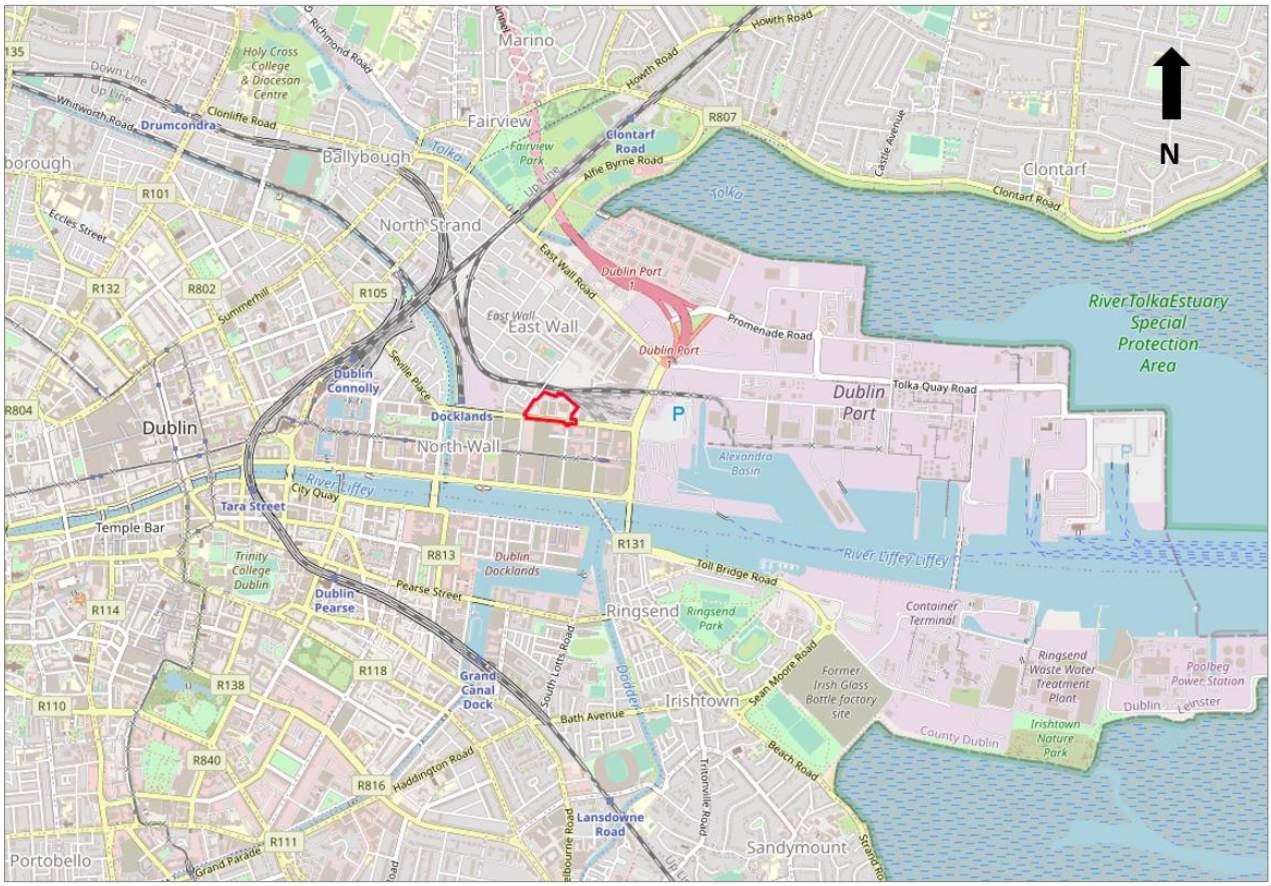
The Site of the proposed Project is located immediately to the north of the Docklands Strategic Development Zone (SDZ), with numerous developments completed, permitted and others in progress nearby.

As per the Dublin City Council Development Plan, the Site has been zoned Z14, to seek the social, economic and physical development and/or rejuvenation of an area with *mixed use, of which residential and "Z6" would be the predominant uses.*

The Site is bound by East Road to the west, an Irish Water pump station to the north, CIE[198] lands to the north and east, and Sheriff Street Upper to the south, see Figure 19.1. The Site of the proposed Project is highly accessible and benefits from a range of transport connections.

[198] Córas Iompair Éireann

Figure 19.1: Location of the Site for the Proposed Project[199] (Site location in red)



19.3.2 Ownership & Access

The Site of the proposed Project has two vehicular entry points on Sheriff Street Upper; one opposite the existing Sheriff Street Upper/Castleforbes Road, at the southeast corner of the Site and the other at the southwest corner via a gated entrance, see Figure 19.2 below.

A Traffic and Transport Assessment (TTA)[200] which is submitted with this planning application to address potential concerns that An Bord Pleanála may have pertaining to the level of influence of the proposed Project (Operational Phase) upon the local transportation system.

[199] EPA Maps (2020). Source: *OpenStreet Maps.*
[200] DBFL Consulting Engineers (2020d).

Figure 19.2: Existing access into the Site[201]

19.3.3 Wastewater Services

The Ringsend Wastewater Treatment Plant (WwTP) which serves Dublin City, parts of Fingal County Council, South Dublin County Council, Dun Laoghaire-Rathdown County Council and Meath County Council agglomeration (D0034) lies within 3km of the proposed Project. The Ringsend WWTP operates under licence from the EPA (Licence No. D0034-01) and received planning permission (ABP Reg. Ref.: 301798) in 2019 for upgrade works, which are expected to be completed within five years. This will increase the plant capacity from 1.65 million (m) population equivalent (PE) to 2.4m PE.

A comprehensive topographical survey was carried out for the Site by the Project Engineers and existing drainage and utility records in the vicinity of the Site obtained and surveyed in detail.

Irish water records show that there is a 990mm combined brick sewer, to the south of the Site of the proposed Project, that drains from east to west along Sheriff Street Upper before turning north onto East Road and eventually discharges into the Irish Water pump station at the north western corner of the Site. The Irish Water pump station discharges into a surface water gravity main, via a syphon overflow, that then drains south down Castleforbes Road.

The original rising main from the East Road Pumping Station, which is now disused, cuts through the north eastern part of the Site before turning south turning eastwards onto Sheriff Street Upper.

[201] DBFL Consulting Engineers (2020c).

Irish Water records also show a 1000mm combined brick sewer at the south eastern corner of the Site of the proposed Project that drains south down Castleforbes Road[202].

19.3.4 Water Supply

The Site of the proposed Project is well served by water mains on Sheriff Street Upper. There are two connections to the existing building off this water main to the south of the Site.

Fire hydrants are present at the south eastern and south western corners of the Site.

19.3.5 Gas & Electricity Supply

Currently, gas is fed to the Site of the proposed Project from a gas main running onto the Site from Sheriff Street Upper, from the south. The gas main comes into the Site and runs to a gas meter. The existing gas meter and incoming pipe size is insufficient for the proposed Project, so it will be removed, upgraded, and relocated to an appropriate location on the Site, see Figure 19.3.

Based on information received from ESB Networks (ESBN), there are underground cables (10kV/20kV/400kV/230kV) traversing the western part of the Site. These cables will be rerouted as part of the enabling works for the proposed Project, see Figure 19.4 below.

19.3.6 Telecommunication

There are no existing electrical IT services on-site that require diversionary works. Based on the information received from telecommunication providers, the area appears to be will serviced and there will be no supply issues going forward.

[202] DBFL Consulting Engineers (2020c).

Figure 19.3: Gas Network Information[203]

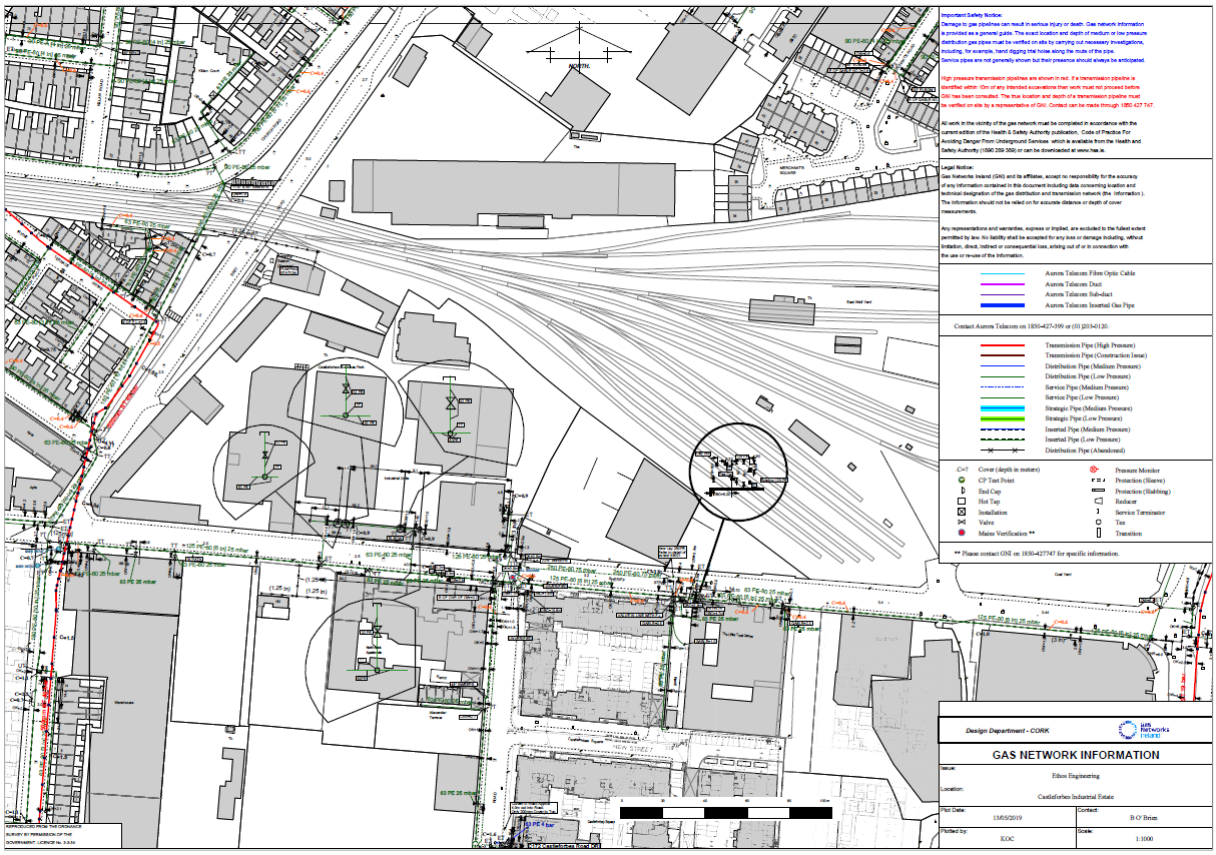
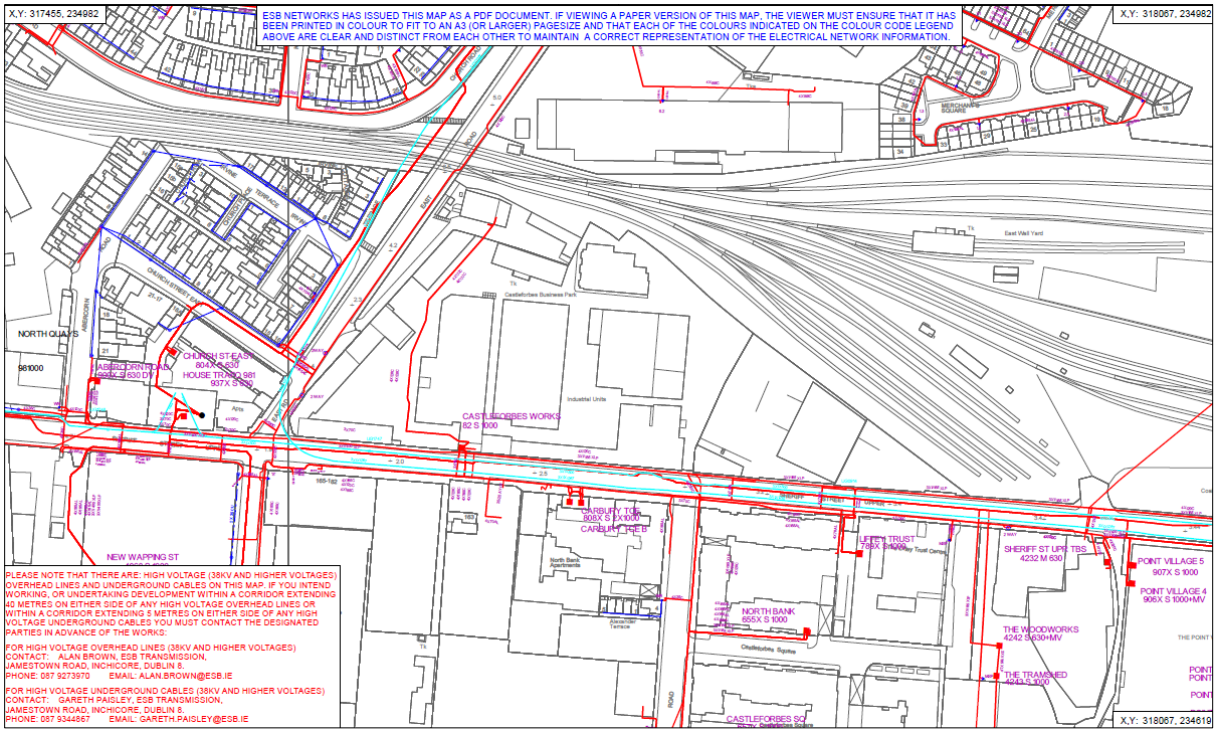


Figure 19.4: ESB Networks Information[204]



[203] Ethos Engineering (2020). *Mechanical & Electrical Services Basis of Design.*
[204] Extract from ESB Networks (2018). *Title: 20180911-006_A3.*

19.4 Potential Impact of the Proposed Project

This section provides a description of the potential impacts that the proposed Project may have during the Construction and Operational Phases. The impact assessment addresses the *direct, indirect*, *cumulative, short*, *medium* and *long-term*, *permanent, temporary, positive* and *negative* effects.

19.4.1 Construction Phase

19.4.1.1 Study Area

The Construction Phase of the proposed Project will consist of site clearance, demolition, excavation and construction works. The Construction Phase activities will cause local disturbance to the existing area/urban settlement in the vicinity of the Site.

Construction works are likely to take place over a c. 48 month period (four years). During this time, there will be no severance of land, loss of rights of way or amenities as a result of the proposed Project.

This will likely have a *temporary* impact on the existing area/urban settlement. There may also be some additional *slight* and *temporary* impacts to the local population which may arise during the Construction Phase, see Chapter 7 (Population and Human Health), Chapter 11 (Air Quality and Climate) and Chapter 12 (Noise and Vibration) for more information. However, the potential effect overall is considered to be *not significant*.

19.4.1.2 Ownership & Access

During the Construction Phase access to the Site will be via Sheriff Street Upper, where the existing entrances area currently located. The appointed Contractor shall provide arrangements to provide for vehicular traffic to the Site with control measures where crossing the public footpath.

The proposed Project includes the upgrade of the junction of Sheriff Street Upper/Castleforbes Road to a signalised junction in line with the *Design Manual for Road and Urban Streets* (DMURS). As part of the junction pedestrian crossings will be included signalised pedestrian crossing is proposed on Sheriff Street Upper at the proposed south eastern pedestrian entrance[205].

As a result, there will be a *temporary* disturbance to traffic in the surrounding area, however, traffic volumes are not anticipated to be significant during construction. Appropriate warning signage will be provided for pedestrians and road users on all approaches in accordance with the *Traffic Signs Manual*[206] and the Contractor's *Traffic Management Plan*[207].

[205] DBFL Consulting Engineers (2020c).
[206] Department of Transport, Tourism & Sport (Updated 2019).
[207] DBFL Consulting Engineers (2020).

The details surround deliveries and access to the Site, during construction, will be decided on prior to construction commencing and will be subject to agreement with the Planning Authority as part of the final CMP. Access and alterations to the local road network are likely to have *a negative, short-term* impact on road users.

19.4.1.3 Wastewater Services

Irish Water's East Road Pumping Station is currently located to the north of the Site which is accessed via East Road. From this pumping station an existing 450mm diameter rising main currently runs from west to east through the north eastern part of the Site, turning south towards Sheriff Street upper where the rising main then turns eastwards and runs in the footpath of Sheriff Street Upper.

Due to the layout of the blocks and basement location, it is proposed to divert the rising main through the Site which will allow 5m either side of the centreline of the sewer. The proposed diversion will then run-down Sheriff Street Upper and connect into the existing rising main to complete the diversion.

The proposals have been submitted to Irish Water's Diversion team to progress the diversion and contact has also been sent to DCC Wastewater Services for their comments. However, DCC do not use the rising main and this has been recommended to Irish Water for decommission. If this recommendation is accepted, there will be no need for the diversion and the rising main will be removed as part of the development works, during the Construction Phase. As a results of these works, there will be no impact to the local network.

During the Construction Phase there will be no discharge of wastewater at the Site, as the provision of welfare facilities on-site will be portable units, with wastewater removed off-site for disposal by an authorised contractor. See Chapter 10 (Hydrology) for more information.

19.4.1.4 Water Supply

Currently the mains water is supplied into the Site from the Local Authority. The Site is served by a water mains on Sheriff Street Upper.

As a result of such works there is potential for *temporary* impacts to the local water supply network, by way of disruption in water supply to the local area. However it is likely that this potential impact will have a *neutral* effect.

19.4.1.5 Gas & Electricity Supply

The existing **gas** meter and incoming pipe is insufficient for the proposed Project, so it will be removed, upgraded, and relocated to an appropriate location on the Site. The supply of gas to the Site will not be

operational during the Construction Phase. There is potential for *temporary* impacts to the local gas supply network, by way of disruption in gas supply to the local area.

Electricity: Once the Site is secure, the Site compound will be established and the existing Site services will be isolated including the decommissioning of existing substations. In conjunction with the ESB, the provision of a temporary builder's power supply will be provided.

The proposed Project will be provided with a medium voltage (MV) power supply from ESBN. The underground cables traversing the western part of the Site and will be rerouted as part of the enabling works for the proposed Project.

The Construction Phase work impact on the local gas supply network and local electrical supply is likely to be *neutral, slight* and *temporary.*

19.4.1.6 Telecommunication

Telecommunications will not be operational during the Construction Phase. However, there is a potential that existing fixed telecom lines may need to be diverted, which has the potential to impact on local telecoms connectivity.

The Construction Phase impact on local telecoms is likely to be *neutral, slight* and *temporary.*

19.4.2 Operational Phase

19.4.2.1 Study Area

The proposed Project is the construction of a mixed use development to accommodate 702 no. build-to-rent residential units, retail/café/restaurant units, cultural building, childcare facility and residential tenant amenity.

The proposed Project is in accordance with the statutory land use zoning pertaining to the Site.

19.4.2.2 Ownership & Access

The Operational Phase of the proposed Project will likely result in an increase in traffic volumes to the local road network. A *Traffic and Transport Assessment* report has been prepared by Project Engineers[208], which is submitted with this planning application. Refer to Chapter 17 (Traffic and Transportation).

The Operational Phase of the proposed Project will result in the introduction of a residential land use to the Site which will provide much needed housing for the growing population of the immediate area and the GDA

[208] DBFL Consulting Engineers (2020).

in general. The Operational Phase of the proposed Project will have *no long-term significant adverse* impacts on pre-existing zoning at this Site.

19.4.2.3 Wastewater Services

Irish Water have confirmed by return of letter, subject to a valid connection agreement, that the proposed Project connection to the Irish Water wastewater network can be facilitated.

The proposed Project design will incorporate SuDS/attenuation for the management of stormwater and to reduce surface water inflow into the combine sewers.

The proposed foul drainage for the proposed Project has been designed to drain to a slung drainage systems in the basement parking lots which will then discharge into a subsurface foul sewer in the courtyard. The surface water drainage network will join into the last foul manhole before finally discharging the into the 1200mm diameter Irish Water combined sewer on Sheriff Street Upper to the south of the proposed Project. The design foul flow has been calculated by the Project Engineers as 11.27l/s.

The Operational Phase of the proposed Project will lead to an increase in the foul discharge from the Site, therefore increasing the pressure on the existing public foul sewer. All foul effluent will be treated at Ringsend WWTP which operates under EPA Licence D0034-01. The potential impact is likely to be *moderate* and *long-term.*

19.4.2.4 Water Supply

The connection to mains water will be provided from the existing watermain spur onto site located to the south on Sheriff Street Upper[209]. Overall peak water demand will be 20.54l/s for residential use and 1.71l/s for commercial use. The potential impact is likely to be *moderate* and *long-term.*

Irish Water have confirmed by return of letter, that the proposed Project connection to the Irish Water network can be facilitated.

19.4.2.5 Gas & Electricity Supply

The Operational Phase of the proposed Project will require a **gas** supply. The existing gas meter and incoming pipe will be upgraded, and relocated during the Construction Phase. It is proposed that the natural gas supply will be taken from Sheriff Street Upper to serve new natural gas rooms with multiple capped connections for future meter installation, located in the basements of the Site. The gas capped connections will be there for future gas meters to be installed by tenants of retail/commercial areas on the ground floor. The future gas meters will be installed with a digital output to facilitate with monitoring gas usage on the building

[209] See DBFL Consulting Engineers Drawing 180159-3101.

management system (BMS). The impact of the Operational Phase on the gas supply network is likely to be an increase in the demand on the existing supply.

The Operational Phase of the proposed Project will require **electricity** supplies, which will be an increase in the demand on the existing supply. ESBN will provide an MV power supply to the proposed Project, this will then be stepped down to a low voltage (LV) power supply using a transformer before feeding a utility metering switch room[210]. Each apartment will have its own ESB meter.

The building load and capacity shall be designed with future capacity allowed to meet the requirements of the proposed Project. The assessed electrical loads for the proposed Project will be requested from ESB and is 3,561kVA (kilo-volt-ampere).

The potential impact from the Operational Phase on the gas supply and the electricity supply network is likely to be *moderate* and *long-term.*

19.4.2.6 Telecommunication

The Operational Phase of the proposed Project will require telecommunication connections, which will result in a marginal increase in demand. The area appears to be well serviced with telecommunication provides, and so will provide the building users with a greater choice of service. This will result in *a positive, long-term* effect for the building users.

The potential impact from the Operational Phase on the telecommunication network is likely to be *neutral, imperceptible* and *long-term*.

19.5 Mitigation Measures

The proposed Project is located within an area designated for the type of development proposed. As such the services pertaining to the proposed Project are required to facilitate the proposed scheme. It is not possible to not provide the services required. Notwithstanding this, the gas, electricity and telecommunication services have all been designed in accordance with the requirements of the various stakeholders.

All possible precautions shall be taken to avoid unplanned disruptions to any services/utilities during the Construction Phase of the proposed Project. It should be noted that a number of mitigation measures proposed in other EIAR Chapters are also of relevance to Material Assets but are not repeated here. There are sufficient supplies of electricity, gas and telecommunications services currently available to the proposed Project.

[210] DBFL Consulting Engineers (2020).

19.5.1 Construction Phase

The Construction Phase mitigation measures includes avoidance, reduction and remedy measures as set out in *Section 4.7 of the Development Management Guidelines*[211] to reduce or eliminate any significant adverse impacts identified.

There will be an interface established the relevant service providers within the locality during the Construction Phase of the proposed Project. This interface will be managed in order to ensure a smooth construction schedule without disruption to the residential and business community.

The following mitigation measures are proposed for the Construction Phase of the proposed Project:

- Consultation with the relevant services providers shall be undertaken in advance of works. This will ensure all works are carried out to the relevant standards and ensure safe working practices are implemented - *i.e.* for overhead electricity lines, live electricity lines and gas mains.
- All infrastructure is to be installed and constructed to the relevant codes of practice and guidelines.
- A final CMP and CTMP will be implemented by the appointed Contractor for the duration of the Construction Phase. This will ensure protection to the local amenities and the operation of the local road network.
- The potable water supply and wastewater infrastructure will be pressure tested by an approved method during the Construction Phase, prior to connection to the public networks, all in accordance with Irish Water Requirements.

The following requirements are likely to arise from the interface:

- Attention will need to be paid to the safety and other requirements outlined in the GNI and ESB *Safety Document: Guidelines for Builders*.
- The exact locations of known local underground services will be confirmed and the detail of overhead line relocations will be agreed.

With the above mitigation measures implemented, the severity of the impact is reduced to *slight/imperceptible* as the services will have been satisfactorily diverted or amended, and will therefore continue to operate in their current form as required.

19.5.2 Operational Phase

The design and construction of the necessary service infrastructure will be in accordance with relevant codes of practice and guidelines. As a result this is likely to mitigate any potential impacts during the Operational Phase of the proposed Project.

[211] DEHLG (2007).

However, routine maintenance of the Site services will be required from time to time, as such any mitigation measures will be advised by the relevant service provider.

19.6 Residual Impacts

Residual impacts are the final or intended impacts which occur after the proposed mitigation measures have been implemented. They refer to the degree of change that will occur after the proposed mitigation measures have taken effect.

Based on the implementation of the Construction Management Plan (CMP), Construction & Demolition Waste Management Plan (C&D WMP) and all mitigation measures outlined in the EIAR, there are *no significant* residual impacts foreseen.

There will be *no negative* residual impacts on material assets as a result of the proposed Project.

19.7 Monitoring

Monitoring will be provided for by each Utility company with an over-seeing responsibly by the appointed Contractor during the Construction Phase.

Prior to the Operational Phase of the proposed Project, all connections (wastewater, water supply, gas and electricity) will be tested by a suitable qualified person under the supervision of DCC. The proposed Project water supply will be tested to the satisfaction of DCC prior to the connection to the public potable water.

Any monitoring of the built services required during the Operational Phase of the proposed project will be as advised by the relevant services providers.

19.8 Reinstatement

As the proposed Project will be a 'new build' there will be no reinstatement within the Site boundary required.

19.9 Interactions

The main interactions relating to Services are **water, air quality** and **population and human health.**

During the Construction Phase, the availability of **water** supplies to the Site and during the connection of the water supply and wastewater services has the potential to impact of the local surface water. There is also implications for the local **population** if these services are disrupted during the Construction Phase. The development and installation of the Services during construction has the potential to impact on the local **air quality**.

During the Operational Phase the water supply and wastewater services will have a potential interaction with the available water supply and the potential emissions to the water cycle.

19.10 Cumulative Impacts

The assessment has considered cumulative impact of Construction and Operational Phase in conjunction with surrounding committed developments.

Considering the minimal use of material assets (*i.e*. temporary power) during the Construction Phase, there *is no likely impact.*

19.11 'Do-Nothing' Impact

A '*do-nothing'* scenario is not considered valid, as the lands are currently zoned for redevelopment under the Development Plan.

However, in the '*do-nothing'* scenario the Site would not be redeveloped and therefore there would be no adverse impacts to the existing services/utilities.

19.12 Difficulties Encountered in Compiling the Chapter

The exact location of the existing services infrastructure is reliant upon the records obtained, which are indicative. The exact location of services infrastructure can only be determined by an intrusive survey investigation. However, the information received gives a good indication of the approximate location of the various built services.

20 Interactions

20.1 Introduction

As a requirement of the Planning Regulations and the EPA *Draft Guidelines*[212], not only are the individual significant impacts required to be considered when assessing the impact of a development/project on the environment, but so must the inter-relationships between these factors be identified and assessed. This Chapter of the EIAR addresses the interactions between the various environmental aspects of the proposed Project.

The following Section is directed by Article 3 section 1(e) of the EIA Directive. The EPA *Draft Guidelines* and EPA *Advice Notes for Preparing Environmental Impact Statements*[213] were also considered.

Article 3 of the Directive states:

1. *The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:*
    - *a) population and human health;*
    - *b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;*
    - *c) land, soil, water, air and climate;*
    - *d) material assets, cultural heritage and the landscape; and*
    - e) *the interaction between the factors referred to in points (a) to (d).*

20.2 Study Methodology

The interactions between impacts on different environmental factors are addressed throughout the EIAR. Close co-ordination and management with the EIAR team was carried out to ensure that interactions have been adequately addressed and all likely relevant interactions were addressed at the Scoping phase of the EIAR.

Following an assessment of the EIAR, a matrix was produced to show where interactions between effects on different factors have been addressed. Table 20.1 below provides a matrix summarising potential interactions.

[212] EPA (2017).
[213] EPA (2015).

20.3 Description of Potential Interactions

The primary interactions can be summarised as follows:

- Population and Human Health with Hydrology (Surface Water), Air Quality and Climate, Noise and Vibration, Landscape, Daylight/Sunlight, Wind, Traffic, Material Assets (Waste & Services).
- Biodiversity with Hydrology (Surface Water).
- Biodiversity with Landscape.
- Land, Soils, Geology and Hydrogeology with Hydrology (Surface Water).
- Land, Soils, Geology and Hydrogeology with Waste.
- Air Quality and Climate with Traffic.
- Noise and Vibration with Traffic.
- Landscape with Cultural Heritage.
- Daylight/Sunlight with Landscape.
- Traffic with Waste.
- Services with Hydrology (Surface Water) and Air Quality and Climate.

The relevant consultants liaised with each other and the project architects, engineers etc. where necessary to review the proposed Project and incorporate suitable mitigation measures where necessary. Most inter-relationships are *neutral* in impact when the mitigation measures proposed will be incorporated into the design, construction or operation of the proposed Project.

20.3.1 Population and Human Health

Several disciplines have potential for significant impacts on human health, during the Construction Phase, these include:

- **Surface Water (Hydrology):** Control of surface water during construction has potential to impact human health due to emissions from the Site to the hydrosphere or potential flooding during ground works.
- **Air Quality and Climate:** There is potential for impact on human health from dust associated with construction activities.
- **Noise and Vibration:** There is potential for impact on human health from noise associated with construction activities and inward traffic noise.
- **Traffic and Transport:** Traffic flow for construction vehicles in the locality has potential to impact upon road safety.
- **Waste:** There is potential for impact on human beings in relation to the generation of waste during the Demolition and Construction Phases are that incorrect management of waste could result in littering which could cause a nuisance to the public and attract vermin.

- **Services:** There is potential for impact on the local population during the connection of the utilities and services.

During the Operational Phase potential interactions include:

- **Surface Water (Hydrology):** Surface water management during the Operational Phase has the potential to cause flooding which may impact human health and safety.
- **Air Quality and Climate:** There is potential for impact on human health from climate change associated with greenhouse gas emissions from increased traffic movements as a result of the proposed Project.
- **Landscape:** The landscape plan will impact on the quality of the private and public open spaces, which can impact on people's health and well-being.
- **Daylight/Sunlight:** There is potential for impact on human health, as the proposed Project will result in a considerable change on the existing daylight access and shadow environment on the surrounding area.
- **Wind:** There is potential for impact on human health as the proposed Project will impact on the wind microclimate within and around the Site, which ultimately can impact negatively on people's health and well-being. The wind microclimate has the potential to impact on the level of pedestrian comfort and safety within the development.
- **Traffic and Transport:** Traffic flow within the Site has the potential to create safety risks for pedestrians and cyclists, where the design does not provide for safe pedestrian/cycling environments.
- **Waste:** There is potential for impact on human beings in relation to the generation of waste during the Operational Phase from the incorrect management of waste, which could result in littering which could cause a nuisance to the public and attract vermin.

The potential impacts on human health have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, *no potential significant residual negative* impacts on human health are predicted.

20.3.2 Biodiversity

Risks to Biodiversity during the Construction and Operational Phases include:

- **Surface Water (Hydrology):** There is potential for impact on biodiversity via contaminated run-off and sedimentation enters the local surface water.
- **Landscape:** The landscape design for the proposed Project takes into account the requirements to maximise the benefits to biodiversity, both locally and within the wider landscape. The landscape

scheme proposes significant ecologically sensitive planting to provide for potentially diverse habitats.

The potential impacts on biodiversity has been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, *no potential significant residual negative* impacts on biodiversity are predicted. The landscape planting that is proposed will ensure that there will be an overall increase in biodiversity on the Site.

20.3.3 Land, Soils, Geology and Hydrogeology

Risks to land, soils, geology and hydrogeology during the Construction Phase include:

- Hydrology: Excavation and soil works (i.e. through Site clearance, excavations etc.) during the Construction Phase have the potential to cause impact on the hydrogeology of the Site. Surface water run-off may have the limited potential to enter soil and groundwater.
- Material Assets - Waste Management: Excavated topsoil and subsoil will be required to facilitate site levelling and new foundations etc. Topsoil and sub-soil will be removed from Site for appropriate reuse, recycling or disposal. Approximately 11,100m^3 of material will be required to be removed from the Site to facilitate the installation of piles, attenuation measure, oil interceptors, basement excavations *etc*. Waste materials will be required to be temporarily stored on-site pending collection by a waste contractor.

No potential significant Operational Phase interactions were identified. The potential impacts on land, soils, geology and hydrogeology has been considered within the relevant discipline and mitigation measures outlined where required.

20.3.4 Hydrology (Surface Water)

Risks to hydrology during the Construction Phase include:

- Population and Human Heath: Control of surface water during construction has potential to impact human health due to emissions from the Site to the hydrosphere or potential flooding during ground works.
- Biodiversity: There is potential for impact on biodiversity via contaminated run-off and sedimentation enters the local surface water.
- Land, Soils, Geology and Hydrogeology: Excavation and soil works (*i.e.* through Site clearance, excavations etc.) during the Construction Phase have the potential to cause impact on the hydrology of the Site.

No potential significant Operational Phase interactions were identified. The potential impacts on hydrology has been considered within the relevant discipline and mitigation measures outlined where required.

20.3.5 Air Quality and Climate

Risks to air quality and climate during the Construction and Operational Phases include:

- **Human Health:** There is potential for impact on human health from dust associated with construction activities.
- **Traffic and Transport:** Construction traffic has the potential to have an impact in terms of air quality. Increased traffic movements and reduced engine efficiency, *i.e.* due to congestion, the emissions of vehicles increase.

The potential impacts on air quality and climate has been considered within the relevant discipline and mitigation measures outlined where required. Best practice dust mitigation measures will be implemented on-site and as such impacts to human health are predicted to be *imperceptible* and *short-term.* The impact to air quality is *imperceptible* for the *long* and *short-term.*

20.3.6 Noise and Vibration

Risks to noise and vibration during the Construction and Operational Phases include:

- **Population and Human Heath:** There is potential for impact on human health from noise associated with construction activities and inward traffic noise.
- **Traffic and Transport**: Construction traffic has the potential to have an impact in terms of noise and vibration. The Noise and Vibration chapter has been prepared in close consultation with the traffic consultant.

The potential impacts on noise and vibration has been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, *no potential significant residual negative* impacts are predicted.

20.3.7 Landscape (Townscape) and Visual

Risks due to landscape and visual during the Construction and Operational Phases include:

- **Population and Human Heath:** The landscape plan has potential to impact on the quality of the private and public open spaces, which can impact on people's health and well-being.

The potential impacts on landscape and visual has been considered within the relevant discipline and mitigation measures outlined where required.

20.3.8 Microclimate - Daylight/Sunlight

Risks to daylight and sunlight during the Operational Phase include:

- **Population and Human Heath:** There is potential for impact on human health, as the proposed Project will result in a considerable change on the existing daylight and sunlight access and shadow environment on the surrounding area.
- **Landscape:** There is potential for impact on the local landscape, as the proposed Project will result in a considerable change on the existing daylight and sunlight access and shadow environment on the surrounding area.
- **Climate:** There is potential for impact on the local climate, as the proposed Project will result in a considerable change on the existing daylight access and shadow environment on the surrounding area.

The potential impacts on daylight and sunlight has been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, *no potential significant residual negative* impacts are predicted.

20.3.9 Microclimate - Wind

Risks during the Operational Phase from wind impacts include:

- **Population and Human Heath:** There is potential for impact on human health as the proposed Project will impact on the wind microclimate within and around the Site, which ultimately can impact negatively on people's health and well-being. The wind microclimate has the potential to impact on the level of pedestrian comfort and safety within the development.

In general, the proposed Project is likely to provide a comfortable and an attractive environment for pedestrians and occupants. Without suitable mitigation, the winds can produce wind conditions that pedestrians may find distressing in certain areas of the Site.

20.3.10 Traffic and Transportation

Risks to traffic and transportation during the Construction and Operational Phases include:

- **Population and Human Heath:** Traffic flow within the Site has the potential to create safety risks for pedestrians and cyclists, where the design does not provide for safe pedestrian/cycling environments.
- **Air Quality and Climate:** Construction traffic has the potential to have an impact in terms of air quality. Increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase.

- **Noise and Vibration**: Construction traffic has the potential to have an impact in terms of noise and vibration.
- **Waste:** The volume of surplus soils generated by the scheme will influence Construction Phase traffic generation.

The potential impacts on traffic and transportation has been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, *no potential significant residual negative* impacts are predicted.

20.3.11 Material Assets - Waste

Risks to waste during the Construction and Operational Phases include:

- **Population and Human Heath:** There is potential for impact on human beings in relation to the generation of waste during the Demolition, Construction and Operational Phases are that incorrect management of waste could result in littering which could cause a nuisance to the public and attract vermin.
- **Land, Soils, Geology and Hydrogeology:** Excavated topsoil and subsoil will be required to facilitate site levelling and new foundations etc. Topsoil and sub-soil will be removed from Site for appropriate reuse, recycling or disposal. Waste materials will be required to be temporarily stored on-site pending collection by a waste contractor. During the Construction Phase the waste materials temporarily stored have the potential to cause impact to local soils and geology.
- **Traffic and Transport:** Local traffic and transportation 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 Project.

The potential impacts on waste has been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, *no potential significant residual negative* impacts are predicted.

20.3.12 Material Assets - Services

Risks to services during the Construction and Operational Phases include:

- **Population and Human Heath:** There is potential for impact on the local population during the connection of the utilities and services.
- **Surface Water (Hydrology):** The availability of water supplies to the Site and during the connection of the water supply and wastewater services has the potential to impact of the local surface water. During the Operational Phase the water supply and wastewater services will have a potential interaction with the available water supply and the potential emissions to the water cycle.

- **Air Quality and Climate:** During the development and installation of the services/utilities has the potential to impact on the local air quality.

The potential impacts on services has been considered within the relevant discipline and mitigation measures outlined where required.

Table 20.1: Interactions with Environmental Factors

Inter-Relationship Matrix	Population & Human Health	Biodiversity	Land, Soils, Geology & Hydrogeology	Hydrology	Air Quality & Climate	Noise & Vibration	Landscape & Visual	Cultural Heritage	Microclimate - Daylight/Sunlight	Microclimate - Wind	Traffic & Transport	Material Assets - Waste	Material Assets - Services
Population & Human Health		-	-	✓	✓	✓	✓	-	✓	✓	✓	✓	✓
Biodiversity			-	✓	-	-	✓	-	-	-	-	-	-
Land, Soils, Geology & Hydrogeology				✓	-	-	-	-	-	-	-	✓	-
Hydrology					-	-	-	-	-	-	-	-	✓
Air Quality & Climate						-	-	-	✓	-	✓	-	✓
Noise & Vibration							-	-	-	-	✓	-	-
Landscape & Visual								-	✓	-	-	-	-
Cultural Heritage									-	-	-	-	-
Microclimate - Daylight/Sunlight										-	-	-	-
Microclimate - Wind											-	-	-
Traffic & Transport												✓	-
Material Assets - Waste													-
Material Assets - Services													

21 Cumulative Impacts

21.1 Introduction

This Chapter considers the potential cumulative impacts on the environment of the proposed Project with other developments (*i.e.* committed development) in the locality.

The EU Guidelines define cumulative impacts as:

> *'Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. For example:*
>
> - *incremental noise from a number of separate developments;*
> - *combined effect of individual impacts, e.g. noise, dust and visual, from one development on a particular receptor; and*
> - *several developments with insignificant impacts individually but which together have a cumulative effect.'*

Cumulative impacts of the proposed Project and other committed development in the area can be assessed by taking account of the existing baseline environment and the predicted impacts associated with the operation of the proposed Project in-combination with predicted impacts of any other proposed developments/projects in the area.

It is noted that *temporary/short-term* cumulative impacts during the Construction and Operational Phases impacts are also assessed in the individual specialist chapters of this EIAR (Chapters 7 to 19).

21.2 Committed Development

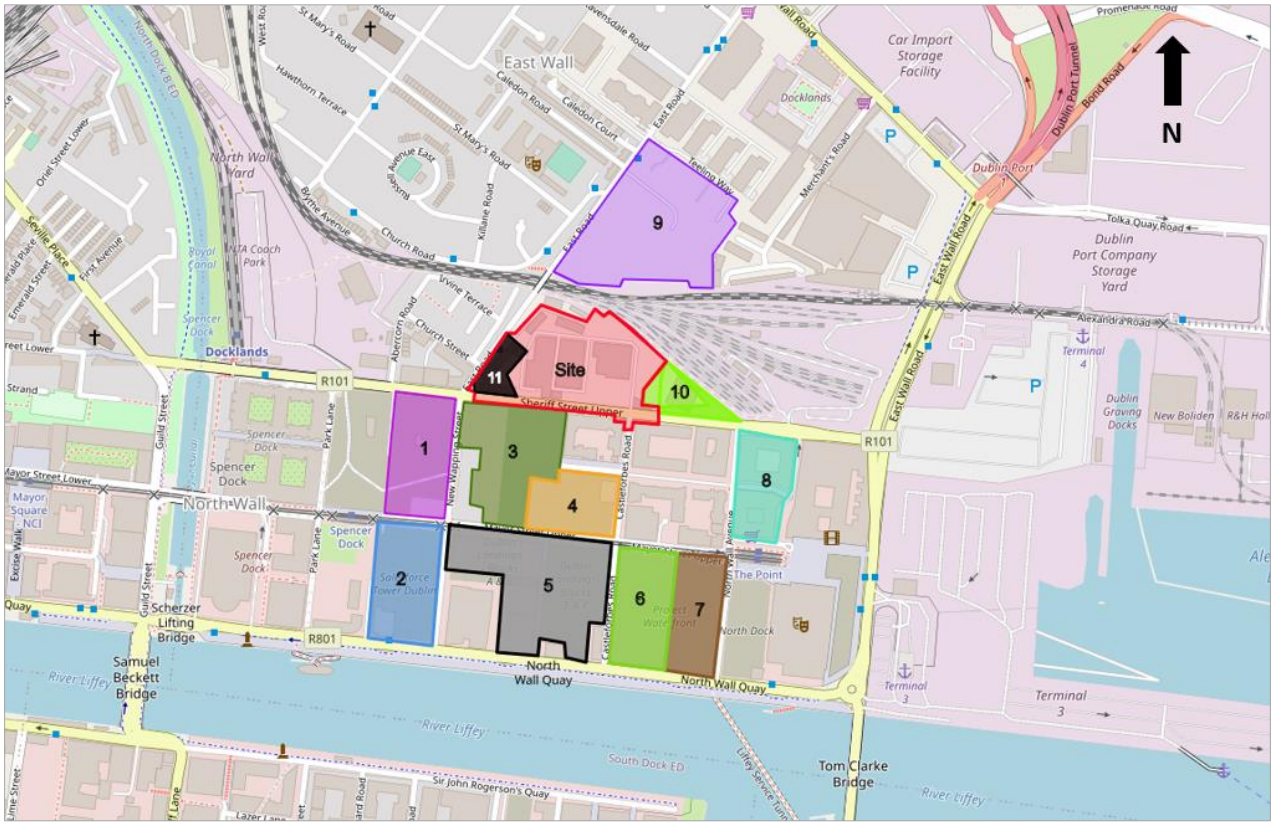
Cumulative impacts were assessed by looking at the committed and in progress developments for which planning has been received within the area of influence of the Site. A search in relation to plans and projects that may have the potential to result in cumulative impacts was carried out. In assessing cumulative impacts the following were the principal sources consulted:

- Dublin City Council Planning Department;
- Dublin City Development Plan 2016-2022; and
- An Bord Pleanála.

Following a review of the above sources, the following developments with existing planning permission, located within the area of influence of the Site, have been identified. These 'committed developments' currently have a planning permission but have yet to be constructed/occupied. Much of the development is located with the area of the North Lotts and Grand Canal Dock SDZ Planning Scheme to the south of the Site,

and specifically the North Lotts, located north of the River Liffey. Figure 21.1 presents a map showing the location of the committed developments and Table 21.1 provides a brief description of these developments.

Figure 21.1: Committed Development Indicative Locations near the Site[214]



[214] EPA Maps (2020). Source: *OpenStreet Maps.*

Table 21.1: Committed Developments located near the Site

Development Type	Planning Ref.
Residential Development Spencer Place Residential City Block 2 (No. 1 on Figure 21.1)	ABP 3052-19 Planning permission was previously Reg. Ref. DSDZ2896/18 as amended by DSDZ4279/18, DSDZ4111/19
New Wapping Street, off of the R101 Sheriff Street Upper. The residential development proposals include the provision of: ▪ 548 no. residential units (464 no. apartments, 84 no. shared accommodation units); and ▪ 7 no. storeys to 13 no. storeys.	
Commercial Development Spencer Place City Block 7 (No. 2 on Figure 21.1)	DSDZ 4184/18
New Wapping Street, with frontage onto the R801 North Wall Quay. The commercial development proposals include the provision of: ▪ 48,436m^2 of office space; ▪ 204 no. room hotel; and ▪ retail units.	
Residential Development City Block 3 (No. 3 on Figure 21.1)	DSDZ4112/19 DSDZ2464/19
New Wapping Street. The development proposals include the provision of: ▪ 449 no. residential apartment units across 6 No. blocks; ▪ 100 no. car parking spaces; and ▪ a café and crèche.	
Commercial Development City Block 3 (No. 4 on Figure 21.1)	DSDZ2626/20 Planning permission was previously Reg. Ref. DSDZ4087/19
Coopers Cross. The commercial development proposals include the provision of: ▪ 2 no. commercial blocks over 2 no. basement levels; ▪ 45,328m^2 of predominantly office space; ▪ 91 no. car parking spaces; and ▪ 2 no. retail/café/restaurant units.	

Development Type	Planning Ref.
Commercial Development City Block 3 (No. 4 on Figure 21.1)	DSDZ2186/20
The development proposals include the provision of: ▪ 5 no. residential blocks ranging from 2 to 7 storeys; and ▪ 472 no. residential units, comprising 463 no. 'Build-to-Rent' apartments, 9 no. 2-bed houses.	
Residential and Commercial Development City Block 8 - Project Wave Development (No. 5 on Figure 21.1)	DSDZ 4558/18 DSDZ 3452/19 DSDZ 4157/17 DSDZ 2489/18
Castleforbes Road. Project Wave is a commercial office and residential development originally permitted under Ref. DSDZ 3550/15 and currently under construction at City Block 8 of North Wall Quay. The development proposals include the provision of: ▪ 63,697m^2 of office space; ▪ 283 no. residential apartments; ▪ 431 no. car parking spaces; and ▪ a café, gym and retail unit.	
Residential and Commercial Development City Block 9 (No. 6 & 7 on Figure 21.1)	DSDZ 3779/17 DSDZ 3780/17
Castleforbes Road. The development proposals include the provision of two committed developments on the City Block 9 of the Dublin docklands. The residential development (DSDZ 3779/17) include the provision of: ▪ 420 no. residential apartment units; ▪ 288 no. car parking spaces; and ▪ Crèche/retail/café uses. The commercial development (DSDZ 3780/17) include the provision of: ▪ 4 no. offices with a total area of 35,883m^2; and ▪ 90 no. car parking spaces.	
Residential Development City Block 5 - Student Accommodation Development (No. 8 on Figure 21.1)	DSDZ 4332/18
Upper Mayor St. The development was originally permitted under Ref. DSDZ 3689/15 and has been subsequently amended by others. The residential development proposals include the provision of: ▪ 970 no. bed spaces.	

Development Type	Planning Ref.
Residential Development East Road Development (No. 9 on Figure 21.1)	ABP-304710- 19
The residential development proposals include the provision of: ▪ 560 no. residential apartment units; ▪ 241 no. car parking spaces; and ▪ Café/retail/enterprise space/crèche and various other mixed uses.	
Commercial Development Castleforbes Offices & Hotel Commercial Development (No. 10 on Figure 21.1)	DCC Reg. Ref. 3433/19
As the initial phase to the development of the Castleforbes Business Park, directly adjoining the Site of the proposed Project to the east is this permitted commercial development of: ▪ 270 no. bed hotel (7 to 10 storeys); and ▪ 10,265m^2 of office space (6 to 9 storeys).	
Commercial Development Castleforbes Hotel Development (No. 11 on Figure 21.1)	DCC Reg. Ref. 2143/20
As part of the development of the Castleforbes Business Park, directly adjoining the Site of the proposed Project to the west is this permitted development of: ▪ 219 no. bedroom hotel (6 to 9 storeys); and ▪ c. 9,241sq.m (incl. basement).	

21.3 Planning Framework

As outlined in Chapter 3 (Planning & Development Context) the Site lies within DCC administrative area, north of the North Lotts and Grand Canal Dock SDZ and within the '*Docklands Area*', where it is designated as a SDRA 6 in the Development Plan. Therefore the Site is subject to the land use policies and objectives of the Development Plan, see Figure 21.2 below.

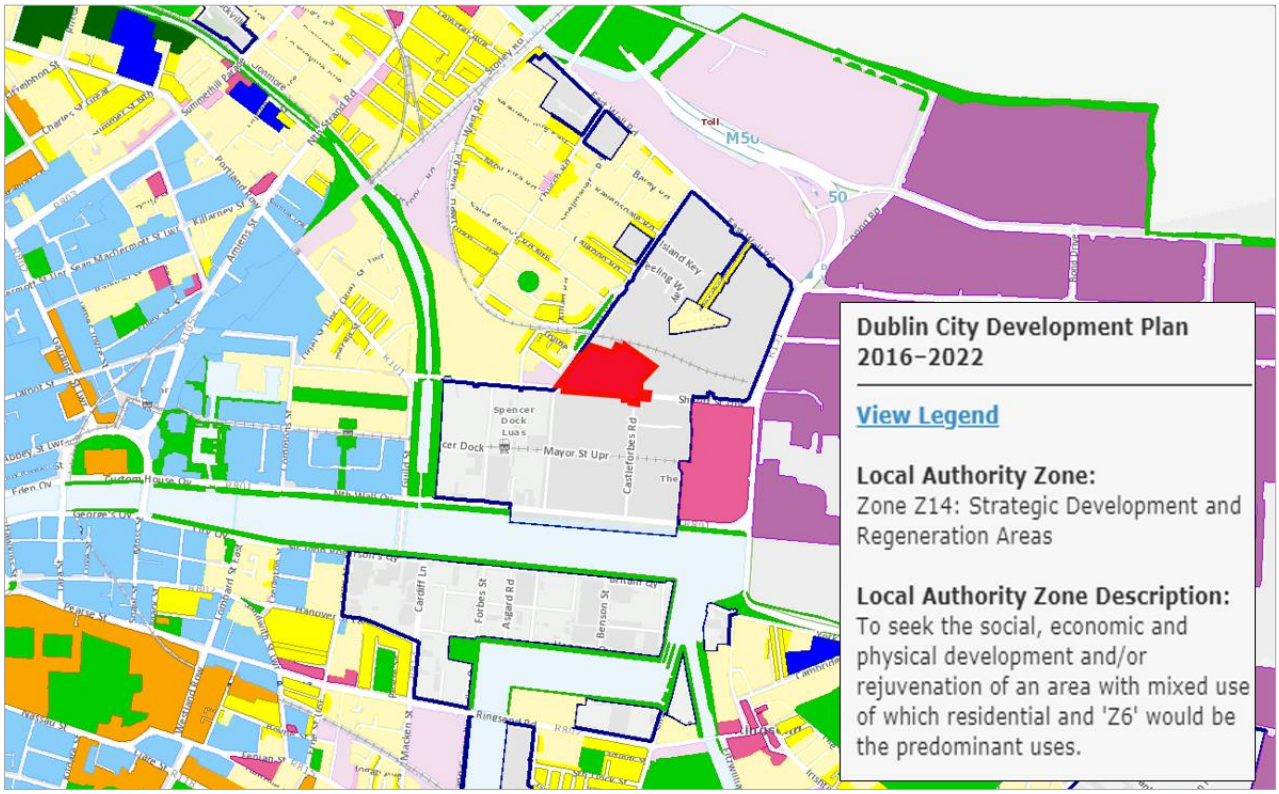
The Core Strategy of the Development Plan promotes the intensification and consolidation of Dublin City, and the Docklands is identified as one of the SDRA capable of realising this objective.

The Site and surrounding area is identified as SDRA 6. In respect of SDRA 6, the City Development Plan identifies that:

> *'the designation of the Docklands, including the Docklands SDZ, as a strategic development and regeneration area (SDRA) provides for the continued physical and social regeneration of this part of the city, consolidating the area as a vibrant economic, cultural and amenity quarter of the city, whilst also nurturing sustainable neighbourhoods and communities.'*

As such it is likely that other lands within the SDRA, and surrounding the Site, will also undergo similar regeneration development in line with the designation and Z14 land use zoning.

Figure 21.2: Land Use Zoning under the Current Dublin City Development Plan 2016-2022[215](Site in red)



21.4 Conclusion

Therefore, the assessment of cumulative impacts considers the total impact associated with the proposed Project when combined with committed development within the area of influence of the Site. Due to the City centre location of the proposed Project and the planning objectives/zoning outlined above for this area, development is continually occurring in the area.

However, no major projects have been identified that would result in a significant cumulative impact with the proposed Project.

[215] Department of Housing, Planning and Local Government (2020). My Plan. http://www.myplan.ie/webapp/

22 Schedule of Environmental Commitments

22.1 Introduction

This Chapter collates the environmental commitments/mitigation measures identified in the Specialist Chapters of the EIAR. These mitigation measures are considered necessary to protect the environment prior to the commencement of works and during both the Construction and Operational Phases of the proposed Project.

The appointed Contractor will be required to adhere to these mitigation measures of the EIAR for the protection of the environment and to ensure sustainable development.

The Schedule for Environmental Commitments are provided in Table 22.1 below.

Table 22.1: Schedule of Environmental Commitments

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
General Mitigation Measures		
G_1	Immediately after access to the Site is made, the Site will be secured with hoarding on all open sides and accessible approaches.	Construction
G_2	**Construction Compound:** The proposed location of the Contractor Compound will be internally within the Site of the proposed Project and will include construction staff accommodation, welfare facilities and car parking etc.	Construction
G_3	**CMP:** The appointed Contractor will be required to prepare a final Construction Management Plan (CMP) for the duration of the works.	Construction
G_4	**Construction Hours**: The final CMP will outline the construction hours for the proposed Project. The expected construction hours will be 08:00-19:00 Monday to Friday and 08:00-14:00 on Saturdays. There will be no works on Sundays or bank/public holidays in accordance with the Environmental Noise Regulations (S.I. No. 140 of 2006 Environmental Noise Regulations) and subject to final agreement with DCC. From time to time, in exceptional instances, works may be required outside of these hours. However, written approval will be sought by the Contractor from the Local Authority, prior to any works taking place.	Construction
G_5	**Health and Safety:** The appointed Contractor will be required to prepare and adhere to a Construction Phase Health and Safety (H&S) Plan and any employed subcontractors will also be required adhere to this Plan. This Plan will operate in line with ISO 18001 & ISO 14001.	Construction
G_6	**Deliveries** of material to the Site will be planned to avoid high volume periods. There may be occasions where it is necessary to have deliveries within these times. The CTMP will establish appropriate access routes, times of access, and any occasional or temporary traffic management requirements at the interface of the Site and either East Road or Sheriff Street Upper.	Construction
G_7	**Site Access/Egress:** The Site of the proposed Project will be accessed from the existing Site entrance off Sheriff Street Upper. All vehicular access will be controlled at the gate where all access and egress will be recorded. All site personnel will have to undergo a Site induction.	Construction
G_8	**Signage:** Warning signage will be provided for pedestrians and other road users on all approaches[216]. **Pedestrian** access will be strictly controlled. Only 'SafePass' accredited personnel will be permitted on to the Site and a daily record (access/egress) of Site personnel will be maintained. No pedestrian access points will be provided during the Construction Phase.	Construction

[216] In accordance with Chapter 8 of the *Traffic Signs Manual* and the Contractor's *Traffic Management Plan.*

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
General Mitigation Measures		
G_9	**Site Security:** Site security will be provided by way of a monitored infrastructure systems such as site lighting and CCTV cameras, when deemed necessary.	Construction
G_10	**CTMP:** A Construction Traffic Management Plan (CTMP) will be prepared and submitted prior to any works commencing on-site and will be discussed with Dublin City Council.	Construction
G_11	**Parking:** There will be appropriate on-site staff **parking** and visitor parking within the confines of the Site. Construction traffic will not be permitted to park on the public roads or within the general area outside the Site. HGV's queuing on any local or public road shall not be permitted and it shall be the responsibility of site management to ensure this policy is enforced.	Construction
G_12	**Health and Safety:** The Construction Phase H&S Plan will apply to any persons working on the Site and in respect of passing pedestrians, motorists or other transport carriers.	Construction
G_13	**Health and Safety:** A suitably qualified and competent Project Supervisor Design Process (PSDP) (with Chris Mee) has been appointed and a suitably qualified and competent Project Supervisor (Construction Phase) will be appointed in line with those requirements laid down in the Safety, Health and Welfare at Work Construction Regulations 2013 (S.I. No. 291 of 2013 Safety, Health and Welfare at Work (Construction)).	Construction

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Population and Human Health (Chapter 7)		
PPH_1	**Site Personnel**: All Site personnel will be required to understand and implement the requirements of the final CMP and will be required to comply with all legal requirements and best practice guidance for construction sites.	Construction
PPH_2	**Project Supervisor Design Process (PSDP):** The design of the final proposal will be subject to safety design reviews to ensure that all requirements of the proposed Project are safe. A Project Supervisor for the Design Process (PSDP) (with Chris Mee) has been appointed as part of the design process. Where issues are identified, corrective actions will be implemented to amend design issues prior to issuance of final design for construction.	Construction
PPH_3	**Procurement**: The proposed Project will look to procure material and services from local providers, where reasonably practicable, and within the requirements of the procurement process.	Construction

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
PPH_4	**Monitoring**: Site specific Health & Safety requirements will be undertaken by the Site Project Manager for the Construction Process. The Building Regulations certification process will address the necessary monitoring requirements of specific conditions of planning permission.	Construction

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Biodiversity (Chapter 8)		
B_1	No designated conservation areas will be impacted in any way by the proposed Project and no mitigation measures are required in this regard.	Construction
B_2	**Habitats:** There will be no significant habitat loss as a result of the proposed Project. Regardless, new planting will be incorporated into the landscape design and will use a mix of appropriate species, incorporating a range of species that will attract feeding invertebrates, including moths, butterflies and bees. It will take account of and implement the relevant objectives of the *All-Ireland Pollinator Plan 2015-2020*.	Construction
B_3	All planting plans and landscaping proposals will further ensure that no invasive species are introduced, either deliberately or inadvertently, to the Site.	Construction

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Land, Soils, Geology and Hydrogeology (Chapter 9)		
LSG_1	Due to the inter-relationship between soils, geology, hydrogeology and hydrology, the following mitigation measures will apply to each of these characteristics of the environment. **Surface water management** in accordance with the design (*e.g.* runoff directed to a settlement tank and through a petrol interceptor prior to discharge) will ensure there is no risk to the underlying aquifer.	Construction
LSG_2	**Soil Storage:** The temporary storage of soil will be carefully managed to prevent any potential negative impact on the receiving environment. This material will be stored away from the surface water drainage network.	Construction
LSG_3	**Soil Removal:** Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust.	Construction
LSG_4	**Soil Removal:** Approximately 2,000m^3 of excavated material will be reused on-site with 11,100m^3 of excavated material being removed off-site. It will be visually assessed for signs of possible contamination such as staining or strong odours. As it has already	Construction

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Land, Soils, Geology and Hydrogeology (Chapter 9)		
	been determined that some of the soil material underlying the Site exceeded the inert WAC criteria, this will be segregated, classified and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.	
LSG_5	**Fuel & Chemical Handling:** To minimise any impact on the underlying subsurface strata from material spillages it is proposed that all fuels, oils, solvents and paints used during construction will be stored within temporary bunded areas or will be contained in double skinned tanks in designated areas of the Site away from surface water drains.	Construction
LSG_6	**Fuel & Chemical Handling:** Re-fuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place off-site or in a designated area that will be away from any existing surface water drains. The area will be determined by the contractor prior to commencement onsite but is likely to be carried out in a designated area of the contractor's compound.	Construction
LSG_7	**Fuel & Chemical Handling:** In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532)* will be complied with.	Construction
LSG_8	**Monitoring:** Regular inspection of surface water run-off and any sediment control measures *e.g.* silt traps will be carried out during the Construction Phase. Regular auditing of construction/mitigation measures will be undertaken *e.g.* concrete pouring, refuelling in designated areas *etc.* Agreement from Irish Water/DCC will be required should these measure be required.	Construction
LSG_9	**Storage:** There will be no bulk storage of fuel required for the Operational Phase of the proposed Project.	Operational
LSG_10	**Run-off:** Any accidental leaks from cars within the car parking/road areas will be directed through the surface drainage system via an appropriately sized interceptor.	Operational
LSG_10	**Attenuation** will be provided by underground tanks to ensure that the discharge rate is maintained at greenfield runoff rate. The attenuation facility will accommodate rainfall events up to, and including, the 1-in-100-year storm event.	Operational
LSG_10	**Monitoring:** Petrol interceptor(s) will be maintained and cleaned out in accordance with the manufacturer's instructions. Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.	Operational

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Hydrology (Water) (Chapter 10)		
W_1	**pCMP:** A preliminary Construction Management Plan (pCMP) has been submitted with this application and a Final CMP will be established and maintained by the contractors during the Construction and Operational Phases of the proposed Project. The Plan will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the Site will be trained in the implementation of the procedures.	Construction
W_2	**pCMP:** The CMP will be formulated in accordance with best international practice including but not limited to: ▪ Construction Industry Research and Information Association (CIRIA) (2001). *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors.* ▪ CIRIA (2005). *Environmental Good Practice on Site* (C650). ▪ BPGCS005, *Oil Storage Guidelines*. ▪ CIRIA (2007). *The SuDS Manual (697).* ▪ UK Environment Agency (2004). *UK* Pollution *Prevention Guidelines (PPG).*	Construction
W_3	**Attenuation:** During the Construction Phase any outflows carrying a high sediment load will be diverted through settlement ponds/tanks. The settlement ponds/tanks will be located between the area of construction and the surface water drain.	Construction
W_4	**Run-off:** Surface water run-off will not be discharged directly to local watercourses. The following mitigation measures will be adopted: ▪ silt reduction measures including sit traps and settlement tanks will be employed during construction; ▪ any excavations required will remain open for as little time as possible before the placement of fill. This will help to minimise potential for groundwater ingress into excavations; ▪ weather conditions will be considered when planning construction activities to minimise risk of run off from the Site; ▪ distance between topsoil piles etc. and surface water drains will be maintained - to protect from dampening operations; and ▪ The generation of run-off from stockpiles of soils, excavated during construction, will be prevented from entering surface water drains by diverting run-off to the settlement ponds/tanks on-site, and removing the material off-site as soon as possible to designated storage areas/licenced disposal facility.	Construction
W_5	**Storage:** To minimise any impact on minor drainage channels onsite from material spillages, all oils, solvents, paints and fuels used during construction will be stored within temporary bunded areas and each of these areas will be bunded to a volume of 110% of the capacity of the largest tank/container within it (plus an allowance of 30mm for rainwater ingress). Drainage from the bunded area(s) will be diverted for collection and safe disposal. There is no notable surface water course on-site. The drainage ditch to the south is to be culverted as part of the initial construction works.	Construction

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Hydrology (Water) (Chapter 10)		
W_6	**Wet concrete** operations adjacent to watercourses will be avoided where possible. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated stormwater to groundwater.	Construction
W_7	**Wash waters:** The appointed Contractor will be required to make provision for removal of any concrete wash waters, most likely by means of tankering off-site and no such wash waters will be discharged to groundwater. Any effluent generated by temporary on-site sanitary facilities will be taken off-site for appropriate treatment.	Construction
W_8	**Re-fuelling** of construction equipment and the addition of hydraulic oil or lubricants to vehicles/equipment will take place in designated bunded areas where possible. Re-fuelling will be avoided in so far as possible at the other work sites but where necessary will take place on hardstand areas and fuel stored in bunded areas. If it is not possible to bring a machine to the refuelling point, fuel will be delivered in a double skinned mobile fuel bowser. A drip tray will be used beneath the fill point during refuelling operations in order to contain any spillages that may occur. The vehicles and equipment will not be left unattended during refuelling. Spill kits and hydrocarbon absorbent packs will be stored in the cab of each vehicle and operators will be fully trained in the use of this equipment.	Construction
W_9	**Monitoring:** Regular inspection of surface water run-off and any sediment control measures *e.g.* silt traps will be carried out during the Construction Phase. Regular auditing of construction/mitigation measures will be undertaken *e.g.* concrete pouring, refuelling in designated areas etc.	Construction
W_10	**Run-off:** The proposed drainage system for the Site and has been designed in accordance with Greater Dublin Strategic Design System (GDSDS) specifications.	Operational
W_11	**Drainage:** The drainage system will employ a number of attenuation methods. The surface water strategy includes one attenuation tank to provide the required volume to ensure the development does not flood in the 1 in 100-year storm event (accounting for a 20% increase with climate change). The main attenuation storage will be located to the east of the development as a geo-cellular tank (waving aqua cell or similar) with a capacity of 889m^3. The outflow to the combined sewer will also be filled with flow control device. As such the design includes improved measures for management of stormwater run-off in relation to flood impact.	Operational
W_12	**SUDS:** Additional SUDS measures are also proposed onsite including green roofs, permeable paving, bioswales, raised planters and rain gardens. Information regarding these is included in Project Engineers *Infrastructures Design Report*	Operational
W_13	**Oil Separator**: All incidental drainage from the car parks will be discharged separately via a Class 1 full retention oil separator (Klargester or similar approve) to the combined sewer.	Operational

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Hydrology (Water) (Chapter 10)		
W_14	**Monitoring:** Oil interceptor(s) will be maintained and cleaned out in accordance with the manufacturer's instructions. Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to ground.	Operational

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Air Quality and Climate (Chapter 11)		
AQC_1	**Dust:** The appointed Contractor shall put in place a regime for monitoring dust levels in the vicinity of the Site during the Construction Phase. The level of monitoring and adoptions of mitigation measures will vary throughout the Construction Phase depending on the type of activities being undertaken and the prevailing weather conditions at the time.	Construction
AQC_2	**Stock Piles**: At the Construction Phase (planning stage), the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance. The prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind (to the east) of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.	Construction
AQC_3	The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions: ▪ The appointed Contractor must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised; ▪ During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions; ▪ The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the Site boundary, this notice board should also include head/regional office contact details; ▪ It is recommended that community engagement be undertaken before works commence on-site explaining the nature and duration of the works to local residents and businesses; ▪ A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out; ▪ It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein; and ▪ At all times, the procedures put in place will be strictly monitored and assessed.	Construction

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Air Quality and Climate (Chapter 11)		
AQC_4	**Dust:** The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures.	Construction
AQC_5	▪ Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only. ▪ During periods of very high winds (gales), activities likely to generate significant dust emissions should be postponed until the gale has subsided. ▪ Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the Site. Where possible storage piles should be located downwind of sensitive receptors. ▪ At the main site traffic exits, a wheel wash facility shall be installed if feasible. All trucks leaving the Site must pass through the wheel wash.	Construction
AQC_6	**Monitoring:** The Construction Phase Contractor will adhere to good working practices and implement dust mitigation measures, the levels of dust generated are assessed to be minimal and are unlikely to cause an environmental nuisance. Monitoring of construction dust deposition at nearby sensitive receptors (residential dwellings) during the Construction Phase of the proposed Project is recommended to ensure mitigation measures are working satisfactorily. The Operational Phase impacts are predicted to be *imperceptible.* Monitoring is not required. See Appendix A11.2 for full air quality/dust mitigation measures.	Construction / Operational

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Noise and Vibration (Chapter 12)		
NV_1	The appointed Contractor shall ensure that the level of noise and vibration resulting from the Construction Phase, does not constitute a nuisance, and that noise and vibration emissions conform to the requirements of BS 5228: 2009 *Code of Practice for Noise and Vibration Control on Construction Sites, Part 1 and Part* 2.	Construction

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Noise and Vibration (Chapter 12)		
NV_2	**Noise-related** mitigation methods are described below and will be implemented for the project in accordance with best practice. These methods include: ▪ no plant used on-site will be permitted to cause an ongoing public nuisance due to noise; ▪ the best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on-site operations; ▪ all vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract; ▪ compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers; ▪ machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use; ▪ during construction, the appointed Contractor will manage the works to comply with noise limits outlined in *BS 5228-1:2009+A1 2014. Part 1 – Noise;* ▪ 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; ▪ limiting the hours during which Site activities which are likely to create high levels of noise or vibration are permitted; and ▪ monitoring levels of noise and vibration during critical periods and at sensitive locations.	Construction
NV_3	Furthermore, it is envisaged that a variety of practicable **noise control measures** will be employed. These may include: ▪ selection of plant with low inherent potential for generation of noise and/or vibration; ▪ erection of good quality site hoarding to the site perimeters which will act as a noise barrier to general construction activity at ground level; ▪ erection of barriers as necessary around items such as generators or high duty compressors; and ▪ situate any noisy plant as far away from sensitive properties as permitted by site constraints.	Construction
NV_4	**Vibration management:** it is recommended that the appointed Contractor is proactive in engaging with local sensitive receptors and should notify them of any works forecast to generate appreciable levels of vibration, explaining the nature and duration of the works. This will be of particular importance during periods of demolition or piling activities.	Construction
NV_5	**Monitoring:** The appointed Contractor will be required to ensure construction activities operate within the noise and vibration limits set out within this assessment. The appointed Contractor will be required to undertake regular noise and vibration monitoring at locations representative of the closest sensitive locations to ensure the relevant criteria are not exceeded.	Construction

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Noise and Vibration (Chapter 12)		
NV_6	**Mechanical Plant Noise and Services:** As part of the detailed design of the proposed Project, plant items with appropriate noise ratings and, where necessary, appropriately selected remedial measures (e.g. enclosures, silencers etc.) will be specified in order that the adopted plant noise criteria is achieved at the façades of noise sensitive properties, including those within the development itself.	Operational
NV_7	**Mechanical Plant Noise and Services:** To achieve these noise limits consideration will be given, at the detailed design stage, to a variety of mitigation measures and forms of noise control techniques. Some example of these measures are as follows: ▪ reduced/quiet modes; ▪ duct mounted attenuators on the atmosphere side of air moving plant; ▪ splitter attenuators or acoustic louvres providing free ventilation to internal plant areas; ▪ solid barriers screening any external plant; and ▪ anti-vibration mounts on reciprocating plant.	Operational
NV_8	**Mechanical Plant Noise and Services**: It is proposed that the following practices are adopted to minimise potential noise disturbance for neighbours. ▪ all mechanical plant items e.g. motors, pumps etc. shall be regularly maintained to ensure that excessive noise generated any worn or rattling components is minimised; and ▪ any new or replacement mechanical plant items, including plant located inside new or existing buildings, shall be designed so that all noise emissions from site do not exceed the noise limits outlined in this document.	Operational
NV_9	**Inward Noise Impact - Acoustic Design Statement Part 2**: The assessment in Section 12.6.2.2 has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. The calculated glazing and ventilation specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage. Consequently, these may be subject to change as the project progresses.	Operational

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Landscape and Visual (Chapter 13)		
LV_1	Mitigation during the Construction Phase will include the establishment of solid perimeter Site hoarding that will restrict views into the Site area and minimise the sense of visual disruption.	Construction
LV_2	The design of the proposed Project has involved detailed consideration of avoidance of inappropriate landscape and visual effects through an iterative process of Site analysis through to concept design and final design of layout, massing and detailed design of the scheme as a whole.	Operational
LV_3	Full details of the landscape proposals are provided in the *Landscape Design Statement*.	Operational
LV_4	**Monitoring:** Monitoring during the Operational Phase will ensure that the proposed Project is implemented as designed so as to deliver on the stated design objectives. A defects liability period will be required for all soft landscaping and any planting that fails to establish will need to be replaced.	Operational
LV_5	**Monitoring:** A maintenance regime will be established to ensure than soft landscaping and public realm is maintained in a high quality manner, and that any damage is repaired promptly so as to ensure the spaces remain attractive to the benefit of the immediate and local community	Operational

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Cultural Heritage, Archaeology and Architectural (Chapter 14)		
CHAA_1	**Archaeological monitoring** of ground disturbance works will be carried out under licence to the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht (DCHG).	Construction
CHAA_2	**Archaeological:** The developer's attention is drawn to National Monuments Legislation (1930–94), which states that, in the event of the discovery of archaeological finds or remains, the National Monuments Service and the National Museum of Ireland should be notified immediately, see Appendix A14.1. The developer should make provision to allow for, and to fund, the necessary archaeological monitoring, inspection and excavation works that may be needed on the site during the site preparation and Construction Phases of development. Such works will need to be carried out under licence to the National Monuments Service (DCHG) and the National Museum of Ireland and sufficient time should be factored into the construction programme to allow licences to be obtained and investigative works.	Construction
CHAA_3	All recommendations in this Chapter are subject to approval of the National Monuments Service of the DCHG, the National Museum of Ireland and the City Archaeologist.	Construction

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Microclimate – Daylight/Sunlight (Chapter 15)		
MC_DS_1	The proposed Project will see the redevelopment of a brownfield site situated in an urban location characterised by medium and high density development. In these circumstances, during the Construction or Operational Phases scope for mitigation measures, which would preserve a sustainable level of density, is limited.	Construction/Operational

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Microclimate - Wind (Chapter 16)		
MC_W_1	Design stage mitigation measures which have been incorporated into the scheme in order to improve the wind conditions at the Site include the following: ▪ A 2.4m height glass winter garden balustrade along the northeast side of the eastern podium. ▪ The provision of trees and other landscaping features along main thoroughfares, podiums and terraces would be helpful to disrupt the wind and provide some localised shelter for pedestrians.	Construction
MC_W _2	**Thoroughfares:** The provision of landscape along the Sheriff Street will provide some localised shelter from the wind. This helps to reduce some windiness at the south-eastern corner of Block A2 while it is anticipated it does not mitigate the wind conditions completely. There is an isolated location where more vulnerable pedestrians may find wind conditions distressing on the occasion, although these conditions will likely be prevalent for fewer than 15 hours a year (i.e. 0.17% of the time).	Construction
MC_W_3	**Eastern Podium:** The provision of dense hedging and raised planters as well with 2.4m high glass winter garden balustrade around the eastern podium does provide some localised shelter from the wind. This helps to reduce some windiness at the northern end of the courtyard. However, it is insufficient to alleviate the issue completely and some less desirable windiness will remain, although less often than without the wind mitigation measures.	Construction
MC_W_4	**Terraces:** The provision of landscape along the terraces assist in providing localised protection from the wind and helps creating a more comfortable environment for 'sitting' activities, however, some general windiness will remain on Blocks B3/C3 and B4/C4. The primary function of this space is for active and recreational uses and under these circumstances, the space is considered suitable for its intended use for the majority of the wind conditions. It is expected that more vulnerable user may experience distress fewer than 15 hours a year (i.e. 0.17% of the time). These events are likely to coincide with adverse weather conditions when terraces are unlikely to be used and it is recommended that the management company should restrict access.	Construction

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Microclimate - Wind (Chapter 16)		
MC_W_5	**Monitoring:** It is anticipated that the proposed Project will be constructed using conventional methods. It is recommended that the local weather conditions should be reviewed routinely, particularly for construction works carried out at a height. It is not considered necessary to undertake any formal wind speed and direction monitoring on-site during the Construction or Operational Phases.	Construction / Operational

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Traffic and Transportation (Chapter 17)		
TT_1	A **preliminary Construction Management Plan** (pCMP) has been prepared as part of the planning application with an associated Construction Traffic Management Plan (CTMP) which incorporates a range of integrated control measures and associated management activities with the objective of minimising the construction activities associated with the proposed Project.	Construction
TT_2	**Mitigation Measures:** The following initiatives will be implemented to avoid, minimise and/or mitigate against the anticipated Construction Phase impacts: ▪ During the Pre-Construction Phase, the Site will be securely fenced off from adjacent properties, public footpaths and roads; ▪ Appropriate on-site parking and compound area will be provided to prevent overflow onto the local network; ▪ It is likely that some numbers of the construction team will be brought to/from the Site in vans/minibuses, which will serve to reduce the trip generation potential; ▪ Delivery vehicles to and from the Site will be spread across the course of the working day, therefore, the number of HGVs travelling during the peak hours will be relatively low; ▪ Truck wheel washes will be installed at construction entrances and any specific recommendations with regard to construction traffic management made by Dublin City Council will be adhered to; ▪ Potential localised traffic disruptions during the Construction Phase will be mitigated through the implementation of industry standard traffic management measures. These traffic management measures shall be designed and implemented in accordance with the *Department of Transport's Traffic Signs Manual*, Chapter 8 and *Guidance for the Control and Management of Traffic at Roads Works*; ▪ Site entrance point/s *from* the public highway will be constructed with a bound, durable surface capable of withstanding heavy loads and with a sealed joint between the access and public highway. This durable bound surface will be constructed for a distance of 10m from the public highway; ▪ Material storage zones will be established in the compound area and will include material recycling areas and facilities;	Construction

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Traffic and Transportation (Chapter 17)		
	▪ 'Way finding' signage will be provided to route staff/deliveries into the Site and to designated compound/construction areas; ▪ Dedicated construction haul routes will be identified and agreed with Dublin City Council prior to commencement of activities on-*site*; and ▪ On completion of the works, all construction materials, debris, temporary hardstands etc. from the Site compound will be *removed* off-site and the Site compound area reinstated in full on completion of the works.	
TT_3	**Monitoring:** During the Construction Phase, the following monitoring exercises are proposed: ▪ Compliance with construction vehicle routing practices; ▪ Compliance with construction vehicle parking practices; ▪ Internal and external road conditions; and ▪ Timing of construction activities.	Construction
TT_4	**Mitigation Measures:** The identified measures and associated timescale for their implementation are summarised below. ▪ **Management** - A preliminary Mobility Management (MMP) has been compiled (and accompanies this planning application) with the aim of guiding the delivery and management of co-ordinated initiatives by the scheme promotor to be implemented upon occupation of the Site. The MMP will ultimately seek to encourage sustainable travel practices for all journeys to and from the proposed Project. ▪ **Car Parking Management Strategy** - A management regime will be implemented by the development's management company to control access to the on-site car parking spaces thereby actively managing the availability of on-site car parking for residents and commercial occupants of the proposed Project. This provision equates to a car parking ratio of c. 0.25 car parking spaces per residential unit. The signing of a rental agreement for one of the proposed residential apartments will NOT include access to a designated on-site parking space. All potential residents (prior to signing rental agreement) will be notified that the proposed scheme is a '*low car allocation*' development with no access (or guarantee thereof) to either (i) the limited on-site residents car parking provision or (ii) apply to Dublin City Council for a residents parking permit (to park on-street in one of the neighbouring streets). Nevertheless, all residents of the proposed Project will have the opportunity to apply to the on-site management company for a resident's car parking permit (updated weekly, fortnightly, monthly, quarterly or annually) and subsequently access to a dedicated (assigned) on-site basement car parking space. A charge will be applied to obtain a permit with the objective of covering the associated management costs and discouraging long term usage of the car parking space. ▪ **Infrastructure** - Infrastructure measures identified to reduce reliance of private vehicles include the provision of ample secure cycle parking on-site and ensuring a design which promotes permeability for pedestrians and cyclists to, through and	Operational

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Traffic and Transportation (Chapter 17)		
	from the proposed Project. The low level of car parking provision for the proposed Project will also act as a powerful mobility management measure, ensuring against an overprovision of parking and a resultant over reliance on the private vehicle. ▪ **Infrastructure** - Junction enhancements have been identified and proposed at the R101 Sheriff Street Upper/Castleforbes Road junction with the objective of mitigating the additional traffic flows that the proposed Project is predicted to generate. ▪ **Car Sharing** - The provision of 3 No. dedicated car share (GoCar) spaces in the basement parking facilities for the use of the scheme's residents and staff. The availability of these on-site provide a viable alternative to residents needing to own a private vehicle whilst still having access to a car as and when required.	
TT_5	**Monitoring:** As part of the MMP process, bi-annual post occupancy surveys are to be carried out in order to determine the success of the measures and initiatives as set out in the proposed MMP document.	Operational

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Material Assets - Waste (Chapter 18)		
MA_W_1	**C&D WMP:** A project specific C&D WMP has been prepared in line with the requirements of the requirements of the guidance document issued by the DEHLG and is included as Appendix A18.1.	Construction
MA_W_2	**C&D WMP:** Prior to commencement, the appointed Contractor(s) will be required to refine/update the C&D WMP or submit an addendum to C&D WMP to DCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.	Construction
MA_W_3	**Waste Segregation:** 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	Construction
MA_W_4	**Mitigation Measures:** addition, the following mitigation measures will be implemented: ▪ Building materials will be chosen with an aim to 'design out waste'; ▪ On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated: ○ Concrete rubble (including ceramics, tiles and bricks); ○ Plasterboard; ○ Metals; ○ Glass; and	Construction

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Material Assets - Waste (Chapter 18)		
	○ Timber. ▪ Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible; ▪ All waste materials will be stored in skips or other suitable receptacles in designated areas of the site; ▪ 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); ▪ A waste manager will be appointed by the main Contractor(s) to ensure effective management of waste during the excavation and construction works; ▪ All construction staff will be provided with training regarding the waste management procedures; ▪ All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal; ▪ All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and ▪ All waste leaving the site will be recorded and copies of relevant documentation maintained.	
MA_W_5	**By-products:** 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 Article 27 of the EC (Waste Directive) Regulations (2011).	Construction
MA_W_6	**By-products:** EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that Article 27 will be used.	Construction
MA_W_7	**Monitoring:** The management of waste during the Construction Phase should be monitored to ensure compliance with relevant local authority requirements, and effective implementation of the C&D WMP including maintenance of waste documentation.	Construction
MA_W_8	**Monitoring:** The C&D WMP specifies the need for a **waste manager** to appoint who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required.	Construction
MA_W_9	**Monitoring:** Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the Construction and Demolition Phases of the proposed Project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.	Construction
MA_W_10	**OWMP:** A project specific OWMP has been prepared and is included as Appendix A18.2. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the Site of the proposed Project.	Operational

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Material Assets - Waste (Chapter 18)		
MA_W_11	**Recycling:** 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 EMR Waste Management Plan 2015-2021 and abiding by the DCC waste bye-laws.	Operational
MA_W_12	**Mitigation Measures:** In addition, the following mitigation measures will be implemented: ▪ 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; ○ 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. ▪ 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; ▪ All waste collected from the Site of the proposed Project will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available; and ▪ All waste leaving the Site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.	Operational
MA_W_13	**Monitoring:** The management of waste during the Operational Phase should be monitored to ensure effective implementation of the OWMP by the building management company and the nominated waste contractor(s).	Operational
MA_W_14	**Monitoring:** During the Operational Phase, waste generation volumes should be monitored against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the WSAs where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contactor costs.	Operational

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Material Assets - Services (Chapter 19)		
MA_S_1	During the Construction Phase there will be **no discharge of wastewater** at the Site, as the provision of welfare facilities on-site will be portable units, with wastewater removed off-site for disposal by an authorised contractor. See Chapter 10 (Hydrology) for more information.	Construction
MA_S_2	The gas, electricity and telecommunication services have all been designed in accordance with the requirements of the various stakeholders.	Construction
MA_S_3	**Mitigation Measures:** All possible precautions shall be taken to avoid unplanned disruptions to any services/utilities during the Construction Phase of the proposed Project. It should be noted that a number of mitigation measures proposed in other EIAR Chapters are also of relevance to Material Assets but are not repeated here. There are sufficient supplies of electricity, gas and telecommunications services currently available to the proposed Project.	Construction
MA_S_4	**Mitigation Measures:** The Construction Phase mitigation measures includes avoidance, reduction and remedy measures as set out in *Section 4.7 of the Development Management Guidelines* to reduce or eliminate any significant adverse impacts identified.	Construction
MA_S_5	**Interface/Schedule:** There will be an interface established the relevant service providers within the locality during the Construction Phase of the proposed Project. This interface will be managed in order to ensure a smooth construction schedule without disruption to the residential and business community.	Construction
MA_S_6	**Mitigation Measures:** The following mitigation measures are proposed for the Construction Phase of the proposed Project: ▪ Consultation with the relevant services providers shall be undertaken in advance of works. This will ensure all works are carried out to the relevant standards and ensure safe working practices are implemented - *i.e.* for overhead electricity lines, live electricity lines and gas mains. ▪ All infrastructure is to be installed and constructed to the relevant codes of practice and guidelines. ▪ A final CMP and CTMP will be implemented by the appointed Contractor for the duration of the Construction Phase. This will ensure protection to the local amenities and the operation of the local road network. ▪ The potable water supply and wastewater infrastructure will be pressure tested by an approved method during the Construction Phase, prior to connection to the public networks, all in accordance with Irish Water Requirements.	Construction
MA_S_7	**Safety:** Attention will need to be paid to the safety and other requirements outlined in the GNI and ESB *Safety Document: Guidelines for Builders*.	Construction
MA_S_8	**Monitoring** will be provided for by each Utility company with an over-seeing responsibly by the appointed Contractor during the Construction Phase.	Construction

Mitigation No.	Description of Mitigation/Environmental Commitment	Phase
Material Assets - Services (Chapter 19)		
MA_S_9	The design and construction of the necessary service infrastructure will be in accordance with relevant codes of practice and guidelines.	Operational
MA_S_10	**Monitoring:** Prior to the Operational Phase of the proposed Project, all connections (wastewater, water supply, gas and electricity) will be tested by a suitable qualified person under the supervision of DCC. The proposed Project water supply will be tested to the satisfaction of DCC prior to the connection to the public potable water.	Operational
MA_S_11	**Monitoring:** Any monitoring of the built services required during the Operational Phase of the proposed project will be as advised by the relevant services providers.	Operational

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