Oxley Holdings Ltd.

Proposed Strategic Housing Development
'The Connolly Quarter'
Rear of Connolly Station,
Sheriff Street Lower,
Dublin 1.

VOLUME II
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Volume II - Table of Contents

CHAPTER 1
INTRODUCTION

OCTOBER 2019

Table of Contents

1 Introduction

This Environmental Impact Assessment Report ("EIAR") was prepared by McCutcheon Halley Planning Consultants on behalf of Oxley Holdings Limited to accompany an application for permission for a Strategic Housing Development (SHD) at a site of 2.88 hectares adjacent to Connolly Station, Dublin 1, see **Figure 1.1**.

This EIAR identifies, describes and assesses the likely significant effects of the project as a whole, in accordance with the EIA Directive 2011/92/EU 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*".

A description of the existing site and its surrounding is presented, together with the proposed design parameters. A summary of the demolition and construction phases of the development is also presented. This description sets the basis against which the specialist assessments presented in this EIAR were undertaken.

The proposed scheme will involve construction of a high-quality residential led development that will consist of 741 no. apartments in building blocks ranging in height from 4 to 23 storeys together with residential amenities and services and commercial and community uses.

The subject site is 'brown field' in nature and is currently used for car parking for CIE staff and commercial parking. The site contains a Protected Structure (Ref. No. 130) and 4 no. buildings/structures that will be demolished to make way for the proposed development.

The Department of Housing, Planning and Local Government have issued EIA Portal reference number is **2019168** for the proposed project and is available to view at http://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1.

The application may also be inspected online at the following website established by the applicant: https://theconnollyquartershd1.ie/

1.1 Site Location and Environs

The site is located adjacent and to the east of Connelly Station, Dublin 1. The site is bounded by Connolly Station and the railway lines to the west and north, Sheriff Street Lower to the south, Oriel Street Upper to the east, Oriel Hall to the northeast and the Irish Rail Control Centre (IRCC) to the north and east, and Seville Place to the north.

Further west of Connelly Station is Talbot Street which leads directly to O'Connell Street. To the south is George's Dock, located adjacent to the city's financial district, the Irish Financial Service Centre (IFSC) and the Docklands development area. The River Liffey is located approximately 450m south of the site. To the east there is a small area of inner-city housing bounded within the environs of the subject site by the Royal Canal and railway infrastructure servicing Connolly Station and Dublin Port. To the north and northwest is mainly inner-city residential areas with business and retail along the main thoroughfare of Amiens Street.

The site is an urban brownfield site which is currently used for ancillary facilities related to the functions of Connolly Station, such as railway sidings, maintenance facilities for trains, and administration facilities for various CIE departments. Most of the site consists of surface car parking (approximately 390 spaces) for customers and staff of Irish Rail. There is one small patch of scrub vegetation in the site near the main site entrance, 4 no. buildings associated with the railway operations, two telecommunication masts and ancillary storage containers.

The site comprises made up ground and has a shallow sloped terrain, with the higher ground located along the railway sidings and approximately 7m above the level of Sheriff Street Lower and Oriel Street Upper.

The site historically contained railway infrastructure and between Sherriff Street Lower and Oriel street Upper, where there is currently located a single storey red brick building (known as Oriel House or Great Northern Railway Office) which will be demolished.

The existing vehicular and pedestrian access to the site is from Sheriff Street Lower, there is also pedestrian access through Connolly Station for Irish Rail passengers and CIE staff using the car parking facilities. There are currently three vehicle entrances to the site, two from Sherriff Street Lower in the south of the site located adjacent to one another and one from the south end of Oriel Street Upper in the east of the site. Currently only the main carpark entrance from Sherriff Street Lower is in daily use.

Three pedestrian access doorways from Oriel Street Upper are blocked up with concrete masonry blocks. This wall is predominately a cut stone wall and is an element of the Protected Structure (RPS No. 130) which also consists of the Luggage Store and Warehouse and boundary wall fronting Sheriff Street Lower and the Stone Arches fronting Seville Place.

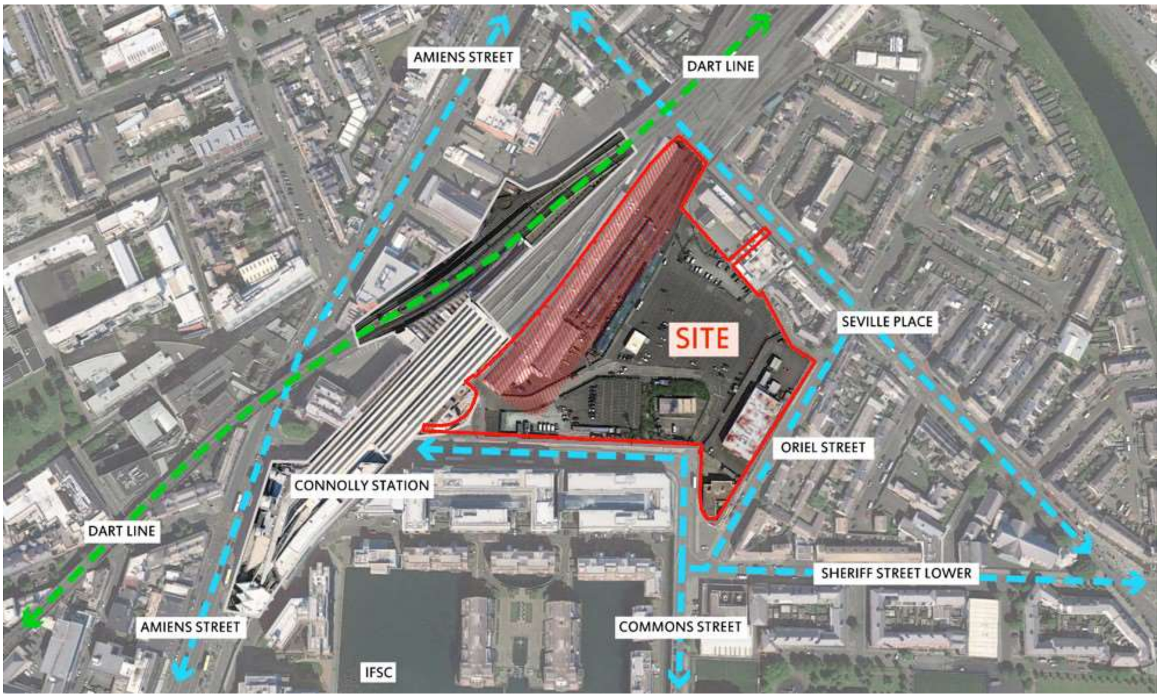


Figure 1-1 Site Location

The site is well connected being adjacent to Connolly Station, Busaras, and the Red Luas line; approximately 1km to O'Connell Street; approximately 2km to the M50 (port tunnel toll plaza), approximately 12km to Dublin Airport; and approximately 3km from Dublin Port.

Notwithstanding the strategic location, the site is currently strongly bounded by Connelly Station to the northwest; a high wall, raised ground level to Seville Place to the north, Oriel Hall to the northeast, a high wall to the east facing Oriel Street Upper; and a high wall (including the luggage store and warehouse) to the south facing Sherriff Street Lower. Thus, it has little or no relationship with its immediate local area, surrounded by high walls including additional high fencing and barbed wire along many sections of the boundary wall and/or buildings.

1.2 Masterplan

It is important to note that this application seeks permission for a 2.88-hectare site. However, this SHD application will only occupy part of the site.

This application for permission essentially constitutes the residential elements of an intended wider development proposal, that will include office and hotel blocks and will be subject to a separate section 34 application for permission and will be accompanied by an EIAR. The section 34 application is at an early stage of design and where definitive information is available it is considered in the cumulative assessment sections of individual chapters of this EIAR.

It is envisaged that the Masterplan development will comprise of the following additional blocks located to the south of the site:

- Block A - an office block
    - A 23,300 m^2 (GIA) office building with active frontage onto Sheriff Street Lower and forming a 'Gateway' into Connolly Square.
    - The building offer 9 floors of modern office space over the protected Luggage Store building which will be adapted to form the new entrance to the block.
- Block D3 – Hotel
    - A 9,229 m^2 (GIA) hotel buildings which is located on a prominent site at the intersection of Oriel St and Commons St. The building is arranged over 12 floors with guest amenity spaces offered at ground floor entrance and at the rooftop penthouse level.
- Block E - Office
    - A 6,988 m^2 (GIA) office building with active frontage onto Sheriff St Lower and forming a 'Gateway' into Connolly Square.
    - The building offers 8 floors of modern office accommodation over the protected Workshop Building.

It should be noted that the SHD application frontloads the essential infrastructure for the entire site including the main pedestrianised streets which form the block layouts and interconnection to the local street network, drainage infrastructure, and ancillary services. This provides clarity in terms of the overall plan for the site (SHD application and Section 34 application) and further detail is available in this respect within the **Masterplan** which accompanies this planning application to An Bord Pleanála.

1.3 The Applicant

Oxley Holdings Limited is principally engaged in the business of property development and property investment. Since its inception, Oxley's accelerated growth has resulted in a burgeoning presence both locally and overseas. It now has a presence across twelve geographical markets.

Oxley has a diversified portfolio comprising development and investment projects in Singapore, the United Kingdom, Ireland (Dublin Landings, North Wall Quay, North Dock, Dublin, Ireland), Cyprus, Cambodia, Malaysia, Indonesia, China, Myanmar, Australia, Japan and Vietnam. Oxley's expertise does not lie solely in property development; they also render project management and consultancy expertise in Myanmar.

Oxley's property development portfolio encompasses high quality residential, commercial and industrial projects. Key elements of Oxley's developments include prime locations, desirable lifestyle features and high-quality design. With a keen grasp of market sentiments and trends, Oxley has achieved remarkable growth since its inception.

1.4 Proposed Development

The development will consist of;

i. the demolition of 4 no. structures with a combined gross floor area of 3,028sq.m;
ii. the construction of 741 no. Build to Rent (BTR) residential units in 8 no. apartment blocks ranging in height from 4 storeys to 23 storeys with lower height buildings located adjacent to the northeast and east site boundaries, with a cumulative gross floor area of 68,535sq.m comprising;
    a. Block B1 (maximum building height 54.917m, total gross internal floor area 11,260sq.m, Apartment Mix: Studio: 25, 1-bed: 37, 2-bed: 51);
    b. Block B2 (maximum building height 54.917m, total gross internal floor area 10,831sq.m, Apartment Mix: Studio: 20, 1-bed: 35, 2-bed: 51,);
    c. Block B3 (maximum building height 51.767m, total gross internal floor area 9,766sq.m, Apartment Mix: Studio: 22, 1-bed: 60, 2-bed: 27, 3-Bed: 1);
    d. Block C1 (maximum building height 79.450m, total gross internal floor area 12,705sq.m, Apartment Mix: Studio: 84, 1-bed: 40, 2-bed: 41);
    e. Block C2 (maximum building height 39.615m, total gross internal floor area 4,890 sq.m, Apartment Mix: Studio: 9, 1-bed: 33, 2-bed: 3, 3-Bed: 4);
    f. Block C3 (maximum building height 39.650m, total gross internal floor area 6,775sq.m, Apartment Mix: Studio: 40, 1-bed: 18, 2-bed: 23);
    g. Block D1 (maximum building height 53.392m, total gross internal floor area 8,418 sq.m, Apartment Mix: Studio: 10, 1-bed: 25, 2-bed: 44, 3-Bed: 1);
    h. Block D2 (maximum building height 30.95m, total gross internal floor area 3,890 sq.m, Apartment Mix: Studio: 18, 1-bed: 8, 2-bed: 11);
iii. residential support amenities including 1 no. gym, a resident's lounge, work areas, meeting rooms, dining rooms, recreational areas with a combined GFA of 1,444 sq.m;
iv. change of use from club house to pedestrian passageway of the existing vault (137sq.m GFA) fronting Seville Place, a Protected Structure (RPS No. 130);

v. a basement of 7,253.4 sq.m with vehicular access from Oriel Street Upper incorporating residents' car parking (58 no. spaces), residents cycle parking (640 no. spaces) 7 no. plant rooms (combined 2,228sq.m), waste management facilities (393 sq.m)

vi. 766 no. covered cycle parking spaces for residents and visitors, concierge office (233 sq.m) and waste management facilities (126 sq.m);

vii. 'other uses' including 10 no. units providing retail, commercial, and community use with a combined GFA of 3,142 sq.m;

viii. A total of 18,562 sq.m of hard and soft landscaping comprising both public, communal and private open space located throughout the development;

ix. A service and emergency vehicle only access ramp from the Oriel Street Upper site entrance to serve CIE's transport needs at Connolly Station;

x. Enabling works of a non-material nature to safeguard the existing vaults (Protected Structures - RPS No. 130) that form part of the subject site fronting Sheriff Street Lower, Oriel Street Upper, and Seville Place during the construction phase;

xi. All associated ancillary development works including drainage, 6 no. electricity substations, pedestrian access; and

xii. Works to the Masonry wall fronting Oriel Street and the Vaults fronting Seville Place (both a Protected Structure) consisting of the creation of a new vehicular and pedestrian entrance.

A full description of the proposed developments is presented in **Chapter 2** of this EIAR.

The proposed development layout is illustrated on **Figure 1.2.**

FIGURE 1-2 DEVELOPMENT LAYOUT

1.5 Requirement for EIAR

Environmental Impact Assessment (EIA) requirements derive from EU Directives. Council Directive 2014/52/EU amended Directive 2011/92/EU and is transposed into Irish Law by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

Proposed development which falls within one of the categories of development specified in Schedule 5 of the Planning and Development Regulations 2001, as amended, which equals or exceeds, a limit, quantity, or threshold prescribed for that class of development must be accompanied by an EIAR.

The subject development does not fall within development classes set out in Part 1 of Schedule 5. It does exceed the thresholds applied for the type of development proposed as set out under Part 2 of Schedule 5, namely;

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

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

The proposed development includes 741 no. units on a site of 2.88 hectares in an inner-city location and accordingly exceeds the thresholds established for mandatory EIAR.

1.6 Purpose of Environmental Impact Assessment

The objective of the Directive (Directive 2011/92/EU), as amended by Directive 2014/52/EU, is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for environmental impact assessment (EIA), prior to development consent being given, of public and private developments that are likely to have significant effects on the environment.

The 2014 Directive for the first time provides a definition of EIA and this is now defined by section 171A of the Planning and Development Act, 2000 (as inserted by Regulation 16 of the 2018 Regulations).

It is defined as a process consisting of:

a) the preparation of an Environmental Impact Assessment Report (EIAR) by the developer;
b) the carrying out of consultations;
c) the examination by the competent authority of the EIAR, any supplementary information provided, where necessary, by the developer and relevant information received through consultations with the public, prescribed bodies and any affected Member States;
d) the reasoned conclusion of the competent authority on the significant effects of the project on the environment; and
e) the integration of the competent authority's reasoned conclusion into any development consent decision.

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

Section 2 of the 2000 Act has been amended to define an EIAR as 'a report of the effects, if any, which proposed development, if carried out, would have on the environment and shall include the information specified in Annex IV of the Environmental Impact Assessment Directive'.

1.7 Content of Environmental Impact Assessment Report

This EIAR addresses the matters detailed in Article 5(1) (a-f) of the Directive, including:

a) A description of the project comprising information on the site, design, size and any other relevant features of the project;
b) A description of the likely significant effects of the project on the environment;
c) A description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
d) A description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics and an indication of the main reasons for the options chosen, taking into account the effects of the project on the environment
e) A non-technical summary; and,
f) Any additional information specified in Annex IV of the Directive/Schedule 6 to the 2001 Regulations, as amended, relevant to the specific characteristics of the project and to the environmental features likely to be affected.

As is required by Annex IV of the 2014 Directive, this EIAR addresses matters including proposed demolition works, risks to human health, major accidents/disasters, biodiversity, climate change and cumulative effects with other existing and/or approved projects.

1.8 Competency

It is a requirement that the EIAR must be prepared by competent experts. For the preparation of this EIAR, Oxley Holdings Limited engaged McCutcheon Halley Chartered Planning Consultants to direct and coordinate the preparation of the EIAR and a team of qualified specialists were engaged to prepare individual chapters, the consultant firms and lead authors are listed in the **Table 1.1**. Details of competency, qualifications and experience of the lead author of each discipline is outlined in the individual chapters.

1.9 Format and Structure of the EIAR

This EIAR is prepared according to the 'Grouped Format Structure' as described in the Guidelines on Information to be Contained in an EIS (EPA, 2002). This means that each topic is considered as a separate section. The advantages of using this format are that it is easy to investigate a single topic and it facilitates easy cross-reference to specialist studies.

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

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

Volume II is presented as 16 no. chapters outlined in **Table 1.1**.

Chapter	Aspect	Consultant	Lead Consultant
1	Introduction	McCutcheon Halley Planning Consultants	Paula Galvin Davin Aiken
2	Project Description	McCutcheon Halley Planning Consultants / McCrossan O'Rourke Manning Architects / CS Consulting Group / Hansfield Investments Ltd.	Paula Galvin Davin Aiken
3	Alternatives Considered	McCutcheon Halley Planning Consultants / McCrossan O'Rourke Manning Architects / Hansfield Investments Ltd.	Paula Galvin Davin Aiken
4	Population and Human Health	McCutcheon Halley Planning Consultants	Paula Galvin Davin Aiken
5	Landscape & Visual	Bernard Seymour Landscape Architects	Bernard Seymour Arnaud Alatissiere
6	Material Assets: Traffic	O'Connor, Sutton, Cronin Consulting Engineers	Tony Horan Patrick Raggett
7	Material Assets: Built Services		Pat Moynihan
8	Land & Soils		Eleanor Burke
9	Water & Hydrology		Niall McMenamin
10	Biodiversity Bat Report	Openfield Ecology Bat Ecoservices	Pádraic Fogarty Tina Aughney
11	Noise & Vibration	Irwin Carr Consulting	Shane Carr
12	Air Quality & Climate		
13	Cultural Heritage - Archaeology	IAC Archaeology	Faith Bailey Grace Corbett
14	Cultural Heritage - Architecture	Hogan Architect	Clare Hogan
15	Interactions of the Foregoing	McCutcheon Halley Planning Consultants	Paula Galvin Davin Aiken
16	Summary of Mitigation Measures		

TABLE 1-1 CHAPTERS OF EIAR & CONTRIBUTORS

In preparing the EIAR the following regulations and guidelines were considered:

- The requirements of applicable EU Directives and implementing Irish Regulations regarding Environmental Impact Assessment;
- Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – DRAFT (Environmental Protection Agency, August 2017).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018).

In addition, specialist disciplines have had regard to other relevant guidelines, and where relevant these are noted in individual chapters of the EIAR.

1.10 Scoping

The purpose of scoping is to identify the information to be contained in an EIAR and the methodology to be used in gathering and assessing that information. Applicants are not required to seek a Scoping Opinion.

The scope of this EIAR is informed by the requirements of the Directive 2014/52/EU and the transposing Regulations. It was further informed by advice received from the specialist team engaged to prepare the EIAR and guidance provided by Dublin City Council received during section 247 pre-planning meetings and guidance provided by An Bord Pleanála received during the Pre-Application Consultation (PAC) process (case reference ABP-304248-19).

1.11 Cumulative

Table 1.2 shows the projects assessed for their potential cumulative effects as well as the **Masterplan** detailed in section 1.2.

Project Description	EIAR Chapter
The Exo building currently under construction at Point Square. This is a 17 storey office building which marks the 'Point Village' hub at the eastern edge of the Docklands quarter, in a gateway position with respect to Docklands, the city centre and the Liffey.	Chapter 5 - Landscape and Visual Impact
Capital Dock. This is a mid-rise cluster with a landmark 22 storey (79m) residential building at the corner of Sir John Rogerson's Quay where the River Dodder and the Grand Canal meet the Liffey River. Capital Dock occupies a similar gateway position and also marks one of the designated Docklands hubs ('Britain Quay').	Chapter 5 - Landscape and Visual Impact
Boland's Mills. This is a cluster of tall buildings around the Inner Grand Canal Dock, also marking one of the Docklands hubs. The buildings include the 17 storey (67m) 'Google Docks' (formerly known as the Montevetro building), the 16 storey Alto Vetro residential tower, Boland's Quay (three towers up to 14 storeys) and the 16 storey (63m) Millennium Tower.	Chapter 5 - Landscape and Visual Impact
Liberty Hall. The 17 storey (59.4m) building was Dublin's first tall building, standing on the north Quays near the Custom House.	Chapter 5 - Landscape and Visual Impact
Tara Street tower. Planning permission has been granted for a 22 storey (88m) building on Tara Street diagonally across the Liffey from Liberty Hall.	Chapter 5 - Landscape and Visual Impact
George's Quay Plaza. This is a development set back from George's Quay opposite the Custom House. It comprises seven interconnected volumes, the tallest rising to 13 storeys (59m).	Chapter 5 - Landscape and Visual Impact
Harbourmaster Place, George's Dock offices and Custom House Square apartments in Mayor Square.	Chapter 8 - Land and Soils

TABLE 1-2 PROJECTS CONSIDERED FOR CUMULATIVE IMPACTS

1.12 Impact Assessment Methodology

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

The identified quality, significance and duration of effects for each aspect is largely based on the terminology set out in the EPAs *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports* (2017) as summarised in **Table 1.3** below.

Quality of Effect	
Positive	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of and ecosystem, or by removing nuisances or improving amenities.

Neutral	No effects of effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
	Significance of Effect
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight Effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effect	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effect	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant Effect	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound Effect	An effect which obliterates sensitive characteristics.
	Duration of Effects
Momentary	Seconds to minutes
Brief	Less than 1 day
Temporary	Less than 1 year
Short-term	1-7 years
Medium-term	7-15 years
Long-term	15-60 years
Permanent	Over 60 years
	Extent and Context of Effects
Extent	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?).
	Probability of Effects
Likely	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
	Type of Effects
Indirect	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.

Cumulative	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
Do Nothing	The environment as it would be in the future should the subject project not be carried out.
Worst Case	The effects arising from a project in the case where mitigation measures substantially fail.
Indeterminable	When the full consequences of a change in the environment cannot be described.
Irreversible	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
Residual	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
Synergistic	Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SOx and NOx to produce smog).

TABLE 1-3 IMPACT RATING TERMINOLOGY

1.13 Consultation

A dedicated website for this proposed development is established and the EIAR is available at https://theconnollyquartershd1.ie/

Additionally, prior to lodging this application, the required information has been issued for the Department of Housing, Planning and Local Government's EIA Portal reference number **2019168**. The purpose of this tool is to inform the public, in a timely manner, of applications that are accompanied by an EIAR.

Extensive pre-planning consultation was held with Dublin City Council in advance of lodging this application. Guidance received is integrated into the design and in turn is assessed in this EIAR.

Where relevant specialists engaged with prescribed bodies and the details of advice received is provided in the individual chapters of this EIAR.

An Opinion was received from An Bord Pleanála following the pre-application consultation meeting and it contained details of the prescribed bodies to be notified of the making of this application. We can confirm that each identified body has received a copy of the application including the EIAR.

1. National Transport Authority;
2. Transport Infrastructure Ireland;
3. Irish Rail;
4. Commission for Railway Regulation;
5. Minister for Culture, Heritage and the Gaeltacht (archaeology and architectural heritage and nature conservation);
6. Heritage Council (archaeology and architectural heritage and nature conservation);
7. An Taisce - the National Trust for Ireland;

8. Failte Ireland;
9. An Comhairle Ealaion - Arts Council of Ireland;
10. Irish Water;
11. Dublin City Council Childcare Committee; and,
12. Irish Aviation Authority.

CHAPTER 2
PROJECT DESCRIPTION

OCTOBER 2019

Table of Contents

Table of Figures

Table of Tables

2. Development Description

This section of the Environmental Impact Assessment Report (EIAR) sets out the proposed development and provides details in relation to the construction and operational phases of the scheme.

2.1. Proposed Development

The proposed development will comprise of the construction of 68,535m^2 of new buildings, comprising of 741 build to let apartment units within 8 no. residential blocks (B1, B2, B3, C1, C2, C3, D1, and D2) that range in height from 4 story to 23 storey structures, over basement of 7,253m^2 for bicycle parking, car parking (58 no.), and building services plant, storage and waste management facilities.

Provision is made for 1,406 bicycle spaces located in the basement and at the ground floor level.

The total number and mix of residential apartment units are shown in **Table 2.1**. All blocks are connected by pedestrianised streets; and blocks are interconnecting via a semi-private 'Highline' walkway and open amenity space located 6m above ground level. The residential blocks extend over an active street level incorporating retail, café, commercial and community uses with an area of 3,142sq.m. The proposed site layout roof plan is shown in **Figure 2.1**.

FIGURE 2-1 - PROPOSED SITE LAYOUT ROOF LEVEL

The block heights are stepped with lower level blocks near the site boundaries with Oriel Street Upper (block D2) and Seville Place (block C2) cognisant of surrounding land uses. Block heights are highest along the Connolly Station site boundary (block B1, B2, B3) and the centre of the site (block C1 and D1).

Figure 2.2 shows the massing of the proposed development (viewed from the south) with the numbers showing the number of floors of each block.

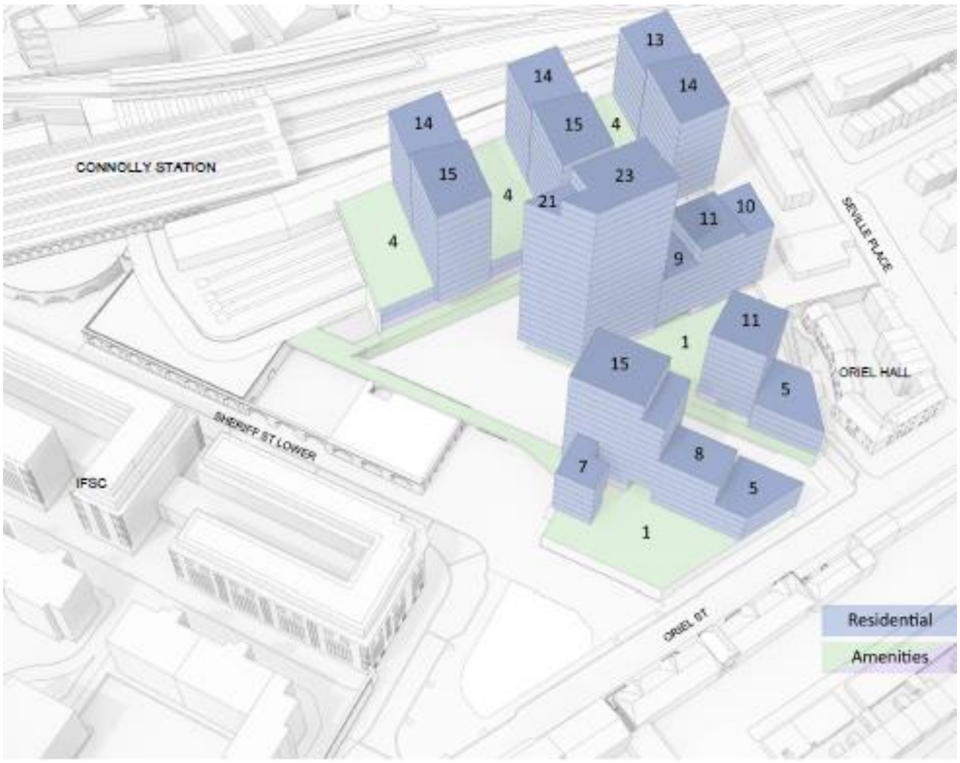


FIGURE 2-2 - PROPOSED SITE MASSING

Figure 2.3 illustrates the block locations and ground level pedestrianised streets providing access within the proposed development and connections to the surrounding streets and Connolly Station. Each block offers independent entrance/access from street level and from the highline level, thus activating the street level.

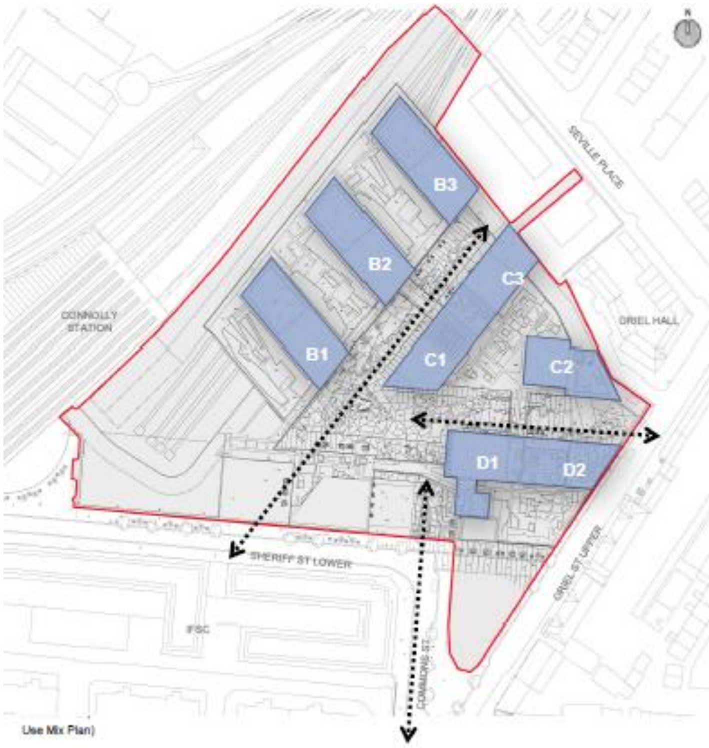


FIGURE 2-3 - PROPOSED BLOCK LAYOUT (B1,B2,B3,C1,C2,C3,D1,D2)

A breakdown of the residential make-up of the proposed blocks is presented in the **Table 2.1**.

Block Reference	Maximum Storey	Building height [m]	No. of Studios	No. of 1-bed	No. of 2-bed	No. of 3-bed
B1	15	54.917	25	37	51	0
B2	15	54.917	20	35	51	0
B3	14	51.767	22	60	27	1
C1	23	79.450	84	40	41	0
C2	11	39.615	9	33	3	4
C3	11	39.650	40	18	23	0
D1	15	53.392	10	25	44	1
D2	8	30.950	18	8	11	0
Total Mix (units)	**N/A**	**N/A**	**228**	**256**	**251**	**6**
Total Mix (%)	**N/A**	**N/A**	**30.8%**	**34.5%**	**33.9%**	**0.8%**

TABLE 2-1 - PROPOSED BLOCK DETAILS

The proposed residential support facilities and amenity areas are located in the ground floor and first floor of blocks C1, C2, and C3. The ground floor areas are illustrated in **Figure 2.4**. A vehicle turning area (circle) is also illustrated in Figure 2.4 located to the rear of block C for deliveries and waste collection.

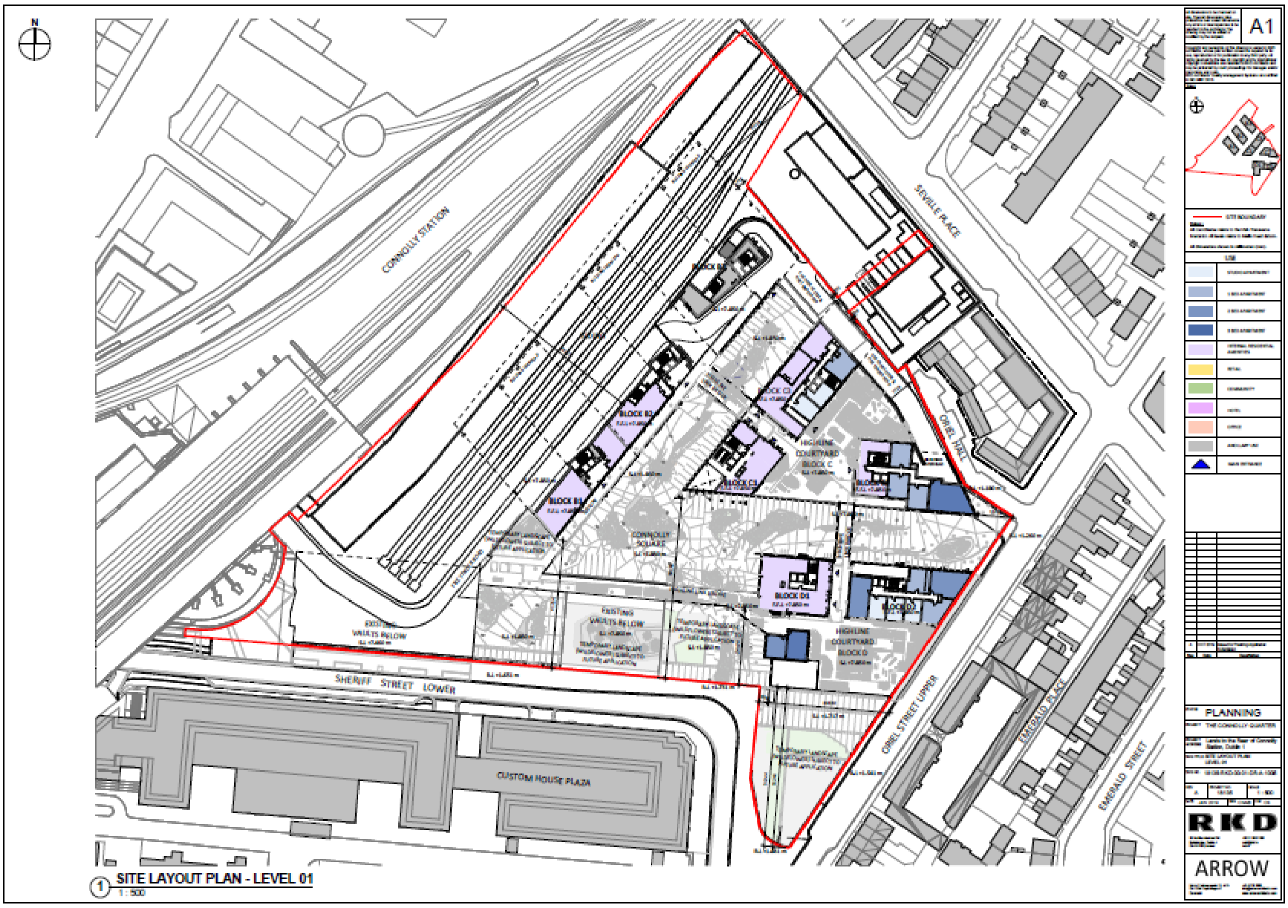


FIGURE 2-4 – LOCATION OF RESIDENTIAL SUPPORT AMENITIES & COMMERCIAL USES

The proposed retail, commercial, and community amenity areas and plant and services are located throughout the ground floor level of all blocks as illustrated in **Figure 2.5**

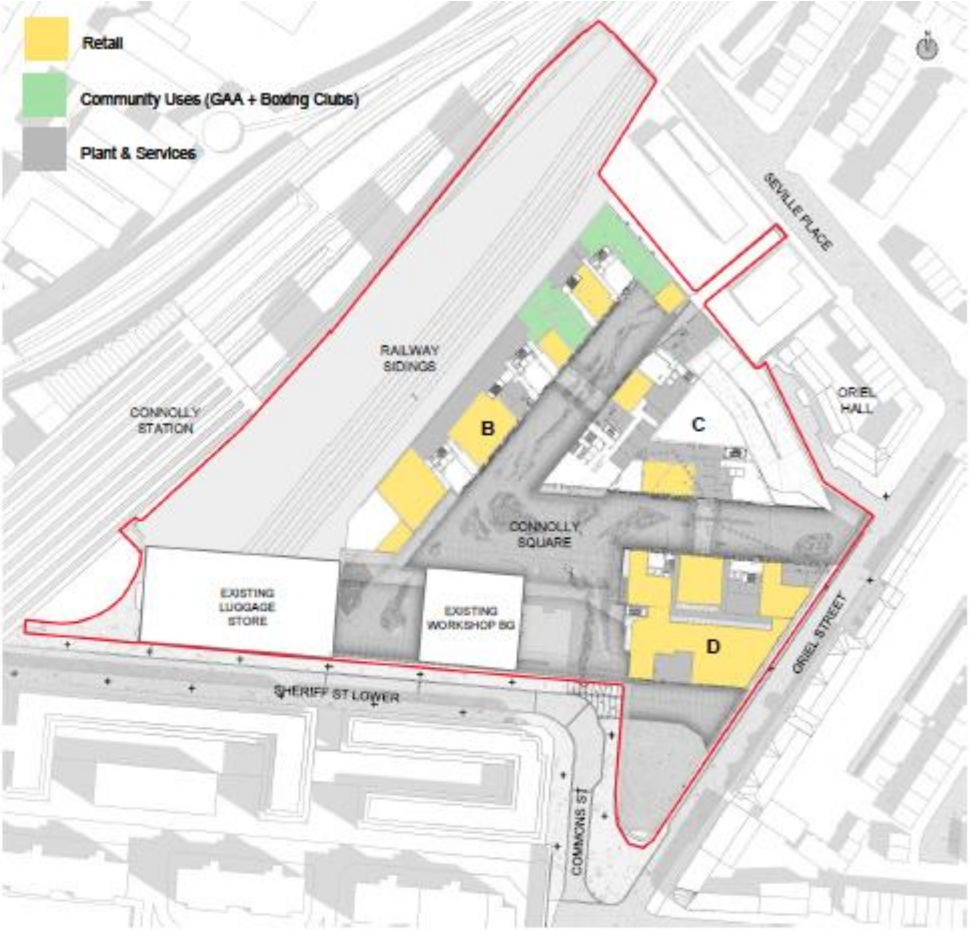


FIGURE 2-5 - PROPOSED RETAIL, COMMERCIAL, AND COMMUNITY AMENITY AREAS

2.1.1. Protected Structures

The site contains a Protected Structure (RPS No. 130), which includes all 19th century portions of the main railway station complex.

The Luggage Store (Sheriff Street Lower) and Workshop building (Sheriff Street Lower), located to the south of the site and shown in **Figure 2.6**, do not form part of this SHD application.

Works to elements of the Protected Structure are included in this application as access between the new public plaza and Sheriff Street Lower, Oriel Street Upper, and Seville Place. Full details of the proposed interventions are presented in **Chapter 14, Architectural Heritage**.

FIGURE 2-6 - PROTECTED STRUCTURES (RPS NO. 130)

2.1.2. Site Access

The proposed new vehicle site entrance located in the north part of Oriel Street Upper will be used for the construction phase and the operational phase (see **Figure 2.7**). Pedestrian access will also be provided. 6 no. pedestrian access points (1 no. from Sheriff Street Lower, 1 from Commons Street, 2 no. from Oriel Street Upper, 1 no. from Seville Place,) are proposed. The Development Agreement provides for the 1 no. access arrangements from the existing car spaces to Connolly Station to be maintained.

The public realm is conceived as a pedestrian priority urban environment with vehicle access within the new ground level open spaces restricted to emergency vehicles only. The landscape proposal at street level has been designed to accommodate this access requirement.

From the site entrance, vehicle access connects to a ground level service yard beneath Block C, ramped access to the single level basement accommodating 58 no. car parking spaces, and ramped access to an elevated deck above the existing railway sidings (within Block B floor 3), and access to the rear of Connolly Station along the west side and under Block B. This access will integrate with the existing access to Connolly Station and will maintain the provision for emergency services to access the Station.

Pedestrian access will be strictly controlled during the construction phase. Only Safepass accredited personnel will be permitted on site and daily in-out attendance records will be maintained. Safe pedestrian access points will be provided based on the stage of works and layout of the construction site.

Construction traffic will access the site via the existing access off Sherriff Street Lower and/or from the new site entrance from Oriel Street Upper when available) so as to minimise disruption on other routes as illustrated below. Once established the Oriel Street Upper entrance will be used for the construction phase. The routing will be strictly managed and controlled, and details will be incorporated into the traffic management plan.

It should be noted that it is likely that construction traffic accessing and egressing the site will contain soil/stone as a result of the site clearance and construction works. **Figure 2.7** shows the main construction vehicle and access via the north end of Oriel Street Upper with current station parking provided via Sherriff Street Lower. Also see **Figure 2.11** for a detailed image of this site entrance.

FIGURE 2-7 - CONSTRUCTION ACCESS AND TEMPORARY STATION PARKING

2.1.3. Flood Risk

A site-specific flood risk assessment (SSFA) accompanies the application and concludes that the site of the proposed development is within Flood Zone A/B and is in a defended area. Therefore, a Justification Test is required for the proposed development. All proposed highly vulnerable development will be provided at first floor level and above. The first floor will have a FFL of 6.0m AOD, which provides well in excess of the 500mm freeboard to the 1.0% AEP fluvial flood level recommended in the Greater Dublin Strategic Drainage Study (GDSDS).

The first floor FFL of 6.0m AOD is also well above the minimum FFL of 4.0mAOD recommended in the Dublin City Development Plan SFRA to mitigate tidal flood risk. It is further proposed to provide a walkway at first floor level linking all the proposed blocks. Access to the residential blocks will be provided at both ground floor level and at first floor walkway level; this walkway will link to Connolly Station and provide an alternative route for access/egress to residential areas.

The entrance to the proposed basement carpark will be provided with a mechanised flood gate and the basement will be constructed using flood resilient techniques.

The Justification demonstrates that the subject development passes the test. As the site is in a defended area, development works will not lead to a loss of active functional floodplain storage and so compensatory storage is not proposed.

2.1.4. Drainage (Surface & Foul Water)

A comprehensive surface water management system is proposed integrating a range of Sustainable Urban Drainage System (SuDS) measures including green roofs, pervious paving, attenuation storage, limiting discharge to the equivalent of greenfield runoff rates, infiltration, class 1 oil separators and rainwater harvesting are proposed.

Due to the nature of the proposed development, most of the extent of the site will be covered in roof; the remainder of the site comprises some of the ground-level thoroughfare where there is no basement below. It is therefore proposed to provide green and blue roofs to collect, treat, convey and store surface water runoff. Where the thoroughfare is on ground (i.e. no basement below), it is proposed to provide pervious paving to collect, treat, convey and store surface water runoff.

The roofs of each individual block (multiple levels) will include green roofs; the rainwater outlets (RWOs) from these roofs will be fitted with flow control devices to utilise the green roof for attenuation (i.e. a blue roof). The roof over the basement will also to utilised as a blue roof. It is proposed that the rainwater from all upper roof levels discharge to the blue roof over the basement and the pervious paving sub-strata.

While it is intended that only a small portion of the surface area of the site is trafficked (at the entrance to the basement carpark), the thoroughfare at ground floor level is designed to allow occasional vehicular access, including fire tender access. It is therefore proposed that all runoff from the site will pass through Class 1 petrol interceptors prior to discharge off site.

All runoff will be limited to equivalent greenfield runoff rates (2 l/s/ha) using flow control devices (e.g. vortex flow control, orifice plate) prior to discharge to the receiving sewers.

The proposed surface water and wastewater drainage system includes three separate outfalls to the existing combined municipal sewers on Sheriff Street Lower and Oriel Street Upper. Confirmation of Feasibility and Design Acceptance has been received from Irish Water and is included with this application.

Full details of the proposed surface water strategy is contained in the **Engineering Services Report** and the layout is illustrated on Drawing O635-OCSC-XX-XX-DR-C-0500 that accompany this application.

In the vicinity of the subject site, there is an extensive network of combined sewers (collecting both wastewater and surface water) in the ownership of Irish Water that is operated and maintained in conjunction with Dublin City Council. Drainage Record Plans provided by Dublin City Council indicate that there are no foul sewers (collecting only foul sewage) in the vicinity of the subject site. The existing combined sewers provide services to domestic, commercial and industrial customers in the immediate vicinity of the site and in the wider area.

The wastewater drainage will be to the combined sewers located in Sheriff Street Lower and Oriel Street Upper and the estimate for the average wastewater drainage volume is approximately 12.0 litres/second (l/s) or 1,037m^3/day and for surface water drainage volume is approximately 5.8 l/s or 501m^3/day. This will require the installation of underground supply pipes to the proposed development. These works will be minor in nature and will be completed under a road opening licence from Dublin City Council.

2.1.5. Potable Water Supply

It is proposed to connect to existing watermains in Sheriff Street Lower and in Oriel Street Upper. Irish Water has advised that an upgrade of water infrastructure, consisting of a 300/350mm-diameter watermain connecting to the existing 600mm-diameter trunk watermains at North Wall Quay and running for approximately 430m along Commons Street to the location of the site, will be required. The estimate for the daily average water consumption is approximately 11.5m^3/day. These works will be minor in nature and will be completed under a road opening licence from Dublin City Council. The proposed watermain layout is shown on O'Connor Sutton Cronin drawing O635-OCSC-XX-XX-DR-C-0540.

The proposed connections will supply a water tank room in the basement, from where the proposed development will be provided with a boosted supply. The demand is calculated as 309.3m^3 per day.

2.1.6. Energy

The residential units are designed in compliance with Part L of the Building Regulations for the conservation of fuel and energy and will meet the requirements for Nearly Zero Energy Building (NZEB). It is anticipated that the buildings will achieve a Building Energy Rating (BER) of A2 or A3 (approximately 40 kWh/m^2/year) depending on the location of the individual apartment.

The building services strategy for The Connolly Quarter is to utilise as many sustainable design options and energy efficient systems that are technically, environmentally and economically feasible for the project to achieve low energy and environmentally friendly buildings, while also providing quality accommodation maximising user health and wellbeing.

The preferred heating strategy taking cognisance of the above is a centralised low temperature heating scheme incorporating air source heat pumps, high efficiency condensing gas boilers, thermal storage, coupled to heat interface units within each apartment to provide space heating and instantaneous domestic hot water heating.

A **Sustainability Report** accompanies this application under separate cover and should be referenced.

2.1.7. Services

All services within the site will be located underground or within appropriate building services pipes, ducts, cables, etc. This section should be read in conjunction with **Chapter 7 Material Assets: Built Services**.

Gas Supply

It is proposed to connect to the gas supply system and provide underground gas pipelines within the development. It is anticipated that the new development will require approximately 9MW peak heating output. In Sheriff Street Lower, to the south of the site, there is a 180PE low pressure distribution pipe and a 125PE medium pressure distribution pipe. In Oriel Street, to the east of the site, there is a 125PE low pressure distribution pipe. In Seville Place, to the north of the site, there are two 125PE low pressure distribution pipes. This will require the installation of underground supply pipes to the proposed development. These works will be minor in nature and will be completed under a road opening licence from Dublin City Council.

Electricity Supply

There are no existing ESB power cables within the site. All proposed power cables within the development will be underground or internal within the building. The estimated maximum demand for the proposed development is in the region of 8MVA. Six new ESB sub-stations will be constructed within the subject site.

Telecommunication Fibre Cables

Any telecommunications networks in the proposed development will consist of cables in underground ducts or internally within the building. New connections will be provided via ducting connections to the existing on-street network. There are a number of telecommunication service provider networks in the vicinity of the subject site, comprising a combination of overhead and underground cables.

2.2. Construction Phase

2.2.1. Construction Hours

The proposed construction hours will be 07:00-19:00 on weekdays (Monday to Friday) and 08:00-14:00 on Saturdays with no works on Sundays or bank/public holidays in accordance with the Environmental Noise regulations 2006 and subject to final agreement with Dublin City Council (DCC).

In exceptional instances where works or deliveries (e.g. abnormal loads) are required outside of these hours, bespoke agreement will be sought from DCC prior to any works taking place. It is respectfully requested that any condition of planning regarding construction hours include a degree of flexibility to accommodate exceptional circumstances.

The appointed contractor will be required to prepare and adhere to a Site Environmental Policy Plan and any employed subcontractors will be required to adhere to its contents. Deliveries outside of hours will not be allowed access to the subject site.

2.2.2. Construction Personnel

Based on a construction contract value of approximately €250 million over a 56-month construction period, it is estimated that 60,000-man weeks of onsite labour will be required for the project. Based on industry standard figures it is likely that an average of 300 construction personnel will be on site on a daily basis. However, it is likely that this figure may approach 450 during periods of peak activity.

2.2.3. Demolition Works

It is proposed to demolish 4 no. existing disused Irish Rail buildings with a total gross floor area of approximately 3,028m^2, all hardstanding areas, and the removal of fill (including made ground). Further details are presented within section 2.2.9.Waste Management.

2.2.4. Phasing of Works

It is expected that the development will be constructed in 6 no. phases and will take approximately 240 weeks (or 56 months) based on the planning programme and on market requirements with some phases overlapping.

Construction will commence with the basement excavation and associated piling. Following on from the construction of the basement, work will commence on blocks C1, C2 and C3 followed, followed by, blocks B1, B2 and B3 alongside, and above, the realigned railway sidings. The final blocks to be completed will be D1 and D2. **Figure 2.8** shows the indicative construction phasing plan.

FIGURE 2-8 - CONSTRUCTION PHASING PLAN (INDICATIVE)

2.2.5. Construction Entrance & Compound

The construction site compound will be located in the southeast quadrant of the site, see **Figure 2.7**. Appropriate segregation will be employed to separate pedestrians from heavy construction equipment. Fenced off pedestrian walkways will be provided close to the site offices. The site will be hoarded off along its external perimeter. Openings will be provided to the hoarding line to accommodate personnel and vehicular access points to the construction site.

2.2.6. On-site Parking

On-site provision will be minimised to ensure travel by car is not encouraged while simultaneously being aware of the need to facilitate vehicle travel due to the nature of the work and seeking to avoid any potential overspill parking into the local area. Adequate numbers of cycle parking will be provided for site personnel and personnel will be encouraged to use public transport which is widely available in the surrounding area. A limited number of spaces will be provided for visitors. All vehicular access will be controlled at the gate where all access and egress will be recorded. All site personnel and delivery drivers will undergo a site induction. A Site Safety & Induction Room will be provided as part of the site construction facilities.

2.2.7. Construction Vehicle Numbers

Based again on a construction contract value of €250 million over a 56-month construction period, it is estimated that maximum construction vehicle numbers will be of the order of 120 movements spread across the course of the day which is considerably less than the traffic currently generated by the operation of the existing car park.

2.2.8. Traffic Management Plan

As part of the planning process, representatives of the developer have had a number of meetings with the Planning Authority including the Roads & Traffic Department. A number of documents have been produced in relation to Traffic Impact Assessment, Construction & Demolition Waste Management, Mobility Management Planning and this document. All of these have been produced with the aim of minimising the construction and operational phase impacts of the development.

Notwithstanding the above it is evident that the construction of the development, in a city centre location, will generate very significant traffic movements including movements of heavy goods vehicles. These vehicles will be involved in bringing deliveries to the site and removing waste and spoil from the site. Specific haul routes will be agreed and licensed between the Main Contractor and DCC. The site is located on the north side of the city and is approximately 9 kilometres from the M1-M50 junction via the Dublin Port Tunnel. It is also located just over 2.5 kilometre from the Dublin Port Tunnel southern access.

It is important that the most appropriate construction routes be identified in order to bring materials to and from the site in the most efficient and environmentally sensitive manner. It is noted that specific haul routes will be agreed and licensed between the Main Contractor and DCC. The site is located on the north side of the city and is approximately 9 kilometres from the M1-M50 junction via the Dublin Port Tunnel. It is also located just over 2.5 kilometre from the Dublin Port Tunnel southern access.

The following options are put forward for discussion (with reference to **Figure 2.9**) and the final details will be agreed with the Planning Authority prior to the commencement of construction works:

- The Green Route: this runs directly from the site to the Dublin Port Tunnel, through the tunnel and then along the old N1 to the M1-M50 junction;
- The Red Route: this route runs along Sheriff Street Upper and then East Wall Road to the old N1 at North Strand before turning right and running along the old
- N1 until it joins the green route beyond the Port Tunnel exit;
- The Navy Route: this runs along Seville Place and Portland Row before turning right onto Summerhill Parade and before joining the Red Route at the Ballybough Road East Wall Road junction.

FIGURE 2-9 - CONSTRUCTION HAUL ROUTES

2.2.9. Waste Management

O'Connor, Sutton, Cronin Consulting Engineers (OSCS) have prepared a **Construction and Environmental Management Plan** (CEMP), and a **Construction & Demolition Waste Management Plan** (CDWMP) to accompany the application for the proposed development. The CEMP and CDWMP will be further updated by the contractor and agreed with Dublin County Council prior to commencement of any construction (i.e. including demolition) works on site.

The CDWMP is designed so as to ensure the highest possible levels of waste reduction, reuse and recycling are achieved for the proposed development. Specifically, the CDWMP aims to achieve waste prevention, maximum recycling and recovery of waste. The plan has as a central tenet, the diversion of waste from landfill wherever possible.

The CDWMP describes the applicable legal and policy framework for C&D waste management in Ireland (both nationally and regionally), it also estimates the category and quantity of waste generated by the proposed development and makes recommendations for the bespoke management of the various waste streams. The plan also provides guidance on collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources).

The removal of existing made ground for basement excavation and pile arisings will result in the generation of some soils waste on the site. As the Connolly site is a brownfield site with a history of uses, there is a possibility that there were historical releases of hazardous materials on the site which may have impacted on the ground conditions.

It is noted that soil generated as part of the construction works will be managed in accordance with a Soil Waste Management Plan (SWMP) to be produced by O'Connor Sutton Cronin Multidisciplinary Consulting Engineers in advance of the construction stage. That report will identify the nature and classification of the soil waste and will detail management procedures to be implemented to ensure appropriate handling and disposal in accordance with Irish and EU legislative requirements.

OCSC has carried out an initial assessment of the amount of cut material that will arise as a result of piling and basement excavation and is given in **Table 2.2**.

Excavation material	Material Arising Volume (m^3)
Total made ground volume	74,000
Total natural ground volume	23,600
Overall arisings	**97,600**

TABLE 2-2 - BASEMENT EXCAVATION

The construction waste reuse, recycle & disposal worst case scenario amounts are given in **Table 2.3**.

Construction Waste: Reuse, Recovery, Recycle & Disposal							
Waste Type	**tonnes**	**Reuse / Recover**		**Recycle**		**Disposal**	
		%	**tonnes**	**%**	**tonnes**	**%**	**tonnes**
Soil & stone	156,160	0	0	0	0	100	156,1600
Concrete, brick, tiles	225	0	0	80	180	20	45
Asphalt, tars	5	0	0	25	1	75	4
Metals	25	5	1	90	22	5	2
Misc.	125	10	13	40	50	50	62
Total	**156,540**	**-**	**14**	**-**	**253**	**-**	**156,273**

TABLE 2-3 - CONSTRUCTION WASTE REUSE, RECYCLE & DISPOSAL AMOUNTS

Waste materials generated will be segregated on site where it is practical. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out. All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring disposal off-site will be disposed of at a facility holding the appropriate licence or permit, as required. Written records will be maintained by the contractor(s) detailing the waste arising throughout the construction and demolition phases, the classification of each waste type, the contact details and waste collection permit number of all waste contactors who collect waste from the site and the end destination and waste facility permit or licence number for all waste removed and disposed off-site. Dedicated bunded storage containers will be provided for hazardous wastes such as batteries, paints, oils, chemicals etc., if required. All information will be entered in a waste management recording system to be maintained on site.

2.2.10. Site Craneage

Tower cranes will be required whilst the exact number will be dictated by the programme and the specific construction requirements, it is likely that between five and eight tower cranes will be required. It is noted that to maximise efficiency of the tower cranes they will be supplemented by mobile cranes to facilitate lifts at and beyond the extremity of the reach of the tower cranes.

2.2.11. General Health and Safety Considerations

Health & Safety issues will be the primary concern for the appointed Contractors. This will apply in respect of persons working on the site and in respect of passing pedestrians, motorists or other transport carriers. In this regard the highest possible care will be taken in providing a detailed Construction Stage Health and Safety Plan in advance of works commencing on site.

Safety, health and environmental issues on the development will be a primary consideration in the construction methods adopted. The construction team will develop detailed *Health & Safety Plans*, specific environmental, fire and accident procedures to suit the construction sequence and methodology of the development. Contractors involved in the development will ensure that all non-English speaking employees are provided with relevant Health & Safety information in their national language. All contractors will be required to adopt the relevant skills certification required for that element of the works. A *Site Specific Safety Statement* and a detailed *Construction Stage Safety & Health Plan* will be compiled prior to any works on site and will be in accordance with the Health & Safety Authority and Local Authority guidelines.

2.3. Monitoring

2.3.1. Community Liaison

It is important that discussions with local residents, businesses and the general public commence well in advance of work commencing on site. The appointed Main Contractor will be required to follow best practice '*Code of Considerate Practice*' guidelines. The Considerate Constructor experience in Ireland has been that early positive and proactive engagement with businesses and residents impacted by building works is the best approach.

A Community Liaison Officer (CLO) will be appointed by the Main Contractor to lead and manage all community related issues. The CLO will initially host and attend regular community meetings. Following the initial meetings, the CLO will compile a list of stakeholders in the area. These stakeholders will be kept informed of progress and planned works on the site through the publication and distribution of a Monthly Progress Newsletter.

2.3.2. Air Quality

Appropriate Air Quality and Dust monitoring will be carried out and records will be kept of all such monitoring. Construction and demolition works will be carried out in such a way as to limit the emissions to air of pollutants (particularly dust and fine particles (PM10)), employing Best Practicable Means. Cover systems will be used on all vehicles removing spoil from site so as to minimise dust arisings on surrounding streets.

Trucks leaving the site will, as previously noted,will pass through a wheel washing system. In addition, these trucks will be watered down and covered as shown in **Figure 2.10**. This will be carried out in a dedicated wash down zone with dedicated site personnel. The use of appropriate water-based dust suppression systems will greatly reduce the amount of dust and windborne particulates as a result of the demolition process. This system will be closely monitored by site management personnel particularly during extended dry periods and in accordance with site management methods discussed earlier.

2.3.3. Construction Noise and Vibration

Noise monitoring for excavation and piling works will be carried out in accordance in accordance with Safety, Health and Welfare at Work (Construction) Regulations 2006 – 2012 Safety, Health and Welfare at Work Act 2005, BS 6187:2011 - Code of Practice for Full & Partial Demolition, BS 5228:2009 Code of Practice for Noise & Vibration Control on Construction & Open Sites.

Noise and Vibration monitoring will be carried out in accordance with any ABP or DCC planning consent and also in accordance with Safety, Health and Welfare at Work (Construction) Regulations 2006 – 2012 Safety, Health and Welfare at Work Act 2005, BS 6187:2011 - Code of Practice for Full & Partial Demolition, BS 5228:2009 Code of Practice for Noise & Vibration Control on Construction & Open Sites, Environmental Protection Agency Act 1992.

2.3.4. Waste Management

It is noted that waste generated as part of the construction works will be managed in accordance with a Soil Waste Management Plan to be produced by OCSC in advance of the construction stage. That report will identify the nature and classification of the soil waste and will detail management procedures to be implemented to ensure appropriate handling and disposal in accordance with Irish and EU legislative requirements. One of the construction team or the foreperson will be appointed as a Waste Manager to ensure commitment, operational efficiency and accountability.

2.3.5. Wheel Washing

A properly sized and designed wheel wash will be provided and maintained on site for the full duration of construction. Appropriate water collection and filtering will take place prior to discharge to the public sewer system. Gate staff will be trained to inspect vehicles for cleanliness prior to egress to the public road network and any trucks that have been inadequately cleaned will be returned to site.

2.4. Commissioning

The testing and commissioning of plant, machinery, and services in the buildings will be completed once works are sufficiently progressed. As the development is using tried and tested equipment, the testing and commissioning will progress without delay or effects that will be different to construction and operational effects. Testing and commissioning will not result in the additional emissions to the environment than will occur during the operational phase.

2.5. Operation and Maintenance

2.5.1. Property Management

A property management company will be engaged at an early stage of the development to ensure that all property management functions are dealt with for the development. Such as such as cleaning, landscaping, refuse management, utility bills, insurance, maintenance of mechanical/electrical lifts/ life safety systems, security, property management fee, etc.

This will help to ensure that the running and maintenance of the common areas of the development are completed and kept within annual operational budgets. Energy labelled white goods will be installed to reduce energy consumption and associated carbon emissions and costs. The design will include for residential aspects, such as accessibility and security. A residents' pack prepared by the property management company which will typically provide information on contact details for the managing agent, emergency contact information, transport links in the area, and a clear set of rules and regulations.

2.5.2. Facilities Management

The operation and maintenance of plant, machinery, and services in the buildings will be completed on an ongoing basis and will be completed by suitably qualified personnel and supervised by the building management company. The operational access is shown in **Figure 2.7** and this will be a new junction formed off Oriel Street Upper. Due to potential hazards to pedestrians and the blocking of sightlines, this junction will require the removal of 5 no. car parking on the west side of Oriel Street Upper near the proposed new access location.

The **Building Lifecycle Report** submitted with the application details that it is expected that a sinking fund allowance will account for future major maintenance and upgrade costs. A 10-year Planned Preventative Maintenance (PPM) strategy will determine the level of sinking fund required.

The Operational Waste Management Plan (OWMP) aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. The OWMP also seeks to provide guidance on the appropriate collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources). The plan estimates the type and quantity of waste to be generated from the proposed development during the operational phase and provides a strategy for managing the different waste streams. The OWMP estimated weekly volumes for the various waste types arising from all blocks for the residential and commercial/retail elements of the development are shown in **Table 2.4** and **Table 2.5**.

Residential Waste Type	**Material Arising Volume per week (m^3/week)**
Organic Waste	10.05
Dry Mixed Recyclables (DRM)	68.78
Glass	1.95
Mixed Non-Recyclable (MNR)/General Waste	45.75
Total	**126.53**

TABLE 2-4 - ESTIMATED WASTE GENERATION FOR THE RESIDENTIAL UNITS.

Commercial Waste Type	**Material Arising Volume per week (m^3/week)**
Organic Waste	10.05
Dry Mixed Recyclables (DRM)	68.78
Glass	1.95
Mixed Non-Recyclable (MNR)/General Waste	45.75
Total	**126.53**

TABLE 2-5 - ESTIMATED WASTE GENERATION FOR THE RETAIL/COMMERCIAL UNITS.

Implementation of the OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the *EMR Waste Management Plan 2015 – 2021*.

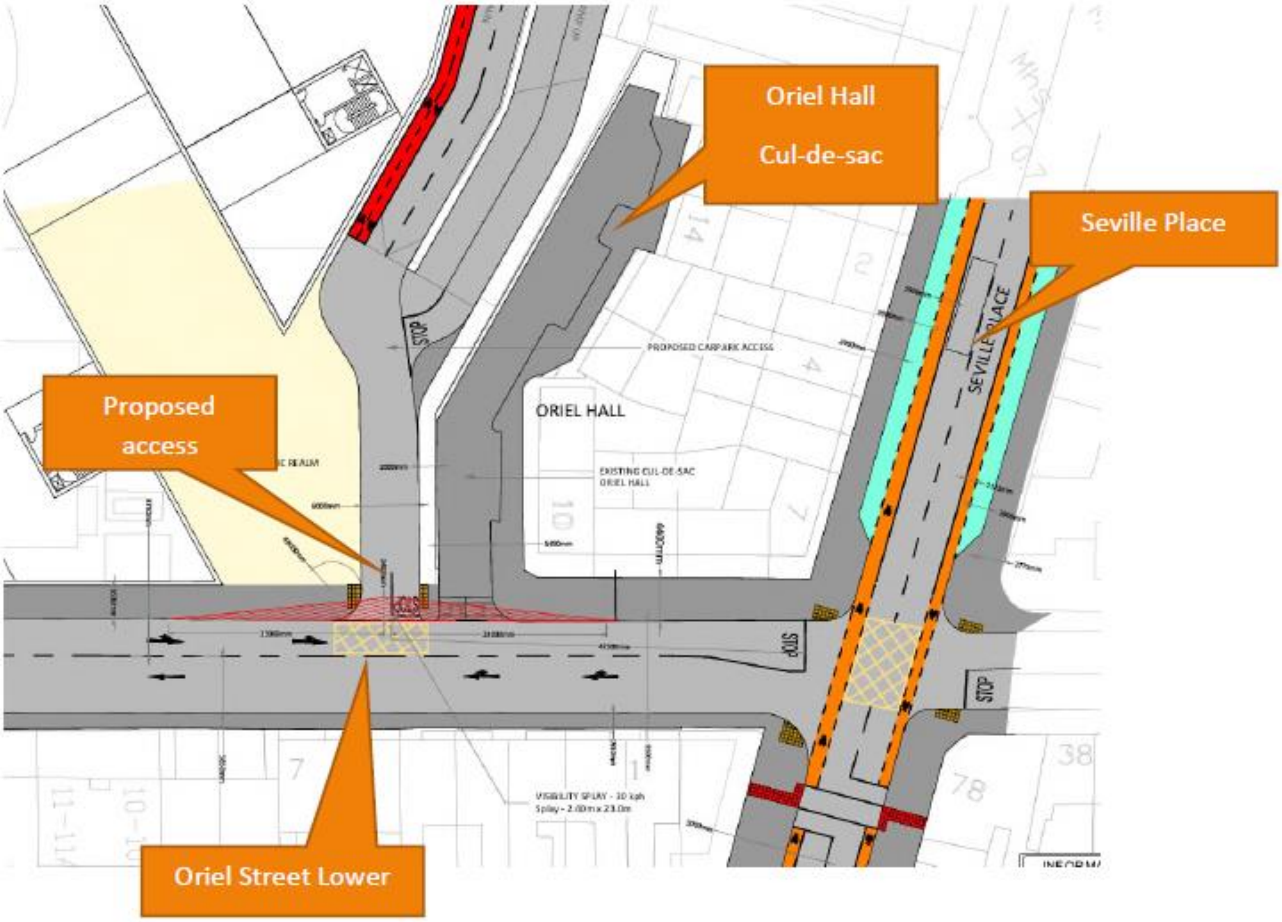


FIGURE 2-10 - PROPOSED OPERATIONAL ACCESS

The Quality and Road Safety Audits that accompany this application recommend that the junction of Oriel Street Upper and Seville Place be signalised, shown in lower right of **Figure 2.11**. It is recommended in this report that a toucan crossing (allow pedestrians and cyclists to cross at the same time without requiring cyclists to dismount and walk across the road.) facility is installed at this junction.

The operational and maintenance phase will result in energy and material consumption by the residents. The design of the proposed building element energy performance. The approach is to for each apartment to achieve a Building Energy Rating (BER) of A2 or A3, or an average unit energy consumption of approximately 40kWh/m^2/year. While these figures are referenced here in relation to apartment units, the figures are for the full development including the wider amenity and facility spaces. These design standards will minimise energy consumption and associated costs from the building throughout is lifetime. For further details on the design approach see the Building Life Cycle Report and the Sustainability and TGD L Report that accompany the application.

2.6. Decommissioning

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

CHAPTER 3
ALTERNATIVES CONSIDERED

OCTOBER 2019

Table of Contents

Table of Figures

Table of Tables

3 Alternatives Considered

3.1 Introduction

This chapter was prepared for the proposed development by Oxley Holdings Limited (the Applicant) for a strategic housing development (SHD).

This chapter was prepared by Davin Aiken of McCutcheon Halley Chartered Planning Consultants. Davin holds an BSc in Mechanical Engineering; a MSc in Renewable Energy Systems Technology; a Graduate Diploma in Environmental Impact Assessment; and a Graduate Certificate in Energy and Sustainable Development. He has 16 years-experience working as a developer and consultant in the private sector and has contributed to the preparation of EIARs for a range of sectors.

The requirement to consider alternatives within an Environmental Impact Assessment Report (EIAR) is set out in Annex IV (2) of the EIA Directive (2014/52/EU) and in Schedule 6 of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which state;

"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" (emphases added).

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

The Environmental Protection Agency (2017) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports - 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 in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required."

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

This section provides an outline of the main alternatives examined during the design phase. It sets out the main reasons for choosing the development as proposed, taking into account and providing a comparison on the environmental effects. For the purposes of the Regulations, alternatives may be described at three levels:

i. Alternative Locations
ii. Alternative Designs
iii. Alternative Processes

Notwithstanding the above, pursuant to Section 3.4.1 of the Draft 2017 EPA Guidelines, the consideration of alternatives also needs to be cognisant of the fact that *"in some instances some* *of the alternatives described below will not be applicable – e.g. there may be no relevant ‘alternative location’…”* The Draft 2017 Guidelines are also instructive in stating: *“Analysis of high-level or sectoral strategic alternatives cannot reasonably be expected within a project level EIAR… It should be borne in mind that the amended Directive refers to ‘reasonable alternatives… which are relevant to the proposed project and its specific characteristics’”*.

This chapter also assess an extant permission for the site, Dublin City Council planning reference 2863/11. This EIAR compares the proposed development and the extant permission as is required by Annex IV(5) of the Directive 2014/52/EU; that the “*the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources*”. This is also highlighted in the EPA (2017) draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports in section 3.7.1 Impact Assessment; which notes that “*Impacts should be described by reference to the individual environmental factors and their sensitivities. It may be useful to consider such impacts in light of the criteria listed in Annex III of the amended Directive*”.

3.2 Consideration of Alternatives

As part of the process of preparing the proposed development, at the outset an environmental appraisal was undertaken at a strategic level to assess the baseline environment and to understand likely significant environmental effects that may arise if the site was developed.

During that appraisal, the following matters were taken into consideration:

- Human Beings
- Flora and Fauna
- Soil
- Water
- Noise
- Air Quality
- Landscape and Visual
- Transportation
- Archaeology, Architectural Heritage, and Cultural Heritage

The appraisal concluded that of the soil samples subjected to the Waste Acceptance Criteria testing 100% of the soils underlying the Connolly site which may require excavation and disposal off site generally comply with the Non-Hazardous Landfill acceptance criteria.

Regarding cultural heritage it was concluded that the archaeological potential of the site is low and that the most significant aspect of cultural heritage within the vicinity of the proposed development area is Connolly Station owing to its architecture and association with Irish history. The Protected Structures (Ref. No.130) and importance of the wall was highlighted.

The biodiversity potential of the site was evaluated and given its location within a built-up area, the absence of habitats listed on Annex I of the Habitats Directive or records of rare or protected plants and the absence of alien invasive species, the site was determined to have negligible ecological value.

The proposed development is a brownfield site, is zoned for residential development and is earmarked for future development in the Dublin City Development Plan. The Plan identifies it as an area capable of absorbing height of 50m+ and accordingly it is confirmed as a site that is suitable for high-density residential development.

There is an extant planning permission (Reg. Ref. 2863/11) for a mixed-use development on the site of the proposed development, and it was in place at the time the Applicant entered into the development agreement with CIE. The extant planning permission includes the whole site, both this subject SHD application and the areas in the south of the site that are included in the masterplan for a future Section 34 application.

Although the character of the area will change with the implementation of the proposed high-density residential development, the outcome of the appraisal process was that development, would ultimately have a significant positive impact for the local population.

3.3 Alternative Locations

The Applicant's decision to enter into a development agreement with the landowner, CIE, was based on their proven track record of successfully deliver residential schemes to the market and the extant planning permission on the subject site (see section 3.4 for further details) which has an expiry date of 22nd May 2022.

The site's ability to satisfy environmental criteria was found to offer the following attributes;

- The application area offered the opportunity to bring a previously industrial brownfield site within the Dublin inner city into more constructive use, thus promoting the principles of compact growth.
- There is a Protected Structure (Ref. No. 130) within the site and the elements will be conserved from further deterioration by incorporation of parts of the protected structures into the proposed development.
- As industrial brownfield site, the subject land provides an opportunity to add to the quantum of much needed residential units, in an ideal location within Dublin inner city centre and within the Dublin Dockland Development area, located adjacent to a major transportation hub, and the financial services centre of the city.
- The site's location within walking distance of public transport corridors and nodes, and Dublin city centre, will promote a modal shift from the private car to more sustainable forms of transportation. This in turn will assist with achieving overarching environmental objectives such as improved air quality (CO_2, NO_2 and particulate emissions) and a reduction in noise pollution.
- The site is not subject to any statutory nature conservation designation and it is unlikely to impact on a designated European Site (Natura2000 network) as detailed in the appropriate assessment screening report that accompanies the application.

In light of the foregoing, it was considered that the application site offered a suitable location from an environmental perspective for the proposed development.

3.4 Alternative Designs

3.4.1 Extant Permission

Extant permission (DCC reference 2863/11) outlined three main options that were considered for the site and surroundings during the design process.

The extant permission proposal was to re-develop the site to incorporate buildings with a mix of uses, including retail, residential, commercial, community / heritage, and green space. **Figure 3.1** shows the layout of the extant permission and the main elements are outlined following:

- 13 blocks containing (1) Office, (2) residential, (3) live/work space, (4) creche, (5) retail / restaurant, (6) hotel, (7) community, (8) leisure, (9) circulation space, and (10) basement car parking on two levels.
- Incorporation of the protected structures (reference no. 130) within the proposed buildings.
- Proposed hard urban landscaping for the public main spaces/street and softer landscaping for the quieter semi-private (communal) and private courtyards and terraces.
- Green roof systems throughout for the attenuation of water flow from the site and biodiversity enhancing properties.
- An energy efficiency and renewable energy strategy.

The extant permission chose and progressed a mixed-use development that was granted planning permission.

It is noted, that there was a greater area available for the extant permission than was made available to the Applicant in the development agreement with CIE. In particular lands in the north of the site where the Irish Rail Control Centre (IRCC) building is located.

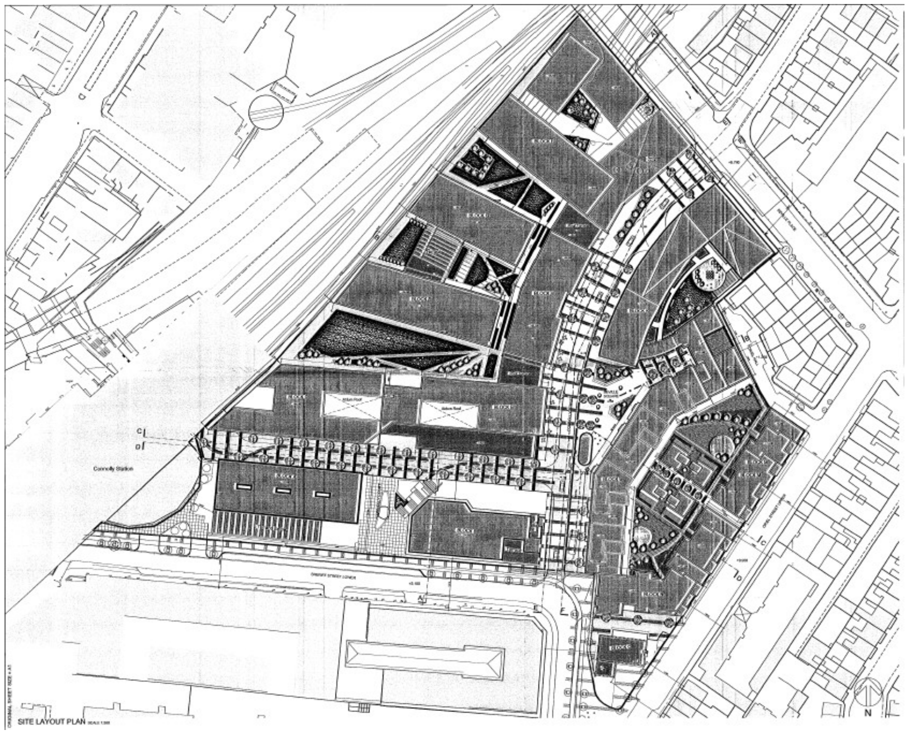


FIGURE 3-1 CONNOLLY QUARTER DEVELOPMENT LAYOUT 2011

Table 3.1 shows a comparison between the proposed development and the extant permission. The purpose of **Table 3.1** is not to present the accurate metrics of each scheme, but to only highlight the main similarities and differences from an EIA perspective.

Facility	Extant Permission	Proposed Development	Masterplan
Total site area	3.22 hectares	2.88 hectares	To be decided
Total development area (GIA)	81,538 m²	68,535m²	39,517m² (for a total of 108,052 m²)
Residential	106 apartments (15,460m²)	741 apartments	None
Office space	8 blocks (49,692m²)	None	2 blocks (30,288m²).
Hotel space	110 rooms (5,820m²)	None	14 floors (9,229m²).
Communal recreational space	3,105m²	6,026m²	Roof /terrace amenity space
Residential, commercial, and recreational space	5,301m²	7,094m²	None
Street level commercial	6,655m²	2,834m²	Exact space not yet defined
Car parking (public/CIE/residential)	550	58	None
Basement car park depth / area	c. -4.2m / 1.78 hectares	c. -3.0m / 0.7253 hectares	c. -3.0m / for hotel block only
Maximum building height	c. 25m (4 - 7 storeys)	c. 31m – 79m (8 - 23 storeys)	c. 47m (14 floors)

TABLE 3-1 - COMPARISON OF EXTANT PERMISSION AND PROPOSED DEVELOPMENT

While there are some similarities between the extant permission and the proposed development there are also key differences.

The similarities are:

- Both developments are mixed use developments containing at street level commercial units for retail, restaurant, hotel facilities and offices.
- Both developments provide for many communal facilities in the basement level (car & bicycle parking, storage facilities, water, energy, and waste management facilities) and in the first (podium / highline level), second, and third floor levels for hotel functional space, restaurants, landscaped terraced courtyard amenity, laundry, sports, and recreational (lounge/TV/games/work space/gym) spaces.
- Both developments utilise higher levels as residential landscaped courtyards and the implementation of green roofs and urban biodiversity enhancement.
- Both developments will implement attenuation for volume and flow rates from the development to the combined sewer network.
- The extant permission EIS committed to implementing a sustainable design, in terms of energy efficiency and renewable energy but no exact details were given. The proposed development will be implemented to a high level of energy efficiency and renewable energy as is required by the nearly Zero Energy Building (NZEB) standard (Part L of the Buildings Regulations).

The differences are:

- The proposed development contains approximately 22% greater gross internal area than the extant permission.
- The extant permission development was predominately an office space development while the proposed development is a residential development.
- The extant permission proposed a new street in a north-south orientation linking Sherriff Street Lower/Commons Street with a new junction in Seville Place, dividing the site with the office and hotel blocks to the west side and the residential blocks to the east side. The extant permission development 'internal' space is for pedestrians and cyclists.
- The extant permission contained 550 car parking spaces. The proposed development proposes 58 basement car parking spaces, the rationalisation of CIE car parking spaces from 390 to 180 spaces, and 1,409 bicycle parking spaces.
- The extant permission EIS detailed that the construction would be phased with construction taking approximately 10 years. In the CEMP accompanying the proposed development the construction duration will likely be approximately 56 months (4.6 years).
- The extant permission comprised of mid-rise blocks (up to 25m) while the proposed development contains a mixture of mid-rise (less than 50m) and high-rise (greater than 50m) blocks.

Overall, it is considered that the proposed development is a more efficient use of the subject lands and responds to the current demand for housing in Dublin City. A Housing Needs Analysis was undertaken and is included in the **Planning Statement** that accompanies this application, it identifies that 27,000 people commute daily to the IFSC and Docklands area to work. This is clearly unsustainable and a more optimum solution in terms of lifestyle would be to provide suitable accommodation close to centres of employment. This subject proposal meets that objective and would contribute to the principles of proper planning and sustainable development.

3.4.2 Section 247 and An Bord Pleanála PAC

Pre-Application Consultation was held with Dublin City Council under a Section 247 process and after this process was completed a Pre-Planning Consultation (PAC) process with An Bord Pleanala (ABP) was completed and the Bord issued its opinion on the 24th June 2019. The layout changes resulting from this consultation have positive environmental consequences and are:

- Considerations with regard to permeability, in particular the inclusion of the link to Seville Place and connecting the site with the wider community;
- Reduction in residential car parking spaces to a minimum (58 no.) thus promoting a modal shift with consequent environmental improvements; and,
- Revisions to the design to optimise the sunlight/daylight access to the buildings including;
  - removing overhanging balconies that had an adverse effect on daylight levels;
  - increasing the glazing to full width in living rooms on lower levels to increase daylight penetration
  - eliminating north facing units;
  - creating greater distances between buildings; and,

- reorientation of buildings to maximise each room's exposure to the sky and daylight.

3.4.3 Comparison of Proposed Development and Extant Permission

Key differences in the extant permission and the proposed development are:

- Change to the northwest site boundary and the exclusion of the IRCC building. Thus, in the proposed development block B3 is set back from Seville Place by approximately 30m.
- The extant permission includes for hotel and office space, located in the south of the site. The proposed development does not include any hotel of office development within this application, although the Masterplan that accompanies the application shows hotel and office development within the site that will be the subject of a future section 34 planning application.
- The size of the basement in the extant permission is much larger and to a greater depth than the basement in the proposed development.
- While the extant permission included a motorised traffic street through the site (north to south) the proposed development will be pedestrian streets only.
- The main site vehicular entrance for the extent permission is from Seville Place, while the main site vehicular entrance for the proposed development will be off Oriel Street Upper.

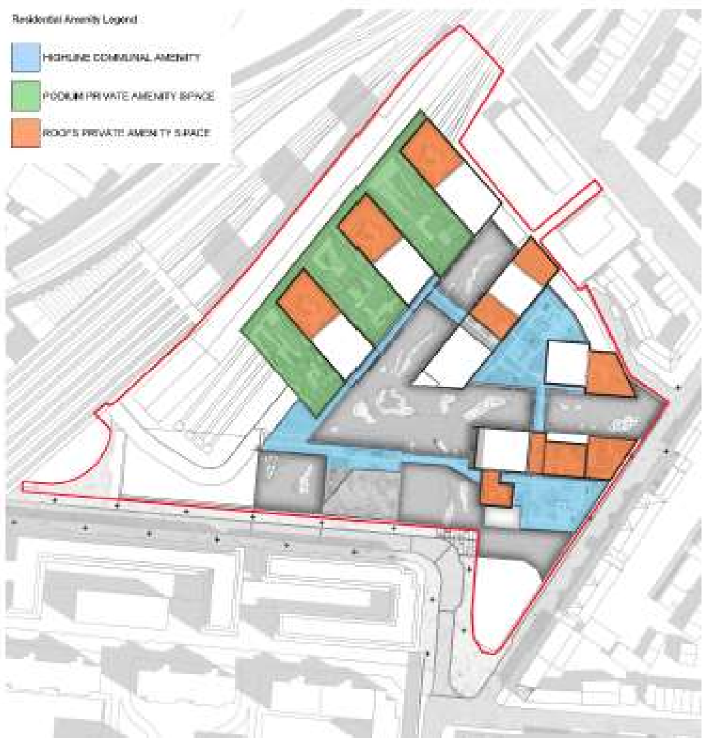


FIGURE 3-2 DEVELOPMENT AMENITY AND USES

The extant permission EIS was essentially compiled in 2011 and by a different project team. The planning application was lodged on the 17 June 2011, further information was received by Dublin City Council on the 9 February 2012, and the final decision to grant planning permission was made on the 11 April 2012. This is approximately 7.5 years ago.

During this interval there was much change in relation to the practice of environmental impact assessment, sustainable development practice, and climate change considerations in Ireland, the European Union (EU), and further internationally. Also, the general public's understanding of the actions required to tackle climate change in the next 10 years and 30 year have also undergone far-reaching change, which is back up by nascent international climate change agreements.

Table 3.2 gives a comparison of the residual impacts as detailed in the extent permission 2011 EIS and for the proposed development in this 2019 EIAR. Due to the above noted considerations, it was considered that for this 2019 EIAR, the existing site (surface car park, buildings, etc.) would be used as the baseline scenario. **Table 3.2** is included to give information to the component authority and the public to allow a comparison of the environmental impact between the proposed development and the extant permission. While also allowing a comparison between the baseline scenario of the existing site use and the proposed development as is completed within the other chapters of this 2019 EIAR.

Aspect	Residual Impacts 2011	Residual Impacts 2019
Introduction	N/A	N/A
Project Description	N/A	N/A
Alternatives Considered	N/A	N/A
Population & Human Health	Construction: Beneficial, short-term, Significant. Operation: Beneficial, permanent, Significant.	Construction: no negative residual impacts or effects. Operation: significant positive, permanent overall economic and social benefits for the local community
Landscape & Visual	Construction (landscape): Adverse, permanent, moderate. Construction (visual): Adverse, permanent, moderate.	Construction (landscape/townscape): significant, negative, short-term. Construction (visual): significant, negative, short-term. Operation (townscape): significant, positive, permanent. Operation (visual): range from slight positive to significant positive, permanent.
Material Assets: Traffic and Transport	Construction: adverse, short-term, slight Operation: Adverse, permanent, significant (cyclists on junction of Seville Place / Oriel Street Upper)	Construction: Adverse, moderate, short-term. Operation: neutral, slight, permanent.
Material Assets: Built Services	Construction: adverse, short-term, minor (not significant). Operation: adverse, permanent, minor (not significant)	Construction: [adverse, short-term, slight] Operation: neutral, permanent, not significant (water supply)
Land & Soils	Construction: adverse, short-term, not significant Operation: adverse, permanent, not significant	Construction: positive, slight, negative, short-term. Operational: negative, imperceptible, permanent.

Aspect	Residual Impacts 2011	Residual Impacts 2019
Water	Construction: adverse, short-term, not significant Operation: adverse, permanent, not significant	Construction: Neutral, not significant, short-term Operational: Positive permanent
Biodiversity	Construction: adverse, temporary, not significant Operation: positive, permanent, slight	Construction: neutral, short-term, imperceptible Operational: neutral, permanent, imperceptible.
Noise & Vibration	Construction: adverse, short-term, not significant. Operation: adverse, permanent, not significant	Construction: Deemed Insignificant Operation: Deemed Insignificant
Air Quality & Climate	Adverse, permanent, not significant	Construction: Not Significant Operation: Not Significant
Cultural Heritage - Archaeology	Adverse, permanent, not significant impacts	Construction: negative, permanent, imperceptible-profound. Operation: No residual impacts
Cultural Heritage - Built Heritage	Adverse, permanent, not significant to moderate direct impacts. Adverse, permanent, slight to significant indirect (visual) impacts.	Construction: negligible - significant (if wall impacted negatively during construction incident) Operation: No residual impacts
Mitigation measures	N/A	N/A
Interactions of the Foregoing	N/A	N/A

Table 3-2 - Comparison of the Connelly Quarter EIS 2011 and Connolly Station EIAR 2019

There are three main alternatives for this site:

- Do-nothing and retain the existing use as a car park and ancillary buildings.
- Implement the extant planning permission reference 2863/11.
- Progress the proposed development.

The subject SHD proposal was selected as the optimum alternative as it responds to the current housing crisis that exists within the City. The site is ideally located to support high density development, being adjacent to a range of public transport options and within walking distance of a wide range of employment opportunities. It is clear from the Housing Needs Assessment that there is a need for residential development. Creating high quality city centre living on a brownfield site is inherently sustainable. The proposed development will result in wide ranging environmental benefits including reduced greenhouse gas emissions and improved quality of life for people who will have the option to live closer to work thus reducing commuting times.

3.5 Alternative Processes

The residential units will be designed to comply with the new Building Regulations TGD L 2019 – Conservation of Fuel and Energy – Dwellings. This new version of TGD L includes the requirements for Nearly Zero Energy Building (NZEB). Dwellings compliant with NZEB will usually achieve a BER of A2-A3. To satisfy the new part L, 20% of the building energy must be provided via renewable technologies.

Several renewable and low carbon technologies were considered during the preliminary design process including;

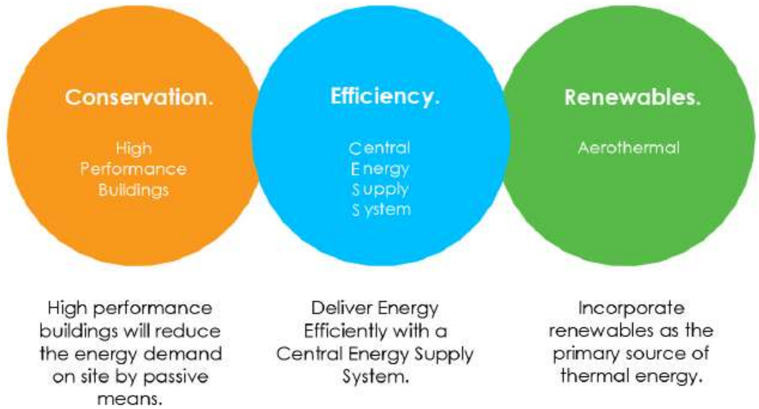
- combined heat and power (CHP);
- heat pump technology;
- biomass boilers;
- solar water heating;
- photovoltaic panels; and,
- wind turbines.

The building services strategy for Connolly Quarter is to utilize as many sustainable design options and energy efficient systems that are technically, environmentally and economically feasible for the project to achieve low energy and environmentally friendly buildings, while also providing quality accommodation maximizing user health and wellbeing.

The design team also recognizes the need for the development to be designed to maximize reliability and maintainability of the installations to efficiently operate the development in a sustainable manner.

The preferred Heating Strategy taking cognizance of the above is a centralized low temperature heating scheme incorporating Air Source Heat Pumps, High Efficiency Condensing Gas Boilers, Thermal Storage, coupled to Heat Interface Units within each apartment to provide space heating and instantaneous domestic hot water heating.

The implementation of a low temperature centralised distribution approach is a key component to providing the framework for integration of sustainable renewable energy technologies such as Air Source Heat Pumps, reducing heat distribution losses and at the same time reducing specific building energy consumption in a cost-effective manner considering economy of scale. This will require a lean approach in relation to the whole system design.



District heating systems generate heat in a centralised location and distribute it amongst multiple different buildings for space heating and domestic hot water heating. District heating has evolved where 1st generation systems typically distributed steam at high temperatures which resulted in high heat losses and operated at low efficiency to more recently 3rd generation systems which operated at lower temperatures of approximately 80°C flow temperature, 60-70°C return temperatures.

The system considered for Connolly Quarter is the natural progression to the previous iterations which is a Next Generation Low Temperature system operating at lower flow and return temperatures of 65°C Flow - 35°C return.

The central plant proposed incorporates Air Source Heat Pumps coupled with thermal storage as the primary Heat Source capable of offsetting 90% of the annual thermal demand. High Efficiency Condensing Gas Boilers will cover the remaining 10% of the annual peak thermal demand.

It is beneficial to close couple Heat Pumps with a Thermal Storage System (TES) for a number of purposes. TES could enable the proposed units to operate at low night-time electricity tariffs to generate low temperature hot water for heating and DHW at night which will be drawn off during the day to offset a proportion of the heating load.

The optimum solution will be finalized and decided upon once the associated finalized ratified calculation tool associated with TGD L 2019 is formally published by Department of Environment (DOE).

3.6 Difficulties Encountered

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

CHAPTER 4
POPULATION & HUMAN HEALTH

OCTOBER 2019

Table of Contents

Table of Figures

Table of Tables

4 Population and Human Health

4.1 Introduction

This chapter was prepared by Davin Aiken of McCutcheon Halley Chartered Planning Consultants. Davin holds an BSc in Mechanical Engineering; a MSc in Renewable Energy Systems Technology; a Graduate Diploma in Environmental Impact Assessment; and a Graduate Certificate in Energy and Sustainable Development. He has 16 years-experience working as a developer and as a consultant in the private sector and has contributed to the preparation of EIARs for a range of project types.

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

The Environmental Protection Agency (EPA) Guidelines on the Information to be contained in Environmental Impact Assessment Reports - Draft (2017) advise that "in an EIAR, the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in this EIAR e.g. under the environmental factors of air, water, soil etc."

This chapter addresses potential impacts of the proposed residential development on lands within the Connolly Station car park site at Sherriff Street Lower, Dublin 1, on population and human health. Potential impacts of this proposal on population and human health arising from traffic and transportation, air quality and climate, noise and vibration, townscape and visual, material assets: utilities and the risk of major accidents and/or disasters are dealt with in the specific chapters in this EIAR dedicated to those topics.

4.2 Proposed Development

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

The development will consist of;

i. the demolition of 4 no. structures with a combined gross floor area of 3,028sq.m;

ii. the construction of 741 no. Build to Rent (BTR) residential units in 8 no. apartment blocks ranging in height from 4 storeys to 23 storeys with lower height buildings located adjacent to the northeast and east site boundaries, with a cumulative gross floor area of 68,535sq.m comprising;

a. Block B1 (maximum building height 54.917m, total gross internal floor area 11,260sq.m, Apartment Mix: Studio: 25, 1-bed: 37, 2-bed: 51);

b. Block B2 (maximum building height 54.917m, total gross internal floor area 10,831sq.m, Apartment Mix: Studio: 20, 1-bed: 35, 2-bed: 51,);

c. Block B3 (maximum building height 51.767m, total gross internal floor area 9,766sq.m, Apartment Mix: Studio: 22, 1-bed: 60, 2-bed: 27, 3-Bed: 1);

d. Block C1 (maximum building height 79,450m, total gross internal floor area 12,705sq.m, Apartment Mix: Studio: 84, 1-bed: 40, 2-bed: 41);

e. Block C2 (maximum building height 39,615 m, total gross internal floor area 4,890 sq.m, Apartment Mix: Studio: 9, 1-bed: 33, 2-bed: 3, 3-Bed: 4);

f. Block C3 (maximum building height 39,650 m, total gross internal floor area 6,775sq.m, Apartment Mix: Studio: 40, 1-bed: 18, 2-bed: 23);

g. Block D1 (maximum building height 53,392 m, total gross internal floor area 8,418 sq.m, Apartment Mix: Studio: 10, 1-bed: 25, 2-bed: 44, 3-Bed: 1);

h. Block D2 (maximum building height 30,950 m, total gross internal floor area 3,890 sq.m, Apartment Mix: Studio: 18, 1-bed: 8, 2-bed: 11);

iii. residential support amenities including 1 no. gyms, a resident's lounge, work areas, meeting rooms, dining rooms, recreational areas with a combined GFA of 1,444 sq.m;

iv. change of use from club house to pedestrian passageway of the existing vault (137sq.m GFA) fronting Seville Place, a Protected Structure (RPS No. 130);

v. a basement of 7,253.4 sq.m with vehicular access from Oriel Street Upper incorporating residents' car parking (58 no. spaces), residents cycle parking (640 no. spaces) 7 no. plant rooms (combined 2,228sq.m), waste management facilities (393 sq.m)

vi. 766 no. covered cycle parking spaces for residents and visitors, concierge office (233 sq.m) and waste management facilities (126 sq.m);

vii. 'other uses' including 10 no. units providing retail, commercial, and community use with a combined GFA of 3,142 sq.m;

viii. A total of 18,562 sq.m of hard and soft landscaping comprising both public, communal and private open space located throughout the development;

ix. A service and emergency vehicle only access ramp from the Oriel Street Upper site entrance to serve CIE's transport needs at Connolly Station;

x. Enabling works of a non-material nature to safeguard the existing vaults (Protected Structures - RPS No. 130) that form part of the subject site fronting Sherriff Street Lower, Oriel Street Upper, and Seville Place during the construction phase;

xi. All associated ancillary development works including drainage, 6 no. electricity substations, pedestrian access; and

xii. Works to the Masonry wall fronting Oriel Street and the Vaults fronting Seville Place (both a Protected Structure) consisting of the creation of a new vehicular and pedestrian entrance.

4.3 Methodology

The application area and surrounds were visited on a number of occasions in 2018 and 2019 to inform this assessment. The purpose of the site walkover and survey was to identify characteristics of the subject land and surrounding area. Ordnance Survey maps and aerial photography were also examined to assist in this process.

In addition, a desk-based study of information on employment, education, health, tourism, amenity and community facilities was completed.

Publications and other data sources consulted include;

- National Planning Framework, Ireland 2040 – Our Plan (Government of Ireland, 2018)
- Regional Planning Guidelines for the Greater Dublin Area 2010-2022
- Regional Planning Guidelines for the Greater Dublin Area 2010-2022;
- Eastern and Midlands Regional Spatial and Economic Strategy 2019-2031;
- Dublin City Council Development Plan 2016-2022;
- Central Statistics Office (CSO) website www.cso.ie; and
- Department of Education and Sciences (DES) website www.education.ie

Additionally, reports prepared by McCutcheon Halley Planning Consultants and included in this application were consulted

- Social Infrastructure Audit (see Planning Statement)
- Housing Needs Assessment (see Planning Statement)
- Creche Demand Assessment

Information was gathered with respect to the demographic and employment characteristics of the resident population within the relevant catchment area, sourced from the 2006, 2011, and 2016 Censuses. The data collected included information on population, structure, age profile and household size, number of persons at work and the unemployment profile.

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

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018)
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Statements (EPA, 2002); and
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003).

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

4.4 Baseline Scenario

The following provides a description of the receiving environment, with a focus on demography, land use and local amenity.

The subject site is located in the Dublin City Council administrative area, within Zone 5 “City Centre”. The proposed development is located in the eastern portion of Zone 5 adjacent to Connolly Station.

The site is located adjacent and to the east of Connelly Station, Dublin 1. The site is bounded by Connolly Station and the railway lines to the west and north, Sheriff Street Lower to the south, Oriel Street Upper to the east, Oriel Hall to the northeast and the Irish Rail Control Centre (IRCC) to the north and east and Seville Place to the north.

Further west of Connelly Station is Talbot Street which leads directly to O’Connell Street. To the south is the Inner Dock and George Dock, located adjacent to the city’s financial district, the Irish Financial Service Centre (IFSC) and the Docklands development area. The River Liffey is located approximately 450m to the south. To the east is a small area of inner-city housing bounded within the environs of the subject site by the Royal Canal and railway infrastructure servicing Connolly Station and Dublin Port. To the north and northwest is mainly inner-city residential areas with business and retail along the main thoroughfare of Amiens Street.

For the purpose of this report, the study area is broadly based on the characteristics of the area within Zone 5 "City Centre" and Zone 1 "Sustainable Residential Neighbourhoods". The subject site is located within Electoral District (ED) North Dock C and together with North Dock B these two electoral districts constitute the north side of the Docklands area of the city centre. The ED is the smallest area for which census data is published and provides a detailed analysis of population and demographic statistics and trends.

The noted guidelines identify sensitive receptors as neighbouring landowners, local communities and other parties likely to be impacted by the proposed development. Surrounding developments including homes, hospitals, hotels, schools, rehabilitation workshops, and schools have been identified. Consideration has also been given to temporary populations such as tourists, walkers, cyclists, and drivers.

The sensitive receptors that will be impacted by air, noise and visual effects are discussed in the relevant chapters of this report. Presently, the receptors specifically relevant to this chapter include the existing residents of the two Electoral Districts (EDs) noted and the future residents of the proposed development.

4.4.1 Housing

The Government’s National Planning Framework (NPF) indicates that an increased housing output will be required into the 2020’s to deal with a deficit that has built up since 2010. To meet projected population and economic growth as well as increased household formation, the NPF states that an annual housing output of 30,000 to 35,000 homes per annum in the years to 2027 will be needed and sets a target for 25,000 homes to be constructed annually to 2021.

Within this output 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.

Within our cities, the Housing Agency has identified an aggregate need for at least 45,000 new homes up to 2020, more than 30,000 of which are required in Dublin City and suburbs.

The Department of Housing, Planning and Local Government, Homelessness Report (2018), indicated there were 1,326 homeless families recorded in Dublin during the week of 24th to 30th September. A further 3,940 people were accessing local authority managed accommodation in the same period.

According to the CSO Q3 New Dwelling Completions Report, 12,582 new dwellings have been completed in 2018, substantially below the output needed to meet housing delivery objectives. Similarly, the CSO reported only 14,446 new dwelling completions in 2017, well below the output targets. For context, the total population and total housing stock for 2006, 2011, and 2016 is given in **Table 4.1**. Over 10-years the population in Dublin City has increase by approximately 48,343 (9.5%) and the housing stock has increased by approximately 49,569 (26.0%). Although there was only a small increase in the housing stock between 2011 and 2016.

	2006	2011	2016	10 year increase
Total Population	506,211	527,612	554,554	9.5%
Housing Stock	190,984	241,678	240,553	26.0%

TABLE 4-1 POPULATION AND HOUSING IN DUBLIN (SOURCE: CSO)

The average household size within the two ED's in 2016 was 2.1 persons, compared with an average of 2.75 persons per household across the state. The Dublin City Council County Development Plan (CDP) 2016-2022 states that the population growth between 2013 and 2022 will be approximately 75,905 persons. The Development Plan details that in the (Strategic Development and Regeneration Area) SDRA 6 Docklands (including SDZ area and Poolbeg West) the capacity for residential units is approximately 4,600.

Table 4.2 shows the total housing in the North Dock B and North Dock C by unit type for the years 2006, 2011, and 2016. As can be seen the number of apartments increased considerably while the number of studio apartments is a comparatively low number when compared to any of the other type, with the exceptions of caravans.

Housing	**North Dock B and North Dock C**		
Accommodation Type	**2006**	**2011**	**2016**
House/Bungalow	4,470	4,613	4,715
Flat/Apartment	2,427	5,313	6,089
Studio	58	58	14
Caravan	17	9	0
Not Stated	435	485	137
Total	**7,407**	**10,478**	**10,955**

TABLE 4-2 - HOUSING IN STUDY AREA (SOURCE: CSO)

Housing within Dublin inner city will predominantly be needed to cater for young workers and young couples. The proposed development is consistent with this objective and will include a mix of studio, one-bedroom, two- bedroom and three-bedroom apartments to provide for this projected population.

4.4.2 Land Use

To facilitate the delivery of housing within the Dublin City Development Plan (CDP) 2016-2022 states that the population growth between 2013 and 2022 will be approximately 75,905 persons. The CDP details that in the (Strategic Development and Regeneration Area) SDRA 6 Docklands (including North Lotts and Grand Canal Dock SDZ area and Poolbeg West) the capacity for residential units is approximately 4,600, see extract from Map E of Dublin City Council CDP in **Figure 4.1**.

The areas within the Dublin SDRAs are to be capable of delivering a significant number of homes and employment for the city. SDRA 6 is to "*provide 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*".

Much of the lands to the north, west, and south of the subject site have been developed for residential and commercial purposes. while lands to the south-east in the Dublin Docklands have been developed in the last number of years with consented development construction currently ongoing.

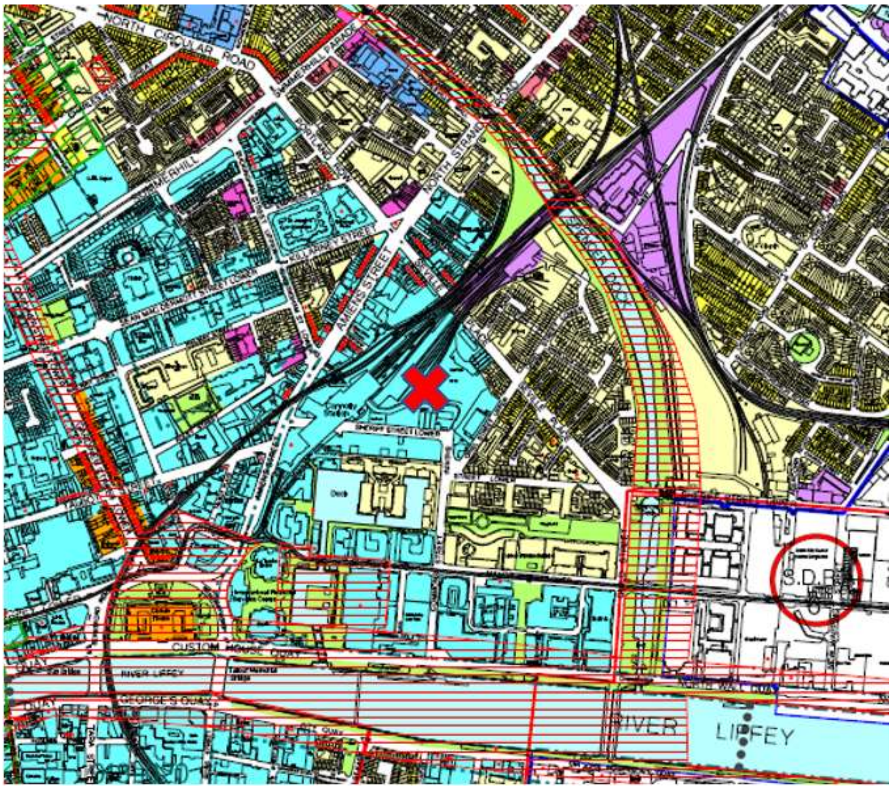


FIGURE 4-1 LAND USE ZONING

The CDP details that the site location is acceptable for a taller high-density type development like the proposed development. CDP section 4.5.4.1 notes that "*Clustering of taller buildings of the type needed to promote significant densities of commercial and residential space are likely to be achieved in a limited number of areas only. Taller buildings (over 50m) are acceptable at locations such as at major public transport hubs, and some SDRAs*" and "Connolly" is shown in CDP Figure 39 - Building Heights in Dublin Context.

The subject land is in zone Z5 – City Centre. The CDP notes in section 14.8.5 that "*The primary purpose of this use zone is to sustain life within the centre of the city through intensive mixed-use development*". The proposed development is considered consistent with the site zoning and objective and is deemed a permissible use under the Plan.

The primary adjacent land uses are detailed in **Table 4.3**. Also included are some highlight local area non-residential uses. Due to the site location within the inner-city area of Dublin there are many educational/training, health, sports/recreation, social/community, arts & culture, faith, and other amenities within approximately 2 km of the site. **Figure 4.2** shows some of the amenities in the Docklands Area within approximately 0.5 km of the site. There are also a number of SEVESO sites located in Dublin Port and Poolbeg, mainly for the petrochemical and power generation industry but these sites are not located near to the proposed development.

Boundary	**Adjacent land use (c.0.5 km)**	**Local area non-residential use (c.2 km)**
North	Residential properties to the Royal Canal (c.250m)	Lands zoned for enterprise and employment creation, recreational amenity near Royal Canal, Croke Park, Fairview Park.
South	Custom House Harbour mixed used residential and commercial and IFSC district further South and southeast.	National College of Ireland campus, Central Bank of Ireland, The Convention Centre Dublin, Bord Gáis Energy Theatre.
East	Residential properties, St Laurence O'Toole's Catholic Church and the Royal Canal further East.	3 Arena, ODEON Point Square, Dublin Port, Eastpoint Business Park,
West	Connolly station railway lines, platforms and building, residential buildings and a Top Service station, Failte Ireland HQ along Amiens Street.	Dublin city centre, O'Connell Street, Rotunda Hospital, Trinity College Dublin, Temple Bar, *et cetera*.

TABLE 4-3 ADJACENT LAND USES

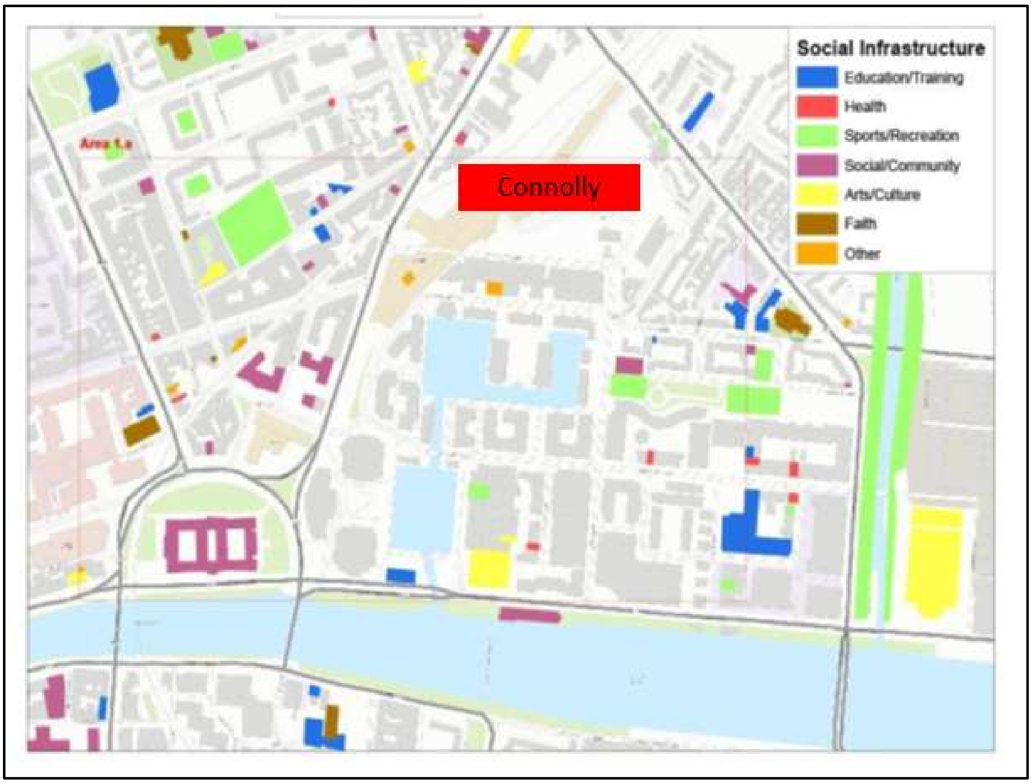


FIGURE 4-2 DOCKLANDS AREA 1A

There are few hotels located to the north, east, and southeast of the development site. These areas contain historic residential and industrial developments. Along the River Liffey and the Dublin Docklands Development area there are hotels to service the business district. To the west and southwest is the historic Dublin City area and there is a wide range of accommodation of all types available.

There are a range of public transport options located in close proximity to the site:

- Connolly Station which provided direct access to a variety of rails services (DART, Commuter Rail, and Intercity Rail).
- The site is approximately 500m from the Busáras bus station providing access to a wide variety of commuter routes.
- There are approximately 19 No. Dublin Bus routes within a short walking distance from the site.
- Cycle tracks/lanes on adjacent roads infrastructure (North Wall Quay, Guild Street to the North Strand Road) to be further improved by the development and delivery of Greater Dublin Area Cycle Network Plan.; and,
- Good quality pedestrian infrastructure on adjacent links and through the proposed development linking to key destinations locally within a short walking distance.

The current proposal will aid in consolidating the delivery of new high-density residential development in this strategic location adjacent to the Connolly Station, in accordance with the aims of Zone Z5 and the SDZ.

4.4.3 Demographic Profile

This section draws on statistical data sourced from Census 2006, 2011 and 2016. The study area comprises two Electoral Districts (ED) North Dock B and North Dock C shown in **Figure 4.3**.

FIGURE 4-3 NORTH DOCK B AND NORTH DOCK C ELECTORAL DISTRICTS

Examination of the Census 2016 figures on population profile in **Table 4.4** shows the difference between the population in the Docklands area and national averages. **Table 4.4** and gives us the following insights into the resident population:

- There is a greater than the national average percentage of single persons and two-person households in the North Dock B and North Dock C areas.
- The population is young, with a substantially greater than the national average percentage of the population in the 20 – 40 age group.
- The population has fewer children, with a substantially smaller than the national average percentage of the population of families (couples and single parents) with children.

	North Dock B	North Dock C	% of Total	National Average
Total Population	7,695	4,214		
Single persons	5,173	2,889	67.7%	53.6%
Married / Civil Partnership	2,039	1,032	25.8%	37.6%
20 – 40 age group	4,896	2,548	62.5%	35.3%
2-person families	928 families	452 families	58.1%	39.5%
Couples with children	430 families	181 families	13.0%	35.2%
Mothers with children	260 families	145 families	8.6%	9.0%
Fathers with children	26 families	19 families	1.0%	1.5%

TABLE 4-4 POPULATION PROFILE 2016 (SOURCE: CSO)

Table 4.5 shows population trends and that in the 10 years from 2006 to 2016 there was:

- an increase of 4,040 persons of all ages (51.3%).
- an increase of 2,680 persons of persons in the 20 - 40 age group (66.7%).
- an increase of 645 persons renting from private landlords (43.6%).
- an increase of 645 persons renting from all landlords (37.8%).
- an increase of 256 in the number of 2-person households (82.5%).
- an increase of 286 in the number of 1-person households (31.5%).
- an increase of 1,850 in the number of persons educated to degree level and above (115.3%).

	2006	2011	2016
Population	7,869	11,240	11,909
20 – 40 age group	4,021	6,512	6,701
Workers	3,087	7,070	7,920
One-person households	908	1,235	1,194
Two-person households	1,019	1,826	1,860
Renting	2,091	2,973	2,882
Renting from landlord	1,480	2,242	2,125
Educated to Degree level and higher	1,604	2,972	3,454

TABLE 4-5 POPULATION TRENDS

4.4.3.1 Age and Gender Profile

The population of the study area comprises 6,325 males and 5,584 females. The largest cohort is within the 20-29 age category, being 3,550 persons or 29.8% of the population closely followed by the 30-39 age category, being 3151 persons or 26.5% of the population.

Young persons aged 0-14 years totalled 577 in 2016 within the study area, comprising 4.8% of the total population. Older people aged 60 years and over were a relatively small proportion of the population, totalling 1,169 persons, i.e. 9.8% compared to the national average of 18.3%.

4.4.3.2 Affluence and Deprivation

The Pobal Deprivation Index is Ireland's most widely used social gradient metric, which scores each small area (50 – 200 households) in terms of affluence or disadvantage. The index uses information from Ireland's census, such as employment, age profile and educational attainment, to calculate this score.

The North Dock C was identified as having a deprivation index of 3.49 in 2016, which is considered 'marginally above average'. The North Dock B was identified as having a deprivation index of 11.10 in 2016, which is considered 'affluent'. Both ED's have improved (i.e. are becoming more affluent) since 2006.

4.4.4 Employment

The working age group is identified as persons within the 15-64-year age cohorts. The majority the population within the study area are within the working age cohort, being 82.9% of the population. In 2016, census data revealed that 7.2% of the population in the study area were unemployed and 3.8% were looking after home/family, and 6.6% were retired.

4.4.5 Education

Census 2016 recorded the level of educational attainment for 10,955 persons aged 15 years and over within the study area. Of those respondents, 1,427 did not provide details (17.1%). Of those that did respond, a total of 793 persons (9.5%) had completed primary school. An additional 1,526 persons (18.3%) had completed secondary school. A further 4,492 persons (53.7% of respondents) had attained a tertiary level qualification.

The wider area contains 10 no. primary and 6 no. secondary schools within approximately 15 minute walk from the site of the proposed development. There are also many third level institutions located within Dublin City centre.

4.4.6 Social Infrastructure

The wider area is well served by a range of community facilities, and some examples are given in **Table 4.3** and **Figure 4.2** above.

Dublin City centre is a modern capital city and contains a wide variety of social infrastructure necessary for successful communities, i.e. shops, schools, libraries, community centres, cultural spaces, health centres, facilities for the elderly and persons with disabilities, childcare facilities, parks, and other facilities and spaces for play and recreational activity. **Figure 4.4**. shows the future development of the Dublin Docklands cultural quarter which has and will likely continue to add to social infrastructure available close to the site of the proposed development.

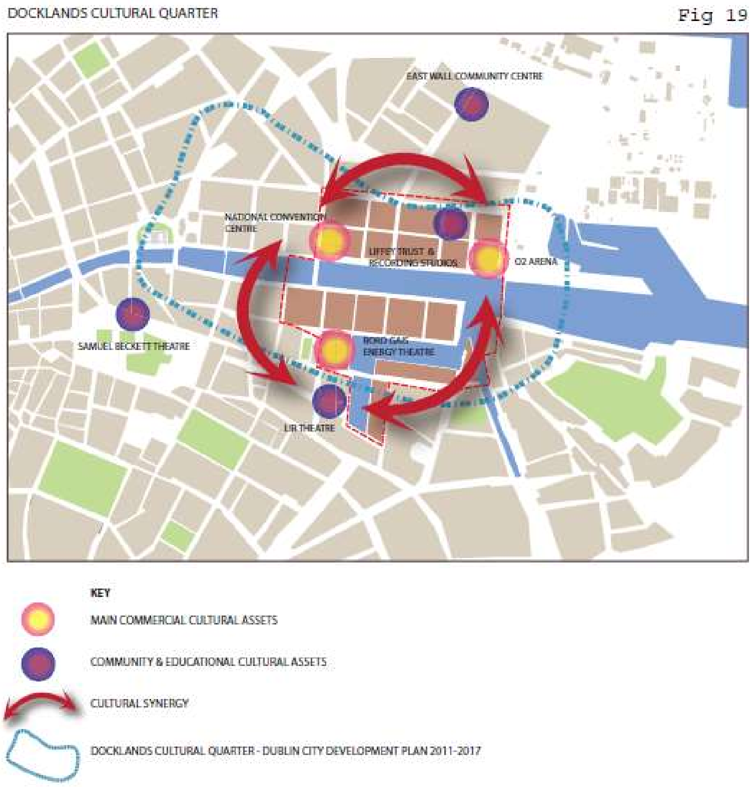


FIGURE 4-4 SOCIAL INFRASTRUCTURE PLAN

4.4.6.1 Health Services

The Mater University Hospital and the Mater Private Hospital are located approximately 1.5km to the northeast of the subject site and provide health and residential support services all ages. The Rotunda Hospital is located approximately 1.1km to the east of the subject site and is a maternity hospital. The National Maternity Hospital is located approximately 1.4km to the south of the subject site and is a maternity hospital. Saint James Hospital is located approximately 3.2km to the west of the subject site and provides health and residential support services all ages.

4.4.6.2 Community and Amenity Services

The nearest park (including a playground and all weather pitches) to the subject site is the Crinan Strand Mariners Port located approximately 200m to the southeast. There is a park on Foley Street located approximately 400m to the west. Fairview Park and the Clontarf Road, fronting Dublin harbour are located approximately 1.1km and 2.4km to the northeast.

The Central Library is located approximately 1.1km to the west. In addition, Dublin City Library & Archive Community Centre is located approximately 0.9km to the south of the subject lands. The North Wall Community Development Project (CDP) is located approximately 250m to the east.

4.4.7 Principal Receptors

In identifying receptors that may be potentially impacted by the construction and operational stage of the proposed development, consideration was given to the proposed residential scheme and the identified receiving environment. As identified in the land use section above, the application's immediate context is predominantly residential with mixed use of commercial and public, communal & private amenity and social infrastructure, health services, community and amenity services.

4.5 Do Nothing Scenario

If the proposed development is not realised, it is anticipated that the subject site would remain a brownfield site in its current use mainly as a surface carpark in the short to medium term. The subject site is a significant for its central location in Dublin inner city adjacent/within Dublin Docklands SDZ and is recognised within the CDP as having potential for the provision of much needed high-density living space. The location of this site adjacent to Connolly Station increases its strategic importance, as reflected in the provisions of the SDZ which identifies it as an area appropriate for higher density residential development.

Should the subject site remain undeveloped at this time, current problems of inadequate housing supply will be exacerbated, including further pressure on the affordability of new homes for young people and families.

4.6 Difficulties Encountered

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

4.7 Impact Assessment

This section of the assessment describes those effects that are likely to arise in the absence of mitigation. Section 4.7 sets out the mitigation measures required to alleviate such effects and the assessment of impacts post mitigation is presented in the Residual Impact Section.

Potential Impacts are considered under the following headings:

- Land use
- Human Health Impacts
- Population & Economic Activity Impacts
- Local Amenity Impacts

In each case construction and operational impacts are considered.

4.7.1 Construction Phase

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

4.7.1.1 Land Use

The proposed development complies with the statutory land use zoning. There will be no severance of land, loss of rights of way or amenities as a result of the proposed development. In fact, the proposed development will create new links within the site and through the site from the surrounding streets.

Development of the subject land is aligned with the objective of the NPF to achieve increased housing output and meet projected population and economic growth as well as the inclusion of mix use commercial and amenity provision. The proposal is also consistent with the NPF objective of compact growth to be delivered within and within Dublin inner city, including higher residential densities along public transport corridors.

The impact is likely and will have a permanent significant positive effect that will achieve local and wider county, regional and national objectives.

4.7.1.2 Human Health

O'Connor, Sutton, Cronin Consulting Engineers (OSCS) have prepared a Construction and Environmental Management Plan (CEMP), and a Construction & Demolition Waste Management Plan (CDWMP) under separate cover, to accompany the application for the proposed development. The CEMP and CDWMP will be further updated by the contractor and agreed with Dublin County Council prior to commencement of any construction (i.e. including demolition) works on site.

Construction sites pose potential risks to the health and safety of the public. However, all construction activities will be carefully managed to comply with relevant operational health and safety, as well as environmental requirements, to prevent adverse impacts upon the public.

The protection of public safety will also be achieved by the erection of hoarding and barriers at the site. In addition, access will be restricted, controlled and monitored by security personnel to ensure there are no risks to the public associated with the construction works.

With mitigation measures in place, an adverse effect is unlikely, neutral, short-term and not significant.

It should be noted that the potential for effects on human health during the construction phase are dealt with in this EIAR under the more specific topics of the environmental media by which they might be caused including air, traffic, and noise.

4.7.1.3 Population and Economic Activity

A key characteristic of the proposed development in terms of its potential economic impact relates to its capital value, of which a significant portion will be for the purchase of Irish sourced goods and services. The construction phase will provide a boost for the local construction sector in terms of employment generation and capital spend on materials and construction labour costs.

It is expected that an average of 300 people will be working directly on the construction site and during peak activities this will increase to approximately 450 people. The staff will comprise of managerial, technical, skilled and unskilled workers. As far as practicable local labour will be employed. It is unlikely that the proposed development will increase the population of the area as a result of the construction phase.

In addition to direct employment, there will be substantial off-site employment and economic activity associated with the supply of construction materials and provision of services such as professional firms supplying financial, architectural, engineering, legal, and a range of other professional services to the project.

It is anticipated that the construction phase of the project will take place over a period of approximately 56 months. Revenue generated during the construction phase will have an associated benefit for the local area with respect to expenditure on local goods and services.

The impact of the construction phase will at least extend to the county in terms of the requirement for labour, goods and services. The effect will be positive short-term, and moderate.

4.7.1.4 Local Amenities

Construction activities will occur in the context of a brown-field site. There are no existing residential dwellings within the site that will be disrupted by these works.

Existing residential dwellings situated within approximately 30m of the boundary of the site are located in Oriel Hall, Seville Place, Oriel Street Upper, Sheriff Street Lower, and Custom House Harbour. There are also a number of additional streets located within approximately 100m of the site (predominately located to the north, east and south) and are therefore located sufficiently close to the development site for disturbance arising from noise or dust.

For the duration of the construction works there will be an increase in the number of vehicular movements, including trucks along the local road network. However, the Traffic Impact Assessment (TIA) included with the planning application shows that this increase will be less than 5% for the majority of junctions within the study area. Two junctions, Seville Place/Oriel Street and Seville Place/Sherriff Street Upper will likely have a slightly greater increase during peak traffic flow but this will be well within the normal capacity limits of these junctions.

St Laurence O'Toole's CBS, Senior Boys' Primary School and St Laurence O'Toole Girls School are located approximately 50 metres and 140 meters to the north-east and south-east respectively. At these distances the amenity of students, staff and visitors are unlikely to be adversely impacted during the construction phase.

Any effects will be a slight negative and short-term impact. Please refer to Chapters 5, 6, 11 and 12 of this EIAR for information on the effects on landscape and visual, traffic, noise & vibration, and air quality.

4.7.2 Operational Phase

4.7.2.1 Land Use

The proposed development complies with the statutory land use zoning. It will deliver 741 no. residential apartments, including 10% or 74 no. apartments that will be provided for the purposes of Part V social housing.

Given the existing housing crisis, it is anticipated that a high-density residential development at this location would result in a likely significant positive impact with a permanent duration as it would realise the aim of increased housing output, consistent with the objective of compact growth to be delivered within Dublin inner city, including higher residential densities along public transport corridors and taller buildings near Connolly Station.

The proposal will achieve high-density residential development, being an efficient use of a zoned and serviced brown-field landbank to provide inter alia much needed housing together with high-quality amenities for future occupants. Any effects will be a moderate positive and permanent impact

4.7.2.2 Human Health

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

The integration of energy efficient measures into the design will provide for healthier living standards for future occupants and less dependence on fossil fuels for energy generation with a resultant benefit to air quality and thus the positive impact is likely to be locally significant and of permanent duration.

Adequate and appropriate exposure to light is critical for health and well-being. Light impacts human health and performance by enabling performance of visual tasks, controlling the body's sleeping and walking system and affecting mood and perception.

A **Daylight, Sunlight and Overshadowing Report** prepared by Integrated Environmental Solutions (IES) accompanies this application under separate cover. The suggested design changes in the IES report are included in the proposed application.

In terms of access to amenity space sunlight 68% of the amenity areas in the development as a whole receive more than 2 hours of sunlight on March 21st, the Proposed Development exceeds Building Research Establishment (BRE) recommendations.

In terms of average daylight factors 98% of the tested rooms in the proposed scheme are projected to have an Average Daylight Factors (ADF) above the recommended Average

Daylight Factors (ADF) from the BRE guidelines. The report notes from 2 levels above garden level the pass rate achieved is 100%.

In terms of shading on surrounding properties, the impact of the proposed development is almost identical to that from the previously permitted (the extant permission) scheme as shown by the images in Section 3.

Vertical sky component analysis has been completed to ensure the proposed development meets the recommendations of the BRE guidelines. The analysis was completed for the existing neighbouring properties:

- Oriel Hall
- Oriel Street upper
- St Laurence O'Toole Court House Complex

The results within this report show from all of the points tested. The results are as expected for a high-rise development and analysed correctly as per BRE Guidelines and of no greater impact than the previously permitted scheme.

A summary of the local impacts is shown in **Table 4.6**.

Location	**Impact of proposed development**	**Location Impact of consented development**	**Change**
Oriel Hall	Major adverse	Major	14 better, 4 negligible, 10 worst
1-7 Oriel Street Upper	Minor to moderate adverse	Minor to major adverse	Better overall. 12 within guidelines, 11 better, 1 worse but only marginally outside standard guidelines
8-10 Oriel Street Upper	Moderate to major adverse	Major adverse	Better in all cases.
St Laurence O'Toole Court House Complex	Major adverse	Major adverse	19 better, 12 worse, some substantially worse

TABLE 4-6 SUMMARY OF IMPACTS TO NEIGHBOURING PROPERTIES

The IES report notes that the "*neighbouring properties at Oriel Hall and on Oriel Street Upper are currently almost completely unobstructed and have high existing Vertical Sky Components (VSCs). The development would have a moderate to major adverse impact on most of them. However, the consented development would also have a moderate to major adverse impact. When comparing the impacts of the proposed and consented developments, some windows would be less affected and some would be more affected, such that there is no clear improvement or dis-improvement when all the neighbouring properties are considered together*".

The assessment of the proposed development against the baseline scenario, which is the site as currently exists, is that the construction effect will be short-term, adverse, significant effect.

The assessment of the proposed development against the baseline scenario, which is the site as currently exists, is that the operational effect will be permanent, adverse, significant effect to a small number of properties. This is an inner-city brownfield site and its development is supported at national planning policy level. The benefits of developing the site are wide ranging and the type and form of development is consistent with emerging trends to ensure consolidation of the urban footprint and efficient use of land.

Insufficient physical activity has been identified by the World Health Organisation as the fourth leading risk factor for global mortality. Urban air pollution and traffic injuries are also responsible for a further 2.6 million deaths annually. Pedestrian and cycle access is proposed in accordance with the Dublin City Development Plan. All streets around the site are accessible to pedestrians. There are two marked cycle routes adjacent to the site in Sheriff Street Lower and Seville Place. These cycle lanes adjacent to the site will allow cyclists to easily access the wider Dublin cycle network.

The proposed scheme prioritises both pedestrians and cyclists and promotes the use of public transport, thereby encouraging active movements for future occupants. The proposed development also includes gym and fitness amenities for residents. The health benefits of active transport (walking and cycling combined with public transport) can prevent many of these deaths from physical inactivity.

Overall, the construction phase of the proposed development, in terms of human health on the local population is anticipated to be likely, short-term, negative and moderate.

Notwithstanding the impact identified in the Daylight/Sunlight/Shadow assessment to a small number of properties, taken as a whole and in the common good, overall, the operational phase of the proposed development, in terms of human health on the local population is anticipated to be likely, permanent, positive and significant.

4.7.2.3 Population and Economic Activity

In terms of the operational phase, the potential employment opportunities associated with the proposed development will be low given its residential nature. However, there will be landscape gardening, cleaning, amenity service personnel, security, and management jobs arising from its occupation.

The provision of up to 741 no. quality residential units and including the residential amenity provisions within the proposed development will have a significant permanent positive impact on the Connolly Station environs, contributing to the regeneration of Dublin inner city.

The new residential population will generate additional spending within the area which will likely have a permanent moderate positive impact on local economic activity generated through the multiplier effect. This increase in population will also support the ongoing provision of an efficient public transport system.

4.7.2.4 Local Amenity and Services

The proposed layout provides for excellent public amenity and recreational facilities, including an overall provision of 18,562sq.m of public, communal and private open space for the site. The amenity areas required to be provided in accordance with Planning Guidelines 28 - sustainable Urban Housing: Design Standards for New Apartments is to provide 4,003sq.m of private amenity and 4,003sq.m of communal amenity space.

The proposed development will provide 4,032sq.m of private amenity space and an additional 6,221sq.m of communal amenity space made up of private balconies, residential terraced gardens, internal residential amenity (which includes gym/fitness space, bar/lounge space, private dining space, work space, games room, private cinema, etc) and communal amenity space (Highline level and podium gardens). The total amenity space to be provided is 10,253sqm which exceeds the guidelines by approximately 28%.

A detailed landscape plan and report has been prepared by BSLArch Landscape Consultants and can be found in the Architects Design Statement which accompanies this application. The landscape plan provides details of the proposed public realm and landscaping treatment for the site. The landscape plan includes proposals for street furniture and street tree planting, for public, communal, and private outdoor landscaped areas.

The proposed development also includes an elevated walkway connecting all residential blocks called the 'Highline' level. The Highline is a dedicated communal open space realm which is shared by the entire Connolly Quarter residential community.

The provision of these amenity facilities within the development will be of benefit to future residents and existing residents in the local environs.

Pedestrian connections between adjacent streets are included in the proposed development, linking the site to Sheriff Street Lower, Oriel Street Upper, Seville Place, and Commons Street. The network of pedestrianised streets will ensure full permeability and connectivity between the subject site and the facilities beyond. The effect of this is significantly positive and will have a permanent duration.

The proposed development comprises 741 no. units, with a total of 484 no. units comprising one-bedroom and studio apartments. Accordingly, 257 no. units to be provided could accommodate families. Utilising the average household size of 2.7 persons per unit, in accordance with standardised Census of Population data for the State, 257 no. units will generate a population of 694 persons. According to Census 2016 the average family in the State contains 1.38 children (0-18 years old) and so the proposed development would theoretically accommodate 355 no. children aged between 0 and 18 years old.

In terms of pre-school care, data extrapolated from Census 2016 identified that approximately 4.4% of 0-18-year olds in Dublin City are aged 1-4 years. The proposed development would thus generate a requirement for 38 no. pre-school places.

The CSOs Quarterly National Household Survey (QNHS), Childcare, Quarter 3 2016 is the most current available published data on childcare statistics. It reports that nationally;

- 13% of children aged 0-12 years are cared for in a crèche/montessori/playgroup/after-school care, with parental/relative care accounting for 86%.
- 19% of pre-school children are cared for in a crèche/montessori/playgroup/after-school facility, with the highest rate of use in Dublin at 25%.

Applying the Dublin uptake percentage of 25% to the development, then theoretically, 10 no. childcare spaces would be required to satisfy the requirements of future occupants.

The proposed development will result in a demand for school places at both primary and post-primary level. Again using, data extrapolated from Census 2016 approximately 11.5%, of children in Dublin City are aged between 5-12 years i.e. primary school age and 7.8% are aged between 13 and 18 i.e. post primary age. Applying these percentages, the scheme will generate a requirement for 80 no. primary school places and no. 54 post-primary places when fully occupied.

There are existing schools in the locality including St Laurence O'Toole Girls School and St Laurence O'Toole's CBS, Senior Boys' Primary School and several more within approximately 2km or a 15-minute walk.

4.8 Cumulative Impacts

The most likely cumulative impact of the proposed development is the demand it will place on local infrastructure and services.

To address the cumulative impact of the proposed development, it is necessary to consider the proposed development on adjoining lands. There is currently no proposed development on adjoining lands.

The proposal to construct a high-density mixed use residential scheme at the Connolly Quarter, in addition to the proposed development in neighbouring lands, will not give rise to likely significant effects on existing infrastructure and amenities during the construction phase or during the operational phase.

The Connolly Quarter Masterplan shows a design for the development of the entire site comprising the lands under agreement between CIE and Oxley Holdings Limited. Oxley Holdings Limited intended to submit an application under Section 34 to Dublin City Council for the development of office and hotel blocks. These are Blocks A, D3, and E detailed in the Masterplan. It is considered that the cumulative effects from the works required to implement the masterplan are neutral, permanent, and not significant.

4.9 Mitigation Measures

4.9.1 Construction Phase

O'Connor, Sutton, Cronin Consulting Engineers (OSCS) have prepared a Construction and Environmental Management Plan (CEMP), and a Construction & Demolition Waste Management Plan (CDWMP) under separate cover, to accompany the application for the proposed development. The CEMP and CDWMP will be further updated by the contractor and agreed with Dublin County Council prior to commencement of any construction (i.e. including demolition) works on site.

These plans will be updated by selected contractor, to incorporate any design changes from the planning process prior, to work commencing on site. The main purpose of a CDEMP is to provide a mechanism for implementation of the various mitigation measures which are described in this EIAR and contained within the CEMP and CDWMP that accompany this application under separate cover.

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

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

Adherence to the construction phase mitigation measures presented in this EIAR will ensure that the construction of the proposed development will have an imperceptible and neutral impact in terms of health and safety.

4.9.2 Operational Phase

The proposed development has been designed to avoid negative impacts on population and human health through;

- Well-designed residential units within the proposed development which allow year-round sunlight to penetrate, universal access, energy efficient measures and high-quality finishes and materials;
- That the effects on residential units neighbouring the proposed development will be similar to the extant permission.
- Incorporating attractive and functional public realm and landscaping treatments within the layout, including a paved plaza, seating areas;
- Provision of extensive connections and permeability for pedestrians and cyclists throughout the development and between the adjoining street network; and
- the inclusion of a comprehensive foul and surface water management system.

4.10 Residual Impact Assessment

It is anticipated that the proposed development will realise significant positive overall economic and social benefits for the local community and the wider Connolly Quarter area.

Strict adherence to the mitigation measures recommended in this EIAR will ensure that there will be no negative residual impacts or effects on Population and Human Health from the construction and operation of the proposed scheme. Indeed, the delivery of much needed housing will realise a likely significant positive effect for the local area.

4.11 Monitoring

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

Monitoring will be undertaken by the Building Regulations certification process and by the requirements of specific conditions of a planning permission.

Monitoring of compliance with Health & Safety requirements will be undertaken by the Project Supervisor for the Construction Process.

4.12 Worst Case Scenario

The worst-case scenario where mitigation measures failed for a development of the type proposed is considered to be the risk of an accident during the construction phase. This is considered highly unlikely and indeterminable.

4.13 References

- National Planning Framework, Ireland 2040 – Our Plan (Government of Ireland, 2018)
- Regional Planning Guidelines for the Greater Dublin Area 2010-2022
- Draft Eastern and Midlands Regional Spatial and Economic Strategy
- Fingal Development Plan 2017-2023
- Hansfield SDZ Planning Scheme 2006
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Statements (EPA, 2002)
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003)
- Central Statistics Office (CSO) website www.cso.ie
- Department of Education and Sciences (DES) website www.education.ie.

Proposed Strategic Housing Development, 'The Connolly Quarter', Rear of Connolly Station, Sheriff Street Lower, Dublin 1.

CHAPTER 5
LANDSCAPE & VISUAL

OCTOBER 2019

Table of Contents

Table of Figures

Table of Tables

5 Landscape & Visual

5.1 Introduction

This chapter assesses the potential effects of the proposed development on the landscape and views/visual amenity of the receiving environment. It should be read in conjunction with the verified photomontages presented under separate cover.

The chapter was prepared by Richard Butler (BL Arch, MSc Sp Planning, MILI, MIPI) of Model Works Ltd. Richard has a degree in Landscape Architecture, an MSc in Spatial Planning and is a member of the Irish Landscape Institute and Irish Planning Institute. He has over 20 years' experience in development and environmental planning, specialising in Landscape/Townscape and Visual Impact Assessment (LVIA/TVIA).

The Landscape Institute's Guidelines for Landscape and Visual Impact Assessment, 2013 (GLVIA) and Technical Information Note Townscape Character Assessment recommend that the word 'townscape' be used (instead of landscape) where a proposed development's receiving environment is dominated by built elements. As the site is located in a fully urban environment, the word townscape is used in this chapter. The word landscape is used only in reference to green spaces or vegetation within the townscape.

5.2 Proposed Development

The development proposal is described in detail in Chapter 2 and in the Architect's Design Statement and drawings accompanying the application.

Briefly, the SHD proposal (see **Figure 5.1**) includes eight residential blocks (Blocks B1, B2, B3, C1, C2, C3, D1 and D2, providing 741 build to rent apartment units) over an active street level incorporating retail, café and other commercial uses. The proposed blocks vary in height from 4 to 23 storeys above street level and have diverse façade treatments and materials.

Blocks A and E (office) and Block D3 (hotel), all fronting Sheriff Street Lower, comprising the remainder of the Masterplan site, will form part of a future planning application under Section 34 to Dublin City Council.

Figure 5-1 Site Location

Block C1 at the centre of the site and furthest from the surrounding public realm is the tallest building at 23 storeys (79.45m tall from the site's internal street level). Its façade is faceted white metal and along with the height this distinctive treatment is intended to make Block C1 the landmark building on the site.

Blocks B1, B2 and B3 (see **Figure 5.2**) are three linear blocks along the western boundary, the blocks perpendicular to the boundary and separated by corridors of open space (landscaped spaces on the roof of the shared plinth block). The blocks rise from a shared four storey plinth to a total height of 14 storeys (B1, B2) and 13 storeys (B3) above the site's central street level, and all stepping down one storey towards the western boundary (overlooking the Connolly Station platforms). The facades of the B blocks have a shared modular design, but each building has two volumes (separated by the step-in height), and each volume has a different brick colour. The colours include white, light grey, red and buff.

Figure 5-2 Blocks B1, B2 and B3

Block C3 is attached to the northern side of C1 (see **Figure 5.1**), extending towards the northern site boundary and overlooking a row of business premises fronting Seville Place to the north. Block C3 is 11 storeys and of brown brick, with a 10-storey red brick volume connecting to Block C1.

Blocks C2 and D2 are in the north eastern part of the site, D2 fronting Oriel Street Upper to the east and C2 fronting Oriel Hall to the north. Together they define an entrance in the north east corner of the site, opening into a new internal street between the two buildings.

Block C2 is 5 storeys nearest the north east corner of the site (fronting Oriel Hall), stepping up to an 11-storey volume set further within the site. The lower volume fronting the boundary is clad in red brick and the taller volume within the site is of buff brick.

Block D2 similarly steps up from 5 storeys at its Oriel Street Upper frontage, to an 8-storey volume set back from the street. Block D1 is attached to Block D1 set further back within the site, a 14-storey building clad in red brick.

FIGURE 5-3 SITE ENTRANCE FROM ORIEL STREET (BETWEEN BLOCK C2 & D1)

There are two entrances proposed to the site from Sheriff Street Lower, one between the two protected structures (the Luggage Store and Workshop) and one at the corner of Sheriff Street Lower and Commons Street. Two entrances are proposed from Oriel Street Upper, one in the north east corner of the site near the junction of Oriel Street Upper and Seville Place (and visible from the junction), and one further south along Oriel Street Upper. An entrance is also proposed from Seville Place, via a ground level tunnel beneath the existing units fronting Seville Place.

Within the site, public open space is proposed in the form of two new pedestrian-priority streets at the level of the surrounding public streets (see **Figure 5.4**). One is aligned north-south ('Connolly Street', connecting to Sheriff Street Lower) and one east-west (connecting to Oriel Street Upper). There is a central plaza space at their junction ('Connolly Square'). A northern extension of Commons Street into the site also meets the central plaza.

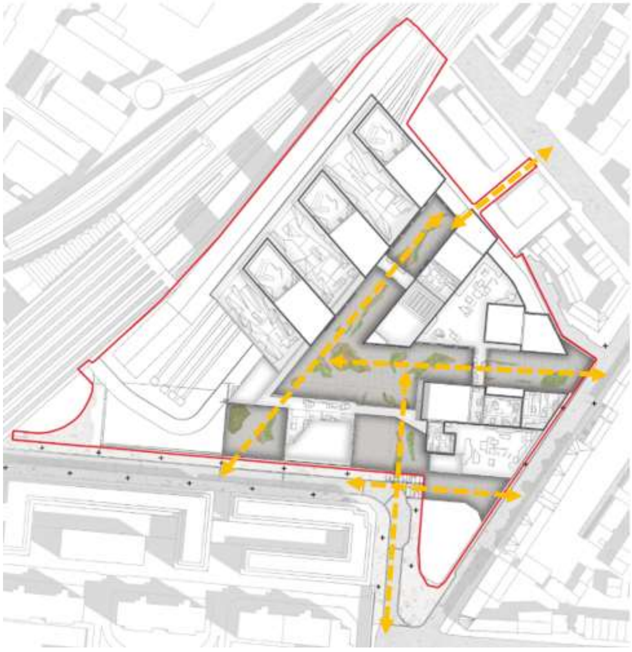


FIGURE 5-4 PUBLIC OPEN SPACES

Soft landscaping (see **Figure 5.5**) is proposed in organically shaped, mounded zones ('islands') along the streets and in the central square. The mounding of the planted areas is of sufficient depth to allow for the planting and maintenance of mature trees. The proposed plant selection references the site's historic coastal location.

5.3 Methodology

The TVIA was prepared with reference to the Landscape Institute's Guidelines for Landscape and Visual Impact Assessment, 2013 (GLVIA) and Technical Information Note Townscape Character Assessment, and the EPA draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, 2017.

The draft EPA guidelines provide a general methodology and impact ratings for all types of specialist assessments. The GLVIA provides specific guidelines for landscape and visual impact assessments. Therefore, a combination of the draft EPA guidelines, the Landscape Institute guidelines and professional experience has informed the methodology for this assessment.

5.3.1 Key Principles of the GLVIA

5.3.1.1 Use of the Word 'Townscape'

The word 'townscape' is used to describe the landscape in urban areas. The GLVIA defines townscape as "the landscape within the built-up area, including the buildings, the relationships between them, the different types of urban spaces, including green spaces and the relationship between buildings and open spaces". Since the subject site is within the urban area, the word townscape is predominantly used in this chapter.

5.3.1.2 Use of the Term 'Effect' vs 'Impact'

The GLVIA requires that the terms 'impact' and 'effect' be clearly distinguished and consistently used. 'Impact' is defined as the action being taken, e.g. the introduction to the landscape of buildings, infrastructure or landscaping. 'Effect' is defined as the change resulting from those actions, e.g. change in townscape character or in the composition of a view.

5.3.1.3 Assessment of Both 'Townscape' and 'Visual' Effects

The GLVIA requires that effects on views and visual amenity be assessed separately from the effects on townscape, although the two topics are inherently linked.

'Townscape' results from the interplay between the physical, natural and cultural components of our surroundings. Different combinations and spatial distribution of these elements create variations in townscape character. Townscape impact assessment identifies the changes to this character which would result from the proposed development and assesses the significance of those effects on the townscape as a resource.

Visual impact assessment is concerned with changes that arise in the composition of available views, the response of people to these changes and the overall effects on the area's visual amenity.

5.3.1.4 Methodology for Assessment of Townscape Effects

Assessment of potential townscape effects involves (a) classifying the sensitivity of the townscape resource, and (b) describing and classifying the magnitude of townscape change which would result from the development. These factors are then combined to arrive at a classification of significance of the effects.

5.3.1.5 Townscape Sensitivity

The sensitivity of the townscape is a function of its land use, patterns and scale, visual enclosure and the distribution of visual receptors, and the value placed on the townscape. The nature and scale of the development in question is also taken into account, as are any trends of change, and relevant policy. Five categories are used to classify sensitivity.

Sensitivity	Description
Very High	Areas where the townscape exhibits very strong, positive character with valued elements, features and characteristics that combine to give an experience of unity, richness and harmony. The townscape character is such that its capacity to accommodate change is very low. These attributes are recognised in policy or designations as being of national or international value and the principle management objective for the area is protection of the existing character from change.
High	Areas where the townscape exhibits strong, positive character with valued elements, features and characteristics. The townscape character is such that it has limited/low capacity to accommodate change. These attributes are recognised in policy or designations as being of national, regional or county value and the principle management objective for the area is the conservation of existing character.
Medium	Areas where the townscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong, or has evidence of alteration, degradation or erosion of elements and characteristics. The townscape character is such that there is some capacity for change. These areas may be recognised in policy at local or county level and the principle management objective may be to consolidate townscape character or facilitate appropriate, necessary change.
Low	Areas where the townscape has few valued elements, features or characteristics and the character is weak. The character is such that it has capacity for change; where development would make no significant change or would make a positive change. Such townscapes are generally unrecognised in policy and the principle management objective may be to facilitate change through development, repair, restoration or enhancement.
Negligible	Areas where the townscape exhibits negative character, with no valued elements, features or characteristics. The character is such that its capacity to accommodate change is high; where development would make no significant change or would make a positive change. Such townscapes include derelict industrial lands, as well as sites or areas that are designated for a particular type of development. The principle management objective for the area is to facilitate change in the townscape through development, repair or restoration.

TABLE 5-1 CATEGORIES OF TOWNSCAPE SENSITIVITY

5.3.1.6 Magnitude of Landscape Change

Magnitude of change is a factor of the scale, extent and degree of change imposed on the landscape by a development, with reference to its key elements, features and characteristics (also known as 'landscape receptors'). Five categories are used to classify magnitude of change.

Sensitivity	Description
Very High	Change that is large in extent, resulting in the loss of or major alteration to key elements, features or characteristics of the townscape, and/or introduction of large elements considered totally uncharacteristic in the context. Such development results in fundamental change in the character of the townscape.
High	Change that is moderate to large in extent, resulting in major alteration to key elements, features or characteristics of the townscape, and/or introduction of large elements considered uncharacteristic in the context. Such development results in change to the character of the townscape.
Medium	Change that is moderate in extent, resulting in partial loss or alteration to key elements, features or characteristics of the townscape, and/or introduction of elements that may be prominent but not necessarily substantially uncharacteristic in the context. Such development results in change to the character of the landscape.
Low	Change that is moderate or limited in scale, resulting in minor alteration to key elements, features or characteristics of the townscape, and/or introduction of elements that are not uncharacteristic in the context. Such development results in minor change to the character of the landscape.
Negligible	Change that is limited in scale, resulting in no alteration to key elements features or characteristics of the townscape, and/or introduction of elements that are characteristic of the context. Such development results in no change to the townscape character.

TABLE 5-2 CATEGORIES OF MAGNITUDE OF TOWNSCAPE CHANGE

5.3.1.7 Significance of Effects

To classify the significance of effects the magnitude of change is measured against the sensitivity of the townscape using the guide in **Table 5.3** below. This matrix is only a guide. The assessor also uses professional judgement informed by their expertise, experience and common sense to arrive at a classification of significance that is reasonable and justifiable.

		Sensitivity of the Landscape/View				
		Very High	High	Medium	Low	Negligible
Magnitude of Change to the Landscape/View	Very High	Profound	Profound to Very Significant	Very Significant to Significant	Moderate	Slight
	High	Profound to Very Significant	Very Significant	Significant	Moderate to Slight	Slight to Not Significant
	Medium	Very Significant to Significant	Significant	Moderate	Slight	Not Significant
	Low	Moderate	Moderate to Slight	Slight	Not significant	Imperceptible
	Negligible	Slight	Slight to Not Significant	Not significant	Imperceptible	Imperceptible

TABLE 5-3 GUIDE TO CLASSIFICATION OF SIGNIFICANCE OF LANDSCAPE &VISUAL EFFECTS

5.3.1.8 Methodology for Assessment of Visual Effects

Assessment of visual effects involves identifying a number of key/representative viewpoints in the site's receiving environment, and for each one of these: (a) classifying the viewpoint sensitivity, and (b) classifying the magnitude of change which would result in the view. These factors are combined to arrive at a classification of significance of the effects on each viewpoint.

5.3.1.9 Sensitivity of the Viewpoint/Visual Receptor

Viewpoint sensitivity is a function of two main considerations:

- ***Susceptibility of the visual receptor to change***. This depends on the occupation or activity of the people experiencing the view, and the extent to which their attention is focussed on the views or visual amenity they experience at that location.

Visual receptors most susceptible to change include residents at home, people engaged in outdoor recreation focused on the landscape (e.g. trail users), and visitors to heritage or other attractions and places of community congregation where the setting contributes to the experience. Visual receptors less sensitive to change include travellers on road, rail and other transport routes (unless on recognised scenic routes), people engaged in outdoor recreation or sports where the surrounding landscape does not influence the experience, and people in their place of work or shopping where the setting does not influence their experience.

- ***Value attached to the view***. This depends to a large extent on the subjective opinion of the visual receptor but also on factors such as policy and designations (e.g. scenic routes, protected views), or the view or setting being associated with a heritage asset, visitor attraction or having some other cultural status (e.g. by appearing in arts).

Five categories are used to classify a viewpoint's sensitivity as given in **Table 5.4**.

Sensitivity	Description
Very High	Iconic viewpoints (views towards or from a townscape feature or area) that are recognised in policy or otherwise designated as being of national value. The composition, character and quality of the view are such that its capacity for change is very low. The principle management objective for the view is its protection from change.
High	Viewpoints that are recognised in policy or otherwise designated as being of value, or viewpoints that are highly valued by people that experience them regularly (such as views from houses or outdoor recreation features focused on the townscape). The composition, character and quality of the view may be such that its capacity for accommodating change may or may not be low. The principle management objective for the view is its protection from change that reduces visual amenity.
Medium	Views that may not have features or characteristics that are of particular value, but have no major detracting elements, and which thus provide some visual amenity. These views may have capacity for appropriate change and the principle management objective is to facilitate change to the composition that does not detract from visual amenity, or which enhances it.
Low	Views that have no valued feature or characteristic, and where the composition and character are such that there is capacity for change. This category also includes views experienced by people involved in activities with no particular focus on the landscape. For such views the principle management objective is to facilitate change that does not detract from visual amenity or enhances it.
Negligible	Views that have no valued feature or characteristic, or in which the composition may be unsightly (e.g. in derelict landscapes). For such views the principle management objective is to facilitate change that repairs, restores or enhances visual amenity.

TABLE 5-4 CATEGORIES OF VIEWPOINT SENSITIVITY

5.3.1.10 Magnitude of Change to the View

Classification of the magnitude of change takes into account the size or scale of the intrusion of development into the view (relative to the other elements and features in the composition, i.e. its relative visual dominance), the degree to which it contrasts or integrates with the other elements and the general character of the view, and the way in which the change will be experienced (e.g. in full view, partial or peripheral view, or in glimpses). It also takes into account the geographical extent of the change, as well as the duration and reversibility of the visual effects. Five categories are used to classify magnitude of visual change to a view as given in **Table 5.5**:

Sensitivity	Description
Very High	Full or extensive intrusion of the development in the view, or partial intrusion that obstructs valued features or characteristics, or introduction of elements that are completely out of character in the context, to the extent that the development becomes dominant in the composition and defines the character of the view and the visual amenity.
High	Extensive intrusion of the development in the view, or partial intrusion that obstructs valued features, or introduction of elements that may be considered uncharacteristic in the context, to the extent that the development becomes co-dominant with other elements in the composition and affects the character of the view and the visual amenity.
Medium	Partial intrusion of the development in the view, or introduction of elements that may be prominent but not necessarily uncharacteristic in the context, resulting in change to the composition but not necessarily the character of the view or the visual amenity.
Low	Minor intrusion of the development into the view, or introduction of elements that are not uncharacteristic in the context, resulting in minor alteration to the composition and character of the view but no change to visual amenity.
Negligible	Barely discernible intrusion of the development into the view, or introduction of elements that are characteristic in the context, resulting in slight change to the composition of the view and no change in visual amenity.

TABLE 5-5 CATEGORIES OF MAGNITUDE OF VISUAL CHANGE

5.3.1.11 Significance of Visual Effects

As with townscape effects, to classify the significance of visual effects, the magnitude of change to the view is measured against the sensitivity of the viewpoint, using the guide in **Table 5.3** above.

5.3.1.12 Quality of Effects

In addition to predicting the significance of the effects, EIA methodology requires that the quality of the effects be classified as positive/beneficial, neutral, or negative/adverse. For townscape to a degree, but particularly for visual effects, this is an inherently subjective exercise. This is because townscape and visual amenity are perceived by people and are therefore subject to variations in the attitude and values - including aesthetic preferences - of the receptor. One person's attitude to a development may differ from another person's, and thus their response to the effects of a development on a townscape or view may vary.

Additionally, in certain situations there might be policy encouraging a particular development in an area, in which case the policy is effectively prescribing townscape and visual change. If a development achieves the objective of the policy the resulting effect might be considered positive, even if the townscape character is profoundly changed. The classification of quality of townscape and visual effects should seek to take these variables into account and provide a reasonable and robust assessment.

5.4 Photomontage Methodology

The photomontages were produced by Model Works Ltd. The photomontage methodology is based on the Landscape Institute advice note 01/11 Photography and Photomontage in Landscape and Visual Impact Assessment and 20 years' experience in photomontage production. The method has five main steps:

- Photography
- Survey
- 3D Modelling and Camera Matching
- Rendering and Finishing of Photomontages
- Presentation

5.4.1 Photography

5.4.1.1 Date, Time and Conditions

The photography is timed so that the scene conditions, weather conditions and sun position allow - as far as possible - for a clear and representative baseline photograph to be captured. The objective is to ensure that all key elements of the view are clearly visible and unobscured by, for example, vehicular or pedestrian traffic in the foreground, precipitation, darkness/shade, sun glare, etc. The date and time of each photograph are recorded so that the sun position can be accurately portrayed in the 3D model ultimately montaged into the baseline photograph.

5.4.1.2 Camera and Camera Set-up

The photographs were taken using a Canon EOS5D Mark II camera with a 21 mega pixel sensor and image resolution of 5616 x 3744 pixels. At each viewpoint the camera was positioned on a tripod with the lens 1.65m above ground level (the level of the average adult's eyes), directed at the site and levelled in the horizontal and vertical axes.

5.4.1.3 Lenses

Prime lenses (fixed focal length with no zoom function) are used as this ensures that the image parameters for every photograph are the same and that all photographs taken with the same lens are comparable. For the close-up to middle distant views a 24mm prime lens is normally used. This lens captures a field of view of 73 degrees. This relatively wide field of view is preferred for the purpose of Landscape and Visual Impact Assessment as it shows more of the context landscape surrounding a site. For distant viewpoints a 50mm prime lens may be used, capturing a 39-degree horizontal field of view.

5.4.1.4 Survey

The coordinates of each viewpoint/camera position, including the elevation, were recorded using a survey grade GPS receiver, the Trimble Geo7X, which is accurate to within 1cm. For each viewpoint, the coordinates of several static objects in the view are also surveyed (e.g. lamp posts, bollards, corners of buildings, etc.). The coordinates of these ‘markers’ are used as reference points later in the process, to ensure that the direction of view of the cameras in the 3D model matches the direction of view of the photographs.

5.4.2 3D Model and Camera Matching

5.4.2.1 Creation of 3D Model

An Autodesk Revit model of the proposed development was supplied by the architect RKD for the production of the photomontages. RKD’s Revit model was built on a point cloud survey of the site supplied by Murphy Survey. Model Works exported RKD’s Revit model into the software package Autodesk 3DS Max, in which materials were applied to the model’s buildings and surfaces.

5.4.2.2 3D Camera Positions

The surveyed camera positions and the markers for each view are inserted into the 3D model, with information on the focal length of the lens attributed to each camera. For each camera/view, the date and time is set to match those of the original photograph. This ensures that the direction of sunlight and shadows in the 3D model match those of the photographs.

5.4.2.3 Camera Matching

The photographs are then inserted as backdrops to the views of each camera in the 3D model. The direction of view of the cameras in the 3D model are matched with the direction of view of the photographs using the surveyed markers. This ensures that the camera positions, the direction of the views and the focal length of the cameras in the 3D model are accurate, so that the proposed development appears in the correct position and scale when montaged into the photographs.

5.4.3 Rendering of 3D Model and Finishing of Photomontages

For each view a render of the development is generated. This is the process of creating a photo-realistic image of the 3D model, as seen from each camera position, with sunlight and shadow applied to the model. The render of the development is then inserted into the photograph to create the photomontage. This involves masking (or cutting out) those parts of the render that are obscured by objects in the foreground of the photograph and masking distant objects behind the render – so that the render fits seamlessly into the photograph.

5.4.4 Presentation and Viewing

The individual photomontages are presented under separate cover. For each photomontage, the viewpoint number, location description, and the date and time of photography are provided on the page.

5.5 Baseline Scenario

5.5.1 The Site

The Masterplan area (of which the SHD site forms the larger part) is a brownfield area of approximately 2.88ha located adjacent to Connolly Station, to the north of the IFSC in the northern city centre. The western boundary runs along the Connolly Station platforms (some parallel railway sidings are contained within the site boundary). The south boundary is along Sheriff Street Lower. The east boundary is along Oriel Street Upper. The north boundary runs along Oriel Hall for a stretch, and to the rear of Irish Rail's Train Control Centre, which fronts Seville Place to the north.

FIGURE 5-5 THE SUBJECT SITE & IMMEDIATE RECEIVING ENVIRONMENT

The site is currently occupied by various railway related uses, structures and infrastructure including the Connolly Station car park, an area of railway sidings, a single storey 20th century red brick office building (the Great Northern Railways Office at the corner of Sheriff Street Lower and Oriel Street Upper), a two storey concrete office building, various smaller structures and containers, and hard standing areas and access roads. The current topography of the site is complex, with numerous internal level changes, and the ground level within the site boundaries is higher than the level of the surrounding streets except along the site boundary with Oriel Street Upper.

Overall the site has an industrial or infrastructural character and is unsightly, with few elements, features of characteristics of townscape or visual amenity value.

5.5.2 Site Boundaries and Interface with Adjacent Lands

5.5.2.1 South

Along Sheriff Street Lower a large part of the boundary is formed by the retained front wall of the 19th century railway warehouses that once occupied the site (see **Figure 5.6**). This is a protected structure. Although in poor condition the cut stone and brick wall with broad arched entrances has potential as an element of the townscape/streetscape. The street itself is cobbled; this is another asset that can be considered under-valued and underused.

FIGURE 5-6 THE SITE FRONTAGE TO SHERIFF STREET LOWER

Across the street is the rear façade of the Custom House Plaza office development, a complex of six to seven storey red brick office buildings in a perimeter block layout. The development fronts Harbourmaster Place to the south and neglects its interface with Sheriff Street Lower (and the site) to the north. There are no windows or entrances in the ground floor of the façade other than service entrances.

The site and Custom House plaza combine to deaden the streetscape of Sheriff Street Lower - to the extent that the street can be considered a detractor to the character and quality of the townscape. Another contributor to this is the bridging of the street, just to the west of the site, by the railway station. The very wide built-over bridge forms a barrier in the townscape, physically and visually separating Sheriff Street Lower from Amiens Street (see **Figure 5.7**), the nearest busy city street. Sheriff Street Lower is barely recognisable as a street from the junction with Amiens Street. Additionally, due to the use and lack of permeability across the site there is little reason for pedestrians to move along Sheriff Street Lower. The street is used as a bus parking area.

FIGURE 5-7 THE VIEW ALONG SHERIFF STREET LOWER FROM AMIENS STREET

5.5.2.2 East

The east boundary of the site along Oriel Street Upper (see **Figure 5.8**) is formed by a very high stone wall (also a protected structure) topped by various types of security fencing. The two low office buildings (one early and one later 20th century) protrude above the wall in the south east corner, but there are no entrances to the site along Oriel Street Upper. Similar to the southern frontage, the eastern site boundary deadens the streetscape and detracts from the character and visual amenity of the area, particularly that of the residential development across the street.

On the east side of Oriel Street Upper fronting the site is a row of two and three storey residential buildings of various types including a Victorian terrace of houses at the northern end (zoned Residential Conservation area), the St Laurence O'Toole Court housing scheme, and a terrace of modern, three storey houses (see **Figure 5.9**).

FIGURE 5-8 THE VIEW ALONG ORIEL STREET UPPER FROM THE SOUTH

FIGURE 5-9 THE VIEW ALONG ORIEL STREET UPPER FROM THE NORTH

5.5.2.3 North

The high stone wall wraps around the north east corner of the site and runs along the south side of Oriel Hall, a cul-de-sac street (see **Figure 5.10**). There is a row of two storey houses on the north side of the street, facing the high wall on the site boundary.

The remainder of the site's northern boundary runs along the rear of a row of industrial and office premises fronting Seville Place to the north. The site has no interface with the public realm along this stretch.

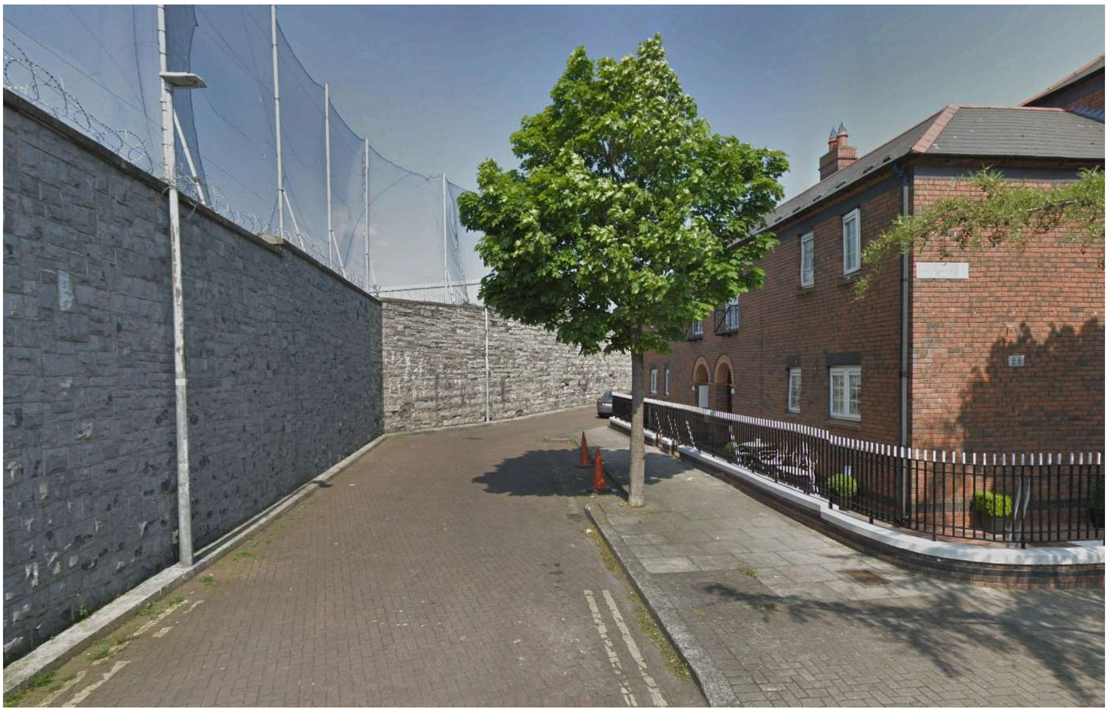


FIGURE 5-10 THE VIEW ALONG ORIEL HALL FROM ORIEL STREET

5.5.2.4 West

The western boundary is shared with Connolly Station and there is a wide corridor of railways and platforms outside the west boundary. Beyond the station there is a row of buildings of diverse architectural character, mostly used as offices, fronting Amiens Street. These include some converted Georgian houses and the Post Office parcel sorting office (protected structures), modern office buildings and a petrol station (see **Figure 5.11**). Planning permission was recently granted for the redevelopment of the petrol station for hotel use.

The combination of the Amiens Street buildings and the railway station separates the site's western boundary from Amiens Street by over 100m.

FIGURE 5-11 A VIEW TOWARDS THE SITE FROM AMIENS STREET TO THE WEST

5.5.3 Surrounding Townscape Character

The main determinants of the surrounding townscape character are (a) the topography; (b) urban grain and movement patterns; (c) land use pattern; (d) plot/building typologies, scale and architecture; (d) adjacent streetscapes and other boundary interfaces; (e) landscape/green infrastructure; (f) perceptual and aesthetic factors.

Taking account of these factors, the following main character areas, elements/features can be identified in the receiving environment (see **Figure 5.12**).

- **Connolly Station and railway corridor:** The Dublin & Drogheda Railway Company opened the 'Dublin Station' (subsequently renamed Connolly) on Amiens Street in 1844. The station was located at an already well-established transport hub, adjacent to the docks and close to the Custom House. The Neo-Classical architectural style and use of Wicklow granite lend the main station building a civic status (although there are juxtapositions with red brick elements and more recently with the Luas station). The positioning of the central tower at the centre of the view east along Talbot Street was a successful stroke in townscape legibility – with the station clearly visible from O'Connell Street and beyond. However, the wide corridor of railway tracks and station buildings, elevated well above the adjacent ground/street levels, created a barrier in the townscape, and this was reinforced by later development patterns. The site, although distinct from the main station complex, relates most closely to the station in townscape terms.

- **Amiens Street corridor:** Amiens Street is the main corridor of vehicular and pedestrian movement in the vicinity of the site. The street is one of the principle access routes into the city from the north. It has a mix of residential, office and small retail uses, with a cluster of higher density at the junction with Seville Place and Portland Row (North Circular Road), and an increase in development intensity passing by Connolly Station, Busaras and the IFSC to terminate at the Custom House.
- **North inner-city mixed use (west of site):** West of Amiens Street is the mixed use, mixed density northern city centre area, an area of diverse plot/building typologies, scale and architecture and numerous streets, spaces and buildings of heritage value. A key street within this area is **Talbot Street**, which runs east to west connecting Amiens Street (and Connolly Station) to O'Connell Street and the northern commercial core.
- **IFSC, George's Dock and North Lotts (south and south east of site):** To the south of the site between Sheriff Street Lower and the Liffey Quays, is the IFSC, George's Dock and North Lotts area. This is a modern, higher density commercial and residential quarter in development since the 1990s. It retains a coarse urban grain (from the historic docklands/industrial usage) and employs mostly perimeter block layouts with the buildings typically between six and eight storeys. Although some historic buildings and docklands infrastructure and spaces have been retained and re-purposed (e.g. the CHQ building) the area is characterised by its modern architecture with a wide variety of materials used. Another notable characteristic is its strong northern edge along Sheriff Street, across which there is a very abrupt change of character.
- **Northern city centre residential (east and north east of site):** Immediately to the east (across Oriel Street) and north of the site (Oriel Hall and Seville Place) there is a residential area with Seville Place as its spine, extending to the Royal Canal which arcs around the area, defining its edge. The Seville Place area is a fine grained, low density neighbourhood of houses ranging from one to three storeys. A number of the streets dating from the 19th century (Seville Place east of the Oriel Street junction, a part of Oriel Street, Emerald Street and 1st to 4th Avenues) are zoned residential conservation areas. With the continuing development of the Docklands including the opening of the Docklands railway station, Seville Place has become an important pedestrian corridor into the city centre.
- **Liffey River Corridor including the Custom House:** Some 430m to the south of the site beyond the IFSC is the Liffey River. The Liffey is one of the main arranging elements of the city, a broad corridor of open space dividing the urban area, with major east-west thoroughfares on both sides (the quays). Every bridge across the river is a significant place in the townscape and a vantage point for the diverse riverfront development. There are numerous buildings of note fronting the Liffey Corridor – old and new, but the most valued is the Custom House, by the architect James Gandon, completed in 1791. The large (115m long), four-fronted, neoclassical building fronts the Liffey to the south west of the site, approximately 450m distant, separated from the site by the IFSC and Connolly Station.

Due to a number of factors - including (a) the 'barrier effect' of the elevated railway corridor, (b) the site's large area, its boundary conditions (high walls or separation from the public realm) and impermeability, and (c) the planning history of the wider area - there is an unusual degree of disconnection and discontinuity in the surrounding townscape. There is limited commonality between the various character areas abutting the site in terms of land use mix, urban grain, density and scale, plot and building typology and architecture (i.e. the main physical determinants of townscape character).

This is a weakness in townscape character and also an opportunity, in that the site – effectively a lacuna in the townscape – while contributing to the current disconnectedness in character and poor visual amenity locally, has significant potential to affect the surrounding areas (positively or negatively). Also, with the wide variety of townscape character surrounding the site, and due to its scale, the site can adopt/establish a character of its own.

These characteristics of the receiving environment have long been recognised in forward planning for the Connolly Station area. Along with the area's unparalleled public transport connectivity, this has resulted in its designation for high density and high-rise development in planning policy.

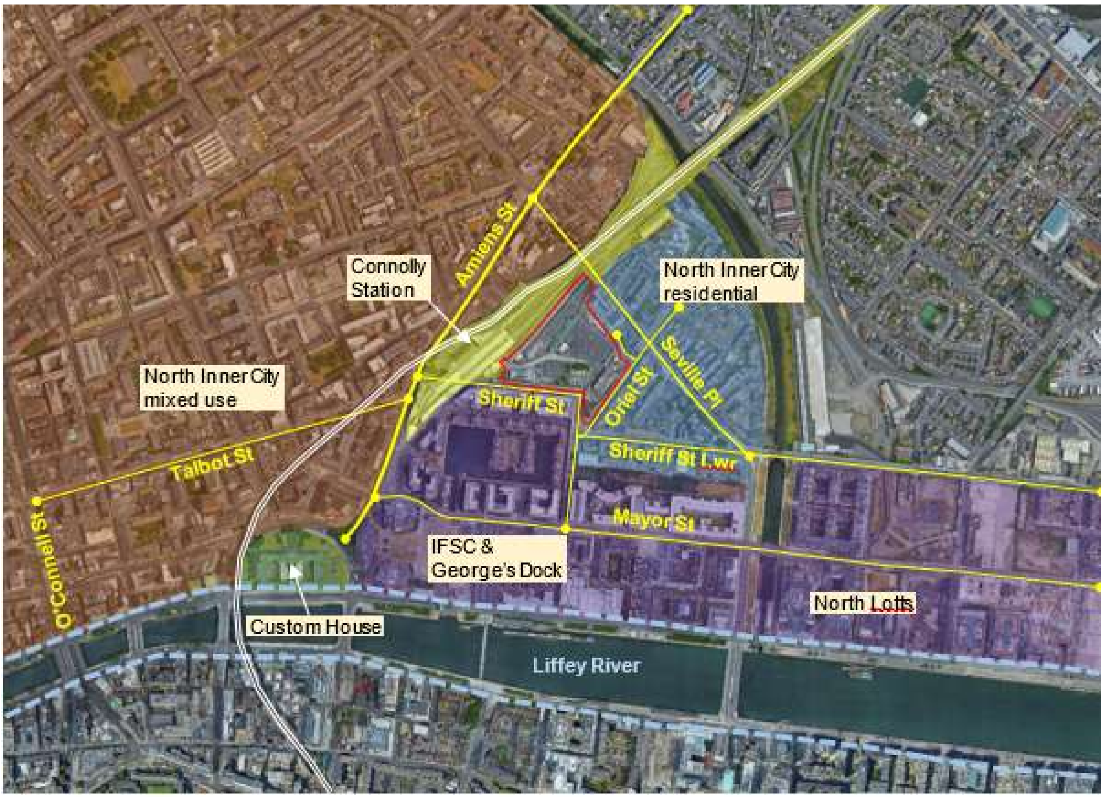


FIGURE 5-12 TOWNSCAPE CHARACTER AREAS AROUND THE SITE

5.6 Relevant Planning Policy

5.6.1 Dublin City Development Plan 2016-2022

5.6.1.1 Zoning

The land use zoning objective for the site is Z5: *"To consolidate and facilitate the development of the central area, and to identify, reinforce, strengthen and protect its civic design character and dignity"*.

"The primary purpose of this use zone is to sustain life within the centre of the city through intensive mixed-use development. The strategy is to provide a dynamic mix of uses which interact with each other, help create a sense of community, and which sustain the vitality of the inner city both by day and night".

Section 2.3.11 states: *"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."*

5.6.1.2 Urban Density

Regarding Integrated Land-use and Transportation, Objective MTO1 states: *"To encourage intensification and mixed-use development along existing and planned public transport corridors and at transport nodes where sufficient public transport capacity and accessibility exists to meet the sustainable transport requirements of the development, having regard to conservation policies set out elsewhere in this plan and the need to make best use of urban land."*

Policy SC13: "*To promote sustainable densities, particularly in public transport corridors, which will enhance the urban form and spatial structure of the city, which are appropriate to their context, and which are supported by a full range of community infrastructure such as schools, shops and recreational areas, having regard to the safeguarding criteria set out in Chapter 16 (development standards), including the criteria and standards for good neighbourhoods, quality urban design and excellence in architecture. These sustainable densities will include due consideration for the protection of surrounding residents, households and communities*".

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.*"

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*".

5.6.1.3 Building Height

Section 4.5.4 of the DCDP references the Managing Intensification and Change study (DEGW, 2000) summarised in 5.6.3.1 below. The DCDP notes that the current DCC policy on taller buildings 'updates and refines' the recommendations of that strategy, 'including the emphasis on public transport'.

Section 4.5.4.1: "*The City Council remains committed to the need to protect conservation areas, architectural conservation areas and the historic core of the city…*

"*However, taller buildings can also play an important visual role and can make a positive contribution to the skyline of a city. Dublin City Council recognises the merit of taller buildings, including landmark buildings, in a very limited number of locations at a scale appropriate for Dublin. Accordingly, the spatial approach to taller buildings in the city is in essence to protect the vast majority of the city as a low-rise city, including established residential areas and conservation areas within the historic core, while also recognising the potential and the need for taller buildings to deliver the core strategy*…

"*Clustering of taller buildings of the type needed to promote significant densities of commercial and residential space are likely to be achieved in a limited number of areas only. Taller buildings (over 50m) are acceptable at locations such as at major public transport hubs, and some SDRAs*"…

"*There are also a few areas where there are good transport links and sites of sufficient size to create their own character, such that a limited number of mid-rise (up to 50m) buildings will help provide a new urban identity*…

"*In all cases, proposals for taller buildings must respect their context and address the assessment criteria set out in the development standards section, to ensure that taller buildings achieve high standards in relation to design, sustainability, amenity, impacts on the receiving environment, and the protection or framing of important views*."

SC17: "*To protect and enhance the skyline of the inner city, and to ensure that all proposals for mid-rise and taller buildings make a positive contribution to the urban character of the city, having regard to the criteria and principles set out in Chapter 15 (Guiding Principles) and Chapter 16 (development standards). In particular, all new proposals must demonstrate sensitivity to the historic city centre, the River Liffey and quays, Trinity College, the cathedrals, Dublin Castle, the historic squares and the city canals, and to established residential areas, open recreation areas and civic spaces of local and citywide importance*."

In Section 16.7.2 'Connolly' is identified as one of four locations in the city for high-rise development, i.e. buildings of '50m+'.

Section 16.7.2 also sets out DCC's 'assessment criteria for higher buildings':

- "*Relationship to context, including topography, built form, and skyline having regard to the need to protect important views, landmarks, prospects and vistas*
- *Effect on the historic environment at a city-wide and local level*
- *Relationship to transport infrastructure, particularly public transport provision*
- *Architectural excellence of a building which is of slender proportions, whereby a slenderness ratio of 3:1 or more should be aimed for*
- *Contribution to public spaces and facilities, including the mix of uses*
- *Effect on the local environment, including micro-climate and general amenity considerations*
- *Contribution to permeability and legibility of the site and wider area*
- *Sufficient accompanying material to enable a proper assessment, including urban design study/masterplan, a 360-degree view analysis, shadow impact assessment, wind impact analysis, details of signage, branding and lighting, and relative height studies*

- *Adoption of best practice guidance related to the sustainable design and construction of tall buildings*
- *Evaluation of providing a similar level of density in an alternative urban form.*"

The DCDP policy on building height has been superseded by more recent national policy, specifically the National Planning Framework (NPF) and the Building Height Guidelines. Both of these encourage compact growth including through the development of taller buildings (than heretofore) in well serviced urban areas to make the most efficient possible use of land and other resources. These policy documents are summarised in 5.6.2.1 and 5.6.2.2 below.

5.6.1.4 Architecture

SC25: "*To promote development which incorporates exemplary standards of high-quality, sustainable and inclusive urban design, urban form and architecture befitting the city's environment and heritage and its diverse range of locally distinctive neighbourhoods, such that they positively contribute to the city's built and natural environments. This relates to the design quality of general development across the city, with the aim of achieving excellence in the ordinary, and which includes the creation of new landmarks and public spaces where appropriate*."

Section 16.2.1: "*In the appropriate context, imaginative contemporary architecture is encouraged, provided that it respects Dublin's heritage and local distinctiveness and enriches its city environment. Through its design, use of materials and finishes, development will make a positive contribution to the townscape and urban realm*."

SC26: "*To promote and facilitate innovation in architectural design to produce contemporary buildings which contribute to the city's acknowledged culture of enterprise and innovation*..."

5.6.1.5 Public Realm

Among the principles for achieving a sustainable and resilient city is the following: "*Urban Form – Creating a connected and legible city based on active streets and quality public spaces with a distinctive sense of place. Place making is particularly important in the strategic development and regeneration areas (SDRAs)*."

SC20: "*To promote the development of high-quality streets and public spaces which are accessible and inclusive, and which deliver vibrant, attractive, accessible and safe places and meet the needs of the city's diverse communities*."

QH10: "*To support the creation of a permeable, connected and well-linked city and discourage gated residential developments as they exclude and divide established communities*."

Section 4.5.5: "*A high-quality public realm makes a more attractive place to live, work and visit, and provides for an improved quality of life for all. Such a public realm can have a very positive impact on Dublin's competitiveness with other city regions internationally, both for tourism and for investment*."

SC3: "*To develop a sustainable network of safe, clean, attractive pedestrian routes, lanes and cycleways in order to make the city more coherent and navigable*."

Policy SC15: "*To recognise and promote green infrastructure and landscape as an integral part of the form and structure of the city, including streets and public spaces*."

The above policies are relevant as they promote new development (of buildings and spaces) of high design and finish quality - including innovative contemporary buildings with landmark potential and highly effective public realm - in recognition of the potential benefits of such development to the townscape.

5.6.1.6 Making Sustainable Neighbourhoods

In Section 16.10.4 the DCDP states: "*Proposals should have regard to the DEHLG's Guidelines on Sustainable Residential Development in Urban Areas and the accompanying Urban Design Manual 2009*". It suggests that proposals for new development may be assessed against the series of questions as set out in the Urban Design Manual, specifically the principles set out in the Neighbourhood Section of the Manual.

5.6.1.7 Built Heritage and Conservation

The site is not covered by any Conservation Area (CA) or Architectural Conservation Area (ACA) designation. However, there are CA and ACA designations some distance to all sides of the site. These include:

- The Gardiner Street CA some 500m west of the site;
- O'Connell Street CA and ACA 850m west of the site;
- Custom House CA, Beresford Place and Busáras, some 300m to the south west of the site (the Custom House building itself is 445m from the site);
- River Liffey CA 360m south of the site;
- George's Dock CA extending to within 250m of the site;
- Royal Canal/Spencer Dock CA some 300m to the east and north of the site.

For a city centre location, the site is well removed from CA and ACA designated areas. However, due to the building heights proposed the development may affect views from within those areas. Therefore, policy for CAs and ACAs may be relevant.

Section 11.1.5.6 of the DCDP states: "*<u>Development outside Conservation Areas can also have an impact on their setting</u>. Where development affects the setting of a Conservation Area, an assessment of its impact on the character and appearance of the area will be required… Any development which adversely affects the setting of a Conservation Area will be refused planning permission and the City Council will encourage change which enhances the setting of Conservation Areas*."

Policy CHC4: "*Development within <u>or affecting</u> a conservation area must contribute positively to its character and distinctiveness, and take opportunities <u>to protect and enhance the character and appearance of the area and its setting</u>, wherever possible…*

"*Enhancement opportunities may include:*

1. *Replacement or improvement of any building, feature or element which detracts from the character of the area or its setting*
2. *Re-instatement of missing architectural detail or other important features*
3. *Improvement of open spaces and the wider public realm, and re-instatement of historic routes and characteristic plot patterns*
4. *Contemporary architecture of exceptional design quality, which is in harmony with the Conservation Area*

5. *The repair and retention of shop- and pub-fronts of architectural interest*…"

"*Development will not:*

1. *Harm buildings, spaces, original street patterns or other features which contribute positively to the special interest of the Conservation Area*
2. *Involve the loss of traditional, historic or important building forms, features, and detailing including roof-scapes, shopfronts, doors, windows and other decorative detail*
3. *Introduce design details and materials, such as uPVC, aluminium and inappropriately designed or dimensioned timber windows and doors*
4. *Harm the setting of a Conservation Area*
5. *Constitute a visually obtrusive or dominant form*."

While the policy on CAs and ACAs is generally to preserve the existing character, the policy allows for new buildings of distinctly contemporary architecture if (a) the site/building currently has a negative impact on its setting, (b) the development takes account of and responds to its sensitive setting, and (c) the building is of exceptional design quality and in harmony with its setting. It is recognised that such buildings can have a positive effect on their historic setting.

5.6.1.8 Protected Structures

CHC1: "*To seek the preservation of the built heritage of the city that makes a positive contribution to the character, appearance and quality of local streetscapes and the sustainable development of the city*."

5.6.1.9 Key Views and Prospects

Section 16.7.1 the Development Plan states: "*There is a recognised need to protect conservation areas and the architectural character of existing buildings, streets and spaces of artistic, civic or historic importance. <u>In particular, any new proposal must be sensitive to the historic city centre, the river Liffey and quays, Trinity College, Dublin Castle, the historic squares and the canals</u>*."

SC7: "*To protect and enhance important views and view corridors into, out of and within the city, and to protect existing landmarks and their prominence*."

Figure 5.13 taken from the DCDP identifies the indicative Key Views and Prospects.

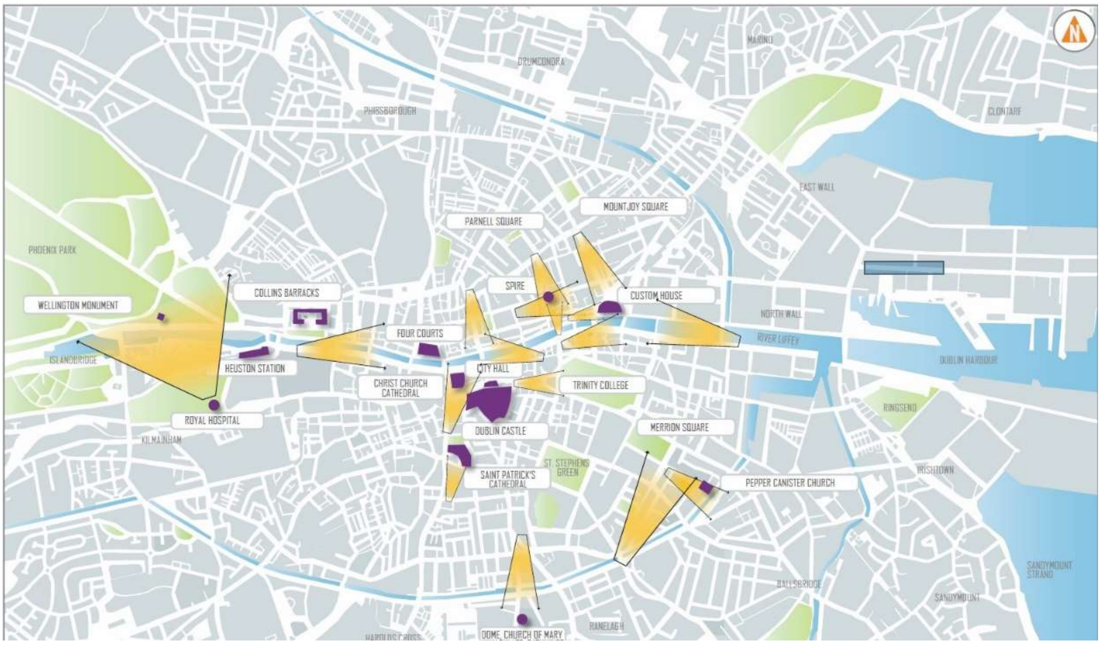


FIGURE 5-13 DCDP (FIG. 4) KEY VIEWS AND PROSPECTS (INDICATIVE)

The key views in the vicinity of the site include (a) views along the Liffey River corridor from the south quays to east and west of the Custom House (therefore to east and west of the site), and (b) views down Gardiner Street towards the Custom House.

5.6.2 National Planning Policy

The DCDP identifies Connolly Station as one of few areas in the city suitable for a high-rise cluster (50m +) and a landmark tall building. With regard to height the proposal does not contravene the DCDP. Therefore, national policy seeking to encourage compact growth and increased building height (above any blanket height limits hitherto imposed by city/county and local development plans) are not strictly relevant. Nonetheless certain principles in those documents are worthy of note.

5.6.2.1 National Planning Framework

Compact growth is one of the main principles and intended outcomes of the NPF. This encourages higher density - and therefore taller - development in urban areas where supporting infrastructure and services are available.

National Policy Objective 11 of the NPF 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… subject to development meeting appropriate planning standards and achieving targeted growth*."

Regarding brownfield development the NPF states: "*<u>The National Planning Framework targets a significant proportion of future urban development on infill/brownfield development sites within the built footprint of existing urban areas</u>… This means encouraging more people, jobs and* *activity generally within our existing urban areas… and requires a change in outlook... It also requires active management of land and sites in urban areas*."

5.6.2.2 Building Height Guidelines

The Building Height Guidelines state: "*Implementation of the National Planning Framework requires increased density, scale and height of development in our town and city cores …*

"*to meet the needs of a growing population without growing our urban areas outwards requires more focus in planning policy and implementation terms on reusing previously developed 'brownfield' land, building up urban infill sites… and either reusing or redeveloping existing sites and buildings that may not be in the optimal usage or format taking into account contemporary and future requirements*…"

In Section 3.2, 'development management criteria' are set out to guide the evaluation of development proposals for buildings taller than the prevailing heights in the area:

"*In the event of making a planning application, the applicant shall demonstrate to the satisfaction of the Planning Authority/ An Bord Pleanála, that the proposed development satisfies the following criteria:*

At the scale of the relevant city/town

- *The site is well served by public transport with high capacity, frequent service and good links to other modes of public transport.*
- *Development proposals incorporating increased building height, including proposals within architecturally sensitive areas, should successfully integrate into/ enhance the character and public realm of the area, having regard to topography, its cultural context, setting of key landmarks, protection of key views. Such development proposals shall undertake a landscape and visual assessment, by a suitably qualified practitioner such as a chartered landscape architect.*
- *On larger urban redevelopment sites, proposed developments should make a positive contribution to place-making, incorporating new streets and public spaces, using massing and height to achieve the required densities but with sufficient variety in scale and form to respond to the scale of adjoining developments and create visual interest in the streetscape.*

At the scale of district/ neighbourhood/ street:

- *The proposal responds to its overall natural and built environment and makes a positive contribution to the urban neighbourhood and streetscape*
- *The proposal is not monolithic and avoids long, uninterrupted walls of building in the form of slab blocks with materials / building fabric well considered.*
- *The proposal enhances the urban design context for public spaces and key thoroughfares and inland waterway/ marine frontage, thereby enabling additional height in development form to be favourably considered in terms of enhancing a sense of scale and enclosure while being in line with the requirements of "The Planning System and Flood Risk Management – Guidelines for Planning Authorities" (2009).*

- *The proposal makes a positive contribution to the improvement of legibility through the site or wider urban area within which the development is situated and integrates in a cohesive manner.*
- *The proposal positively contributes to the mix of uses and/ or building/ dwelling typologies available in the neighbourhood*."

5.6.3 Previous Planning Studies

5.6.3.1 Managing Intensification and Change: A Strategy for Dublin Building Height, 2000

In September 2000 Dublin City Council (DCC) published a non-statutory report entitled *Managing Intensification and Change: A Strategy for Dublin Building Height*, authored by DEGW.

The study identified areas/locations with capacity to accommodate change, and with drivers for change, based on (among other factors): (a) existing townscape character, (b) access to public transport, (c) availability of large brownfield sites and (d) relative distance from established 'activity nodes' in the city to ensure these are not compromised.

The study identified 15 no. potential locations in the city for 'landmark' high buildings and three locations for 'high intensity clusters'. Connolly Station was identified as suitable for both a landmark high building and a high intensity cluster.

5.7 Impact Assessment – Townscape Effects

5.7.1 Do Nothing Scenario - Townscape

The site as a large, underutilised, high-walled and impermeable area of infrastructural character would continue to detract from the character, quality and visual amenity of the adjacent streets and the wider townscape. The site would continue to contribute to a discontinuity in the townscape, spatially and in terms of character. The potential condition/quality of the adjacent character areas/neighbourhoods would be limited by their interface with the site. Legibility and pedestrian permeability would remain poor.

5.7.2 Construction Phase Impacts - Townscape

The proposed development is anticipated to be constructed over a 56-month period. The construction process would entail the following:

- Set up site perimeter hoarding, maintaining existing pedestrian and traffic routes around the site;
- Demolition and site clearance;
- Excavation;
- Site services installations (drainage, power, water etc.);
- Construction of new buildings frames and envelopes (including tall buildings);
- Interior fit-out of buildings;
- Exterior streetscape, landscaping and site boundary works.

During construction the site and immediate environs would be heavily disturbed by the above activities and the incremental growth of the buildings on site. The magnitude of change to the townscape would be high. Overall, the sensitivity of the townscape can be considered medium (refer to 5.7.3.1). Therefore, the effects on the townscape would be ‘significant’ and negative, although temporary.

5.7.3 Operational Phase Impact - Townscape

The assessment of potential townscape effects involves (a) classifying the sensitivity of the townscape receptors (the main elements, features or characteristics of the townscape, and the character areas, that could be affected), (b) classifying the potential magnitude of change to each of the townscape receptors that would result from the development, (c) combining these factors to arrive at an assessment of significance of the effects on each receptor, and the townscape as a whole, and (d) making a judgement as to the quality of the effects, i.e. classifying them as positive, neutral or negative.

5.7.3.1 Townscape Sensitivity

The main elements, features and characteristics of the townscape, which could be affected by the proposed development, are:

- **Topography**. While the wider topography is relatively flat the internal site topography is complex and relates poorly to the adjacent streets and sites, with level changes at the boundaries. <u>The existing topography as a townscape receptor is of low sensitivity</u> (it can accommodate change without undue consequences or loss of townscape value).
- **Urban grain and movement patterns**. Due to its large area and impermeability the site fits poorly into the surrounding urban grain and restricts movement through the

townscape, particularly that of pedestrians. The existing urban grain and movement patterns as a townscape receptor are of low sensitivity.

- **Land use pattern.** The site's current land use is a combination of logistical/infrastructural with a small amount of office space. This relates functionally to the Connolly Station character area to the west but relates poorly to the predominantly residential land use to the north and east, to Custom House Plaza (part of the IFSC) to the south, and to the Amiens Street corridor to the west. Additionally, the site is zoned Z5 for 'intensive mixed-use development'. Therefore, the existing land use pattern as a townscape receptor is of low sensitivity.
- **Plot/building typologies, scale and architecture**. There is a wide range of plot and building typologies, scale, architecture and materials in the receiving environment. The area includes Victorian and modern houses of 2 and 3 storeys; 20th century mid- to higher density apartment buildings; office buildings of up to 8 storeys in perimeter block layouts and with smaller footprints; commercial/retail and mixed use buildings (e.g. on Amiens and Talbot Streets) and the extensive Connolly Station complex. There are also set piece buildings from a range of eras including the Custom House, Busáras, the IFSC, and in the wider area Liberty Hall, the Conference Centre, and the permitted tall building at Tara Street DART station. There is no norm with which new development could seek to comply. Furthermore, the area is specifically identified in the DCDP for high rise buildings. The existing mix of plot/building typologies, scale and architecture is of low sensitivity.
- **Adjacent streetscapes and other boundary interfaces**. Sheriff Street Lower as a streetscape is of particularly poor quality due to the condition of the site boundary combined with the rear façade of Custom House Plaza opposite and the street's use for bus parking. The site boundary along Oriel Street and Oriel Hall also negatively affects the character and quality of those streetscapes. The adjacent streetscapes in their existing condition are of low sensitivity.
- **Landscape/green infrastructure**. The site is almost entirely hard surfaced, with only a small amount of scrub around a shed near the Sheriff Street Lower boundary. There is also limited green infrastructure in the immediate environs of the site; the nearest features are street trees along Seville Place, a small stand of mature trees at the corner of Sheriff Street Lower and Amiens Street, a park between Sheriff Street Lower and the IFSC, and a linear park along the Royal Canal. As a townscape receptor the existing vegetation/green infrastructure is of low sensitivity.
- **Perceptual and aesthetic factors**. The site makes negative contributions to the perceived condition and quality of the townscape locally, and to visual amenity and legibility - being bounded by high walls and with few buildings or other features of value (except the warehouse façade to Sheriff Street Lower and the early 20th century office building). The perceptual and aesthetic aspects of the townscape are of low sensitivity to the change proposed.

The main character areas in the townscape are discussed in 5.5.3 above. They include:

- Connolly Station and railway corridor;
- Amiens Street corridor;
- North inner-city mixed use (west of Amiens Street);

- IFSC, George's Dock and North Lotts (south and south east of site);
- North inner city residential (east and north of site);
- Liffey River Corridor including the Custom House.

The Connolly Station area (of which the site is a part), the IFSC/North Lotts and Amiens Street, while all having certain valued/sensitive features, are sufficiently robust to withstand change in their environs without undue consequences. These areas can be classified as being of low to medium sensitivity to the change proposed and this is underlined by the site's Z5 zoning and identification in the DCDP for high density, high rise development (based on Connolly's strategic position in the pedestrian, cycle, bus, Luas and rail networks as well as the townscape capacity to accommodate change, originally identified in the DEGW report in 2000).

Other more sensitive areas, such as the Liffey corridor, Custom House and parts of the northern city centre mixed use area west of Amiens Street (e.g. O'Connell Street and Gardiner Street), are sufficiently removed from the site to be less susceptible to any effects on their character (other than – potentially - changes to views from or of these areas).

Of the surrounding character areas, only the low-density residential neighbourhood to the east and north can be considered sensitive to the change proposed.

5.7.3.2 Magnitude of Townscape Change

The potential changes to the townscape receptors that would result from the proposed development are as in **Table 5.6**.

Townscape Receptor	Sensitivity	Magnitude of Change	Description of Change & Significance
Topography	Low	Medium	The ground level of the site will be flattened so as to be level with the adjacent streets at the site boundaries, integrating the internal public space/streets with the surrounding streets, facilitating permeability. Significance: Slight, positive.
Urban grain & movement patterns	Low	High	The large, currently undivided area would be divided into development blocks by new pedestrian priority streets with a central square at their junction. The alignment of the streets borrows from the surrounding grain (e.g. the north-south street is parallel to Oriel Street; the east-west street is parallel to Sheriff Street Lower). The location of the entrances responds to the potential desire lines into and across the site. The resulting urban grain is (a) a logical division of the site area, and (b) a functional extension of the existing surrounding grain, improving pedestrian permeability considerably. Significance: Moderate, positive.
Land use pattern	Low	High	An underutilised city centre area in logistics/ infrastructure use, but zoned for 'intensive mixed-use development', would be transformed into a high-density residential quarter, with the residential use supported by retail, café and other commercial uses at street level. (A future S.34 application for hotel and office buildings on the remainder of the Masterplan site would contribute further to the mix of uses.) The resulting use of the site would be (a) in accordance with its zoning and (b) complementary to the surrounding uses (lower density residential to the east and north, mixed use to the west and south, transport hub adjacent to the south west. Significance: Moderate, positive.
Plot/building typologies & architecture	Low	High	A cluster of high density, high rise buildings (the tallest being 79.45m) would be introduced to an area already characterised by a wide range of plot/building typologies, scale, architecture and materials. The existing mix is such that the development could not be considered out of character (as there is no predominant character), although the juxtaposition of type/scale with the low-density residential area to the east and north would potentially be stark. Given that the Connolly Station area is designated for high rise development,

			and the site is the only opportunity (in the 'Connolly Station area') for the realisation of that objective, the change may be considered positive in that it would realise a development/planning objective. Significance: Moderate, positive.
Adjacent streetscapes & boundary interfaces	Low	High	The streetscapes of Sheriff Street Lower and Oriel Street Upper, which due to the existing site condition are of poor character and visual amenity value, would be substantially altered. The changes to Sheriff Street would include the introduction of broad entrances to the site's new internal streets, one through the refurbished warehouse façade, the other where Commons Street meets the site from the south. The changes to Oriel Street include the opening of two broad entrances to the site and in between these a new built frontage to the street (Block D2), while retaining parts of the protected wall. In addition to the physical changes to the street edge, the land use change on the site would generate pedestrian traffic on the streets. The existing high wall on the boundary along Oriel Hall would remain, with new buildings (C2 the nearest) protruding above this. The future S.34 application for office and hotel buildings in the southern part of the site would further alter the streetscapes, reinforcing a new urban character and identity. Significance: Moderate, positive.
Landscape/ Green infra-structure	Low	Medium	Although predominantly hard surfaced the street level public open space includes mounded areas of soft landscaping with trees. Street trees are also proposed along Sheriff Street Lower and Commons Street. Above ground level there are numerous podium and roof terrace open space areas, all with areas of ground cover planting, raised planters and trees. The volume of vegetation and the area of soil coverage (slowing rainwater runoff) would be increased considerably. Significance: Slight, positive.
Perceptual & aesthetic factors	Low	High	The aesthetic of the area would be substantially enhanced by the introduction of buildings and streetscapes of evident design and material quality, and by increased urban activity (movement of people, cafes generating sounds and smells, etc.). Legibility and navigability would be improved by the creation of new built landmarks and pedestrian routes, visible from near and far in the townscape. Significance: Moderate, positive.

Table 5-6 Potential Change to Townscape Receptors

The changes to the potentially affected townscape character areas can be summarised as in **Table 5.7**. The quality of the effects, i.e. classification of effects as positive, neutral or negative, is addressed below.

Townscape Character Area	**Sensitivity**	**Magnitude of Change**	**Description of Change & Significance**
Connolly Station and railway corridor	Low	High	The Connolly Station character area would be fundamentally altered by the transformation of an underutilised area attached to the station, into a high-density neighbourhood incorporating a cluster of high-rise buildings including a landmark tall building. The change would be visible from the approaches to and immediate setting of the station, and from some of the platforms and from trains passing through the station. Significance: Moderate.
IFSC/North Lotts	Low	Low	The IFSC and North Lotts area has a generally high degree of built enclosure and an inward focus. From certain locations within and at the northern edges of this area the change nearby to the north and north west would be visible, but without affecting the area significantly (the IFSC and North Lotts being the most similar area in character to the proposed development). Significance: Not Significant.
Amiens Street Corridor	Medium	Low	Amiens Street passes some 100m to the west of the site and on its approach to the city centre is aligned to afford views towards the site. It is a major urban thoroughfare fronted by development of mixed character (although mostly low rise), arriving in the city centre at a major transport hub and a cluster of prominent but diverse elements (Connolly Station, IFSC, Busáras, Custom House). The development would be visible from parts of the Amiens Street corridor to the west. The character of the street corridor would be indirectly affected by the change. Significance: Slight.
Northern city centre mixed use area west of Amiens Street	Medium	Low - Medium	West of Amiens Street the potential effects would largely be limited to the development's visibility (in the distance) from a limited number of streets that are so aligned as to afford views towards the site (e.g. Talbot Street and Portland Row). The inner-city area generally would be indirectly affected by limited change to views, although in a confined area (Talbot Street) the change would be of greater magnitude. Significance: Slight to moderate.

Northern city centre residential area east and north of site	High	Medium - High	There would be a direct effect on the residential area to the east and north of the site, along Oriel Street Upper and Oriel Hall in particular, as well as a stretch of Seville Place and to a lesser extent Sheriff Street Lower (east of the Oriel Street junction). Along the directly affected edge in particular the character of this area would be substantially altered by the introduction of the cluster of high rise buildings including a landmark tall building, and by the changes to the urban grain and movement pattern, the land use mix, the composition and character of streetscapes and related perceptual and aesthetic factors. Away from the direct interface the change would be indirect and of lesser magnitude. Significance: <u>Very significant</u>.
Liffey Corridor including Custom House	High	Negligible	Visibility of the development from the Liffey corridor, including the key views of the Custom House from across the river, would be negligible. The character of the Liffey corridor and the setting of the Custom house would not be significantly altered. Significance: <u>Not significant</u>.

TABLE 5-7 POTENTIAL CHANGE TO TOWNSCAPE CHARACTER AREAS

5.7.3.3 Significance and Quality of Townscape Effects

The GLVIA (Section 5.53) recommends that an overall conclusion as to the significance of townscape effects be drawn by combining the individual assessments for each townscape receptor and character area. Taking account of these assessments in 5.7.3.2 above, it is found that <u>overall the townscape effects can be classified significant and positive</u>.

In arriving at the positive conclusion, the assessments of the effects on the individual townscape receptors (in 5.4.3.2) were considered. The proposals were also assessed against (a) the 'considerations for large-scale development' listed in Section 16.2.2.1 of the DCDP (see **Table 5.8** below), and (b) the questions set out in the Urban Design Manual (DEHLG, 2009), specifically the principles in the 'Neighbourhood' section of the Manual (see **Table 5.9** below). The DCDP (in Section 16.10.4) suggests this is an appropriate way to assess the appropriateness of proposals for 'large neighbourhood' developments.

Additionally, the visual effects of the proposals on a range of viewpoints in the receiving environment were assessed, informed by verified photomontages. Refer to Section 5.8.3 below.

Dublin City Development Plan *'Considerations' regarding proposals for large-scale development*	**Compliant : Yes/No**	**Comment**
To create new compositions and points of interest	Yes	The proposed layout and composition of spaces/streets and buildings is a considered and logical response to the zoning/ development objective for the site, and to the surrounding urban grain and built form. Through its gradation of scale towards a central landmark building and the use of varied forms and materials, an interesting and distinctive new urban composition and point of interest would be introduced to the city.
To provide high-quality new streets, squares and open spaces, where appropriate, linked to the surrounding street pattern, to maximise accessibility	Yes	The proposal extends the surrounding urban grain into and across the site, with entrances positioned to respond to the existing approaches and likely desire lines, maximising accessibility and legibility. The streets and central square are of high-quality design with a considered material palette.
To provide an appropriate mix of uses comprising retail, residential, entertainment, recreational, cultural, community- and/or employment generating uses; particular emphasis should be given to new and complementary uses and facilities that expand and improve the existing range of uses and facilities in the area	Yes	The residential use of the blocks is complemented by a range of café, retail and commercial units fronting the streets and square. These will be further complemented by office, hotel, community and additional retail uses in the proposal for the remainder of the Masterplan site (in a forthcoming S.34 application). In combination the two proposals for the Masterplan area will deliver a high intensity mixed use cluster but with a predominance of residential use.
To carefully integrate appropriate planting and trees	Yes	Through a combination of mounded areas of soft landscaping with trees in the streets and square, street trees, and podium and roof terrace open space areas, the volume of vegetation and the area of soil coverage would be increased considerably.
To take into account existing and likely future patterns of traffic and pedestrian movement, including pedestrian desire lines	Yes	The entrances are positioned to respond to the existing approaches (along Sheriff Street Lower from Amiens Street; along Commons Street; along Oriel Street Upper from Seville Place) and likely desire lines, maximising accessibility and legibility.
To retain existing and create new features to make an easily understandable urban environment, including active building frontages with clearly defined edges and safe public routes	Yes	The warehouse façade on Sheriff Street Lower would be retained, refurbished and reused as a signature feature (entrance and shopfronts) of the development, also defining the edge. Parts of the wall fronting Oriel Street Upper would also be retained. The streets and central square are a logical extension of the urban grain through the site and the café and retail frontages would activate these spaces. The high level of day and night-time activity would combine with a high level of passive surveillance (from the surrounding apartment buildings) to create a safe public realm.

Table 5-8 Dublin City Development Plan

Urban Design Criteria and Indicators *(Urban Design Manual - A Best Practice Guide)*	**Compliant: Yes/No**	**Comment**
01 Context - How does the development respond to its surroundings?		
The development seems to have evolved naturally as part of its surroundings	No	The surrounding townscape character is varied; there is no norm with which the development could comply. Additionally, the surrounding areas all developed prior to the policy shift towards compact growth, therefore, in this location it would be inappropriate for the development to reflect the existing surrounding character. The development would rather create its own character and urban identity. This scenario is envisaged in the DCDP: • *"In areas of low quality, varied townscape, infill development will have sufficient independence of form and design to create new compositions and points of interest and have regard to the form and materials of adjoining buildings, where these make a positive contribution to the area"*. • *"There are also a few areas where there are good transport links and sites of sufficient size to create their own character, such that a limited number of mid-rise (up to 50m) buildings will help provide a new urban identity"*. Therefore, while the development would not appear to have 'evolved naturally' from its surroundings, its intended effect of creating a new urban quarter of distinct character and identity, would be a positive change.
Appropriate increases in density respect the form of buildings and landscape around the site's edges and the amenity enjoyed by neighbouring users	Yes	The proposal includes a cluster of mid-rise rise buildings and a landmark tall building, as prescribed for the area in the DCDP. It is inevitable, on an infill site in particular, that there will be stark changes in scale and changes to the composition of views, which may affect people's existing amenity. However, in height the development responds appreciably to the sensitive neighbouring character area of low-density housing (2-3 storeys) to the east and north - stepping down in height to 5 storeys fronting these boundaries (Blocks D2 and C2). In contrast, along the western boundary where the site abuts the Connolly Station platforms, facing a large urban street (Amiens Street) and the city centre further west, the massing is less deconstructed.

Form, architecture and landscaping have been informed by the development's place and time	Yes	The layout and form of the buildings is determined primarily by the division of the site by the new internal streets, which are an extension of the surrounding urban grain and desire lines across the site. The massing in each 'block' responds to its immediate interface (illustrated by the frontage to Oriel Street Upper compared to the frontage to the Connolly Station platforms). The architecture throughout is deliberately contemporary, reflecting a new development paradigm for city centre transport hubs, although traditional materials such as brick are employed in the residential building facades (except in the 'landmark' building which is clad in faceted white metal for maximum visual effect). In the streetscape/landscape design and materials the area's coastal and industrial history is referenced.
The development positively contributes to the character and identity of the neighbourhood	Yes	While diverting (deliberately and unavoidably) from the character of the surrounding areas, the development would fill a large gap in the existing townscape, reducing the disconnection between the surrounding areas, and establishing a new urban quarter with a distinct identity. In so doing it would enhance all of the surrounding areas, either by direct improvements (e.g. Sheriff Street Lower, Oriel Street Upper) or indirectly through changes to views (introducing a new and attractive built element to the view compositions, indicating a new place of significance in the townscape).
Appropriate responses are made to the nature of specific boundary conditions	Yes	The proposal pays particular attention to the Sheriff Street Lower and Oriel Street Upper interfaces, with steps down in massing and height to the east and north boundaries and predominantly residential use in those parts of the site. The buildings to form part of the future S.34 application, along the Sheriff Street Upper and Commons Street frontage, will be hotel and office use, more appropriate to the interface with Connolly Station, Amiens Street and the IFSC.
02 Connections - How well connected is the new neighbourhood?		
There are attractive routes in and out for pedestrians and cyclists	Yes	The entrances are positioned in response to the existing approaches and likely desire lines, maximising accessibility and legibility. The entrances are wide and designed with a place-making objective, to encourage use of the routes across the site.
The development is located in or close to a mixed-use centre	Yes	The site is located in the city centre, providing access by foot to the entire commercial core as well as all available public transport modes. The

		development itself would function as a mixed-use neighbourhood centre.
The development's layout makes it easy for a bus to serve the scheme	Yes	The site has immediate access to bus, Luas, rail and bikeshare services.
The layout links to existing movement routes and the places people will want to get to	Yes	Addressed above.
Appropriate density, dependent on location, helps support efficient public transport	Yes	The city centre location at a public transport hub has long been identified as suitable for high density development.

TABLE 5-9 URBAN DESIGN CRITERIA AND INDICATORS

5.8 Impact Assessment – Visual Effects

5.8.1 Do Nothing Scenario – Visual Amenity

The high boundary walls and infrastructural character of the site would continue to define the character of views locally (from Sheriff Street Lower, Oriel Street and Oriel Hall specifically), reducing visual amenity. The absence of buildings of note on the site (apart from a small early 20th century office building and a retained warehouse façade), would continue to contribute to a lack of legibility in the townscape.

5.8.2 Construction Phase Impacts – Visual Amenity

During construction the site and immediate environs would be heavily disturbed by construction activities and haulage, and the incremental growth of the buildings on site. The most significantly affected views would be those from Oriel Street Upper and Oriel Hall, where there are residential buildings directly across the street facing the site. The magnitude of change to views from these streets would be high. The sensitivity of the visual receptors is medium. The significance of the effects would be significant and negative, although temporary. With increased distance from the site the magnitude and significance of effects would reduce.

5.8.3 Operational Phase Impacts – Visual Amenity

39 no. viewpoints in the receiving environment were selected for detailed assessment of the potential visual effects, informed by verified photomontages. 16 no. of these (Nos. 1-16 below) are medium to long distance views which were agreed by the design team and DCC during pre-planning consultation, specifically to assess long range visibility and certain key vistas and sensitivities around the site. A further 11 no. viewpoints (Nos. 17-27) were selected by the LVIA author to assess the effects on the streets and neighbourhoods and other sensitivities around the site, identified in the townscape assessment. 12 no. additional viewpoints were selected by the conservation architect to inform the preparation of the Built Heritage chapter (Chapter 14).

Widespread visual change is inevitable when a high-rise building is inserted in a central position into a generally low-rise city. This is one of the objectives of a 'landmark' development such as that proposed. It should be recognised that not all potentially affected locations and sensitivities can be specifically addressed. Collectively the viewpoint selection is intended provide photomontages and assessment of views from a wide range of angles and distances, allowing for a net understanding to be gained as to the proposal's visibility and visual effects on the receiving environment.

The individual viewpoint assessments should be read in conjunction with the verified photomontages provided under separate cover. The photomontages are presented as follows for each viewpoint:

- **Baseline View**: A photograph of the site in its existing condition;
- **Proposed View**. A photomontage of the subject SHD proposal;
- **Cumulative View**: A photomontage of the entire Masterplan development, incorporating (a) the subject SHD application and (b) the current proposals for the three non-residential buildings comprising the remainder of the Masterplan development - Blocks A and E (office) and Block D3 (hotel), all fronting Sheriff Street Lower. The three non-residential buildings are to be the subject of a separate Section 34 planning application.

5.8.3.1 Viewpoint 1 – Annesley Bridge/North Strand Road

Baseline View: Annesley Bridge is a gateway from the more suburban landscape of Fairview into the urban area on the route into the city centre. The wide road is flanked by a mix of historic and modern buildings, all low rise, in retail, office and residential use. Taller buildings can be seen further along the street suggesting an intensification of land use, and George's Quay Plaza is visible in the distance (on the south side of the Liffey) indicating the city centre. The Dublin Mountains are visible in places between the buildings. Viewpoint sensitivity: Medium.

Proposed View: The development protrudes above the roofline of the low buildings on the east side of the street. It appears as a substantial cluster of taller buildings, with steps up in height from the outer edges to the high-rise Block C1 at the centre of the cluster, presenting its slender north façade to the viewer. Variations in façade design and materials/colours combine with the variations in height to create visual interest in the cluster. No distant built feature, nor the Dublin Mountains, would be screened by the development. Magnitude of change: Low.

Significance and Quality of Visual Effects: Slight and positive. The development makes a positive contribution to the skyline, adding a landmark (indicating a place of significance in the city) and visual interest, without loss or compromise of any valued element, feature or characteristic of the view.

Cumulative View: The cluster of taller buildings would be slightly broadened by the S.34 buildings, with Block A in particular adding to the strength of the west frontage (addressing Amiens Street). Overall the development would retain a pleasing profile appreciably responsive to the context. There would be no significant accumulation of visual effects or change in quality of effects.

5.8.3.2 Viewpoint 2 – Portland Row/North Circular Road

Baseline View: Portland Row is a mixed density residential street in the northern city centre and a key east-west thoroughfare. The street is flanked by three storey red brick terraces to the left and to the right by the former St Joseph's convent, a protected structure converted for residential use. In the middle distance a cluster of taller (six storey) modern buildings can be seen at the Amiens Street junction, and beyond that the spire of St Laurence O'Toole church protrudes above a backdrop of the Spencer Dock apartments. Viewpoint sensitivity: Medium.

Proposed View: The development protrudes above the roofline of the buildings on the south side of the street. The B blocks are in a row presenting their narrow sides to the viewer, separated by corridors of space, and the high-rise Block C1 rises above these at the centre of the cluster. Magnitude of change: Medium.

Significance and Quality of Visual Effects: Moderate and positive. The development makes a positive contribution to the skyline - adding visual interest to an already complex and layered city view. It also contributes to legibility; the strong building line and common form and façade design of the B blocks suggests a response to an element in the townscape (in this case parallel railway and Amiens Street corridors), while the height of Block C1 indicates a place of significance. No valued element, feature (including the church) or characteristic of the view would be compromised.

Cumulative View: The S.34 buildings would not be visible.

5.8.3.3 Viewpoint 3 – Junction of North Strand/Amiens Street and Seville Place

Baseline View: The Five Lamps junction is an important intersection of north-south and east-west thoroughfares. In the view east along Seville Place the street is lined in the foreground by two storey Victorian houses, all protected structures, with another protected structure at the corner (the funeral home). The elevated railway crosses the street in the middle distance, screening all but the protruding roof of a warehouse type building and the spire of St Laurence O'Toole church from view. Viewpoint sensitivity: High.

Proposed View: The development protrudes above the roofline of the foreground buildings on the south side of the street. The B blocks are in a row separated by corridors of space, and the high-rise Block C1 rises above these at the centre of the cluster, with the lower Block C3 protruding marginally to the left. The gradation of height towards the centre of the cluster is appreciable. Magnitude of change: High.

Significance and Quality of Visual Effects: Very significant and positive. The development introduces a new character of development - and a new character area - to the townscape in view, adding visual interest and identity. The foreground buildings lose prominence, but their particular characteristics and qualities are also emphasised by the contrast with the new buildings. There is sufficient separation distance and contrast between the foreground streetscape and the high-density cluster to the rear that they read as two distinct areas in the view (as opposed to a pre-existing character are being compromised by the introduction of new forms of development to the area).

The DCDP recognises this prospect: *"There are also a few areas where there are good transport links and sites of sufficient size to create their own character, such that a limited number of mid-rise (up to 50m) buildings will help provide a new urban identity"*.

Cumulative View: A small part of Block A would be visible, contributing slightly to the diversity of scale and architecture of the cluster - but without changing the significance or quality of the visual effects.

5.8.3.4 Viewpoint 4 – Junction of North Earl Street and O'Connell Street

Baseline View: The view is taken from the junction of North Earl Street and O'Connell Street, beneath the Spire, at the centre of a CA and ACA, looking east. The pedestrianised street is lined by historic buildings mostly four storeys in height (the uniformity of height is a notable characteristic of the view), used for retail at street level with office space above. The street front buildings frame a view of the Connolly Station tower in the distance terminating the vista at the end of the street. The tower stands at an angle to the viewer. <u>Viewpoint sensitivity: High</u>.

Proposed View: The cluster of tall buildings is visible in the distance, beyond the station tower, framed by the street front buildings of North Earl Street and Talbot Street. The new buildings protrude well above the station tower, with the high-rise Block C1 positioned behind the tower, similarly angled to present a corner and two facades to the viewer and of similarly slender proportions. Three other buildings of different heights, façade design and materials are arranged to the sides of the central landmark building, so that a gradation of height towards the centre of the cluster is appreciable. <u>Magnitude of change: Medium</u>.

Significance and Quality of Visual Effects: <u>Significant and positive</u>. The development introduces a new character of development - and a new character area - to the townscape in view, adding visual interest and marking a place of significance and distinct identity. The development is too distant for the foreground buildings to lose their prominence or for the streetscape character to be compromised (i.e. there would be no negative effects on the CA or ACA). However, the Connolly Station tower would lose prominence and definition against the backdrop of tall buildings. This would represent a loss, but it is considered of lesser consequence than the gain in visual interest to wider townscape and the skyline.

Cumulative View: Block A would add a significant element to the distant high-density cluster, contributing to the diversity of scale and architecture and strengthening the development's presence as an urban quarter (as opposed to an isolated development). At a distance of some 850m it would not change the significance or quality of the visual effects.

5.8.3.5 Viewpoint 5 – Junction of Talbot Street and Gardiner Street

Baseline View: There are notable differences in composition and character between this view and Viewpoint 4. There is greater variety in building height, era of development and therefore architecture and materials (including more modern buildings). The Connolly Station tower retains its prominence in the vista at the end of the street, standing at an angle to the viewer, framed by the street front buildings. <u>Viewpoint sensitivity: Medium</u>.

Proposed View: The new buildings protrude well above the station tower, with Block C1 positioned centrally, behind the tower, similarly angled to present a corner and two facades to the viewer, and of similarly slender proportions. Block B1 is to the left of this, presenting a broad façade divided into two volumes of different materials. <u>Magnitude of change: Medium</u>.

Significance and Quality of Visual Effects: <u>Moderate and neutral</u>. The development adds visual interest and marks a place of significance in the townscape, but the cluster appears somewhat incomplete (with several buildings hidden from view, giving greater prominence to the broad façade of Block B1). The Connolly Station tower would lose prominence against the backdrop of tall buildings, although at closer proximity (compared to Viewpoint 4) this would be less pronounced.

Cumulative View: Block A would add a significant element to the high-density cluster, forming a more complete composition with a clear gradation of height towards the centre and greater diversity of architecture and materials, lending the cluster greater presence as a distinct urban quarter. The significance of effects would remain moderate, but the quality of effects would change to positive.

5.8.3.6 Viewpoint 6 – George's Quay Near Loopline Bridge

Baseline View: The Custom House is the most valued element of set-piece architecture in the Liffey River corridor CA. The Loopline Bridge is just to the west of the Custom House and this obstructs views of the building from further west along the quays. This view from George's Quay south of the river is the first unobstructed view of the building from the west. The IFSC stands prominently to its right (and protrudes marginally above part of the Custom House parapet), the architecture and materials contrasting dramatically with the historic building. Further modern buildings are visible to the right along the riverfront. Viewpoint sensitivity: High.

Proposed View: The top of Block C1 protrudes marginally above the IFSC roofline, above the already affected part of the Custom House parapet. Magnitude of change: Negligible.

Significance and Quality of Visual Effects: Not significant and neutral. Although discernible, the development would have no significant effect on the composition, character or quality of the view.

Cumulative View: The S.34 buildings would not be visible.

5.8.3.7 Viewpoint 7 – George's Quay Opposite the Custom House

Baseline View: This view is taken from a position opposite the Custom House, in line with the centre of its south façade, with the camera angled towards the subject site. Viewpoint sensitivity: High.

Proposed View: A small part of Block D1 would be visible in a gap between the IFSC buildings. The high-rise Block C1 would not be visible. Magnitude of change: Negligible.

Significance and Quality of Visual Effects: Not significant and neutral.

Cumulative View: The S.34 buildings would not be visible.

5.8.3.8 Viewpoint 8 – City Quay Beside Sean O'Casey Bridge

Baseline View: The view north across the Liffey is complex, with Sean O'Casey Bridge in the foreground and a wide variety of buildings and other structures on the far side of the river. These include the CHQ building and several modern office buildings and the Hilton hotel - all notably squat in their proportions. In cases the avoidance of height (or perception of scale) has visibly determined the design of the building to its detriment, e.g. the hotel, where horizontal layering of materials and setbacks are employed, resulting in an inelegant form. The setback, blank, light coloured plant levels of office buildings fronting George's Dock (also intended to minimise visibility) protrude above the roofline of the CHQ, to the detriment of the buildings themselves and CHQ. Viewpoint sensitivity: Medium.

Proposed View: The development protrudes above the composite roofline of the CHQ building and the office buildings along George's Dock. It appears as a cluster of taller buildings of various designs and materials, with Block C1 prominent at the centre of the cluster, presenting its slender south façade to the viewer. Magnitude of change: Medium.

Significance and Quality of Visual Effects: Moderate and positive. The development makes a positive contribution to the skyline - adding visual interest to an already complex and layered city view. It also contributes to legibility, with the height of Block C1 indicating a place of significance in the townscape. No valued element, feature or characteristic of the view would be compromised.

Cumulative View: The cluster of taller buildings would be made more substantial by the addition of Block A, adding to the variety of architecture and materials and the overall presence of the new urban quarter. There would be no significant accumulation of visual effects or change in quality of effects however.

5.8.3.9 Viewpoint 9 – Spencer Dock Near Mayor Street Upper

Baseline View: The view is taken from the open space between the Spencer Dock apartments and the Royal Canal (a CA), just off Mayor Street. Beyond the corridor of open space in the foreground is a six-storey apartment building to the left and two blocks of three storey red brick houses to the right of the view, with the St Laurence O'Toole church spire rising prominently above the central block. These buildings views along Seville Place and an open space that runs between North Lotts and the Sheriff Street/Seville Place neighbourhood. The Harbourmaster Place apartments and Custom House Plaza building (adjacent to the site across Sheriff Street Lower) can be seen in the distance. The view illustrates the varied and somewhat disconnected townscape character in the area. Viewpoint sensitivity: Medium.

Proposed View: The development protrudes well above the roofline of the central block of low-density residential buildings, to one side of the church spire. With its distinctive height, design and colour, Block C1 is a prominent addition to the complex view. The red brick Block D1, also tall (though less so) and slender, steps down in height to the surrounding lower buildings. Magnitude of change: Medium.

Significance and Quality of Visual Effects: Moderate and positive. The development makes a positive contribution to the skyline - adding visual interest to an already complex and layered city view. It also contributes to legibility, with Block C1 indicating a place of significance in the townscape. No valued element, feature or characteristic of the view would be compromised.

Cumulative View: The cluster of taller buildings would be made more substantial by the addition of Blocks D3 and Block A, adding to the variety of architecture and materials and the overall presence of the new urban quarter. There would be no significant accumulation of visual effects or change in quality of effects, however.

5.8.3.10 Viewpoint 10 – East Road Bridge, East Wall

Baseline View: The view is taken from the road bridge over the railway line, the elevation providing a panoramic view west towards the city centre. The low-density inner suburb of East Wall occupies the foreground either side of the railway line. The St Laurence O'Toole church is prominent in the middle distance rising above the surrounding low-rise residential neighbourhood. There is a general increase in development density and variety in architecture to the north (left), with the Spencer Dock apartments prominent. In the distance a number of vertical built features including Liberty Hall, the Spire and several church spires lend some legibility to the otherwise undifferentiated cityscape. There are few valued features or characteristics which might be vulnerable to change, and the view would benefit from development resulting in visual interest and improved legibility. Viewpoint sensitivity: Low.

Proposed View: The development introduces a substantial cluster of mid to high rise buildings in the distance, with variety in height, design and materials. There is an appreciable gradation in height from the outer edges to the centre of the cluster, although at the northern edge (Block B3) the transition in scale is abrupt. Magnitude of change: High.

Significance and Quality of Visual Effects: Moderate and positive. The development makes a positive contribution to the skyline - adding visual interest and legibility to a relatively undifferentiated cityscape, indicating a place of significance. The development is of sufficient scale and variety in form and architecture to read as an urban quarter, as opposed to an isolated development. No valued element, feature or characteristic of the view would be lost or compromised.

Cumulative View: The cluster of taller buildings would be made more substantial by the addition of the S.34 buildings, adding to the variety of architecture and materials, to the balance of height and massing across the cluster, and to its overall presence as an urban quarter. However, the classification of significance and quality of the visual effects (moderate and positive) is not affected.

5.8.3.11 Viewpoint 11 – Church Road, East Wall

Baseline View: The view is taken from Church Road near the bridge (Viewpoint 10), representing the East Wall neighbourhood. The view is framed to the right by the two storey houses typical of the neighbourhood and to the left the sound barrier on the wall along the railway line largely obscures the surrounding townscape. The spire of St Laurence O'Toole church is visible, as are the tops of some office buildings in the distance to the west. Viewpoint sensitivity: Medium.

Proposed View: The development introduces a substantial cluster of mid to high rise buildings in the distance, with variety in height, design and materials. Magnitude of change: Medium.

Significance and Quality of Visual Effects: Moderate and positive. The development makes a positive contribution to the skyline - adding visual interest and indicating the position and proximity of the city centre to the inner suburb. No valued element, feature or characteristic of the view would be lost or compromised.

Cumulative View: The cluster of taller buildings would be made more substantial by the addition of the S.34 buildings, adding to the variety of architecture and materials, to the balance of height and massing across the cluster, and to its overall presence as an urban quarter. The classification of significance of effects increases to significant and the quality of the change remains positive.

5.8.3.12 Viewpoint 12 – Alfie Byrne Road

Baseline View: Alfie Byrne Road is aligned to provide a view towards the site and the city centre from the transitional area between the northern suburbs and the urban area. An office building fronting East Wall Road in the middle distance marks the northern edge of the urban area locally. The cityscape (including the top of the tallest tower at George's Quay Plaza) can be vaguely discerned through gaps in the foreground vegetation (in the winter with the trees out of leaf) but there is little indication of the city's proximity. The Dublin Mountains are visible on the horizon. Viewpoint sensitivity: Medium.

Proposed View: The development protrudes above the tree line and the buildings fronting East Wall Road. It appears as a substantial cluster of taller buildings, with steps up in height from the outer edges to Block C1 at the centre of the cluster, presenting its slender north façade to the viewer. Variations in design and materials/colours combine with the variations in height to create visual interest in the cluster. Magnitude of change: Low.

Significance and Quality of Visual Effects: Slight and positive. The development makes a positive contribution to the skyline, adding a landmark (indicating a place of significance in the city) and visual interest, without loss or compromise of any valued element, feature or characteristic of the view.

Cumulative View: There would be no increase in the magnitude of change with the addition of the S.34 buildings.

5.8.3.13 Viewpoint 13 – East Wall Road at Dublin Port Entrance

Baseline View: The view is taken from East Wall Road opposite the entrance to Dublin Port, at a railway crossing which briefly opens a view towards the city centre to the west. It is also the first unobstructed view from the R131/East Wall Road after exiting the Port Tunnel. This can be considered a 'gateway' to the city. The foreground landscape, extending west along the railway, is industrial in character. The mid-rise (up to 11 storeys) mixed use North Lotts area fronting Sheriff Street Upper encloses the view to the south. The St Laurence O'Toole church spire is prominent in the distance to the west rising above an otherwise undifferentiated townscape. There are few valued features or characteristics which might be vulnerable to change, and the view would benefit from development resulting in visual interest and improved legibility. Viewpoint sensitivity: Low.

Proposed View: The development introduces a substantial cluster of mid to high rise buildings in the distance, with variety in height, design and materials. There is an appreciable gradation in height from the outer edges to the centre of the cluster. Magnitude of change: Medium.

Significance and Quality of Visual Effects: Slight and positive. The development makes a positive contribution to the skyline - adding visual interest to a view lacking in visual amenity. It also contributes to legibility, indicating a place of significance (suggestive of the city centre). The development is of sufficient scale and variety in form and architecture to read as an urban quarter, as opposed to an isolated development.

Cumulative View: The cluster of taller buildings would be made more substantial by the addition of the S.34 buildings, adding to the variety of architecture and materials and to the overall presence of the urban quarter. However, the classification of significance and quality of the visual effects (slight and positive) is not affected.

An SHD application (no. 304710) has been made for a site north of (to the right of) the railway line in the middle distance of the view. The proposal incorporates buildings of up to 15 storeys. If permitted this cluster of buildings would partially screen the distant subject development. This would reduce the significance of the change resulting from the subject proposal (due to the fact that the context would be more accommodating of the change).

5.8.3.14 Viewpoint 14 – Sheriff Street Upper Near East Wall Road Junction

Baseline View: The mid-rise (up to 11 storeys) mixed use buildings of the North Lotts area enclose the street to the south. The North Wall freight depot is to the right behind a high wall. The vista terminates in the distance at an indistinct cluster of mid-rise development (the Harbourmaster Place apartments). There are few valued features or characteristics in the view which might be vulnerable to change. <u>Viewpoint sensitivity: Low</u>.

Proposed View: Block C1 protrudes marginally above the roof of a shed in the depot to the north of the street. No other elements of the development are visible. <u>Magnitude of change: Low</u>.

Significance and Quality of Visual Effects: <u>Not significant and neutral</u>. Too little of the development is visible to have a significant effect on the composition, character or quality of the view.

Cumulative View: The S.34 buildings would not be visible.

5.8.3.15 Viewpoint 15 – Point Square/Mayor Street Upper

Baseline View: n/a. (This view was requested by DCC in pre-planning consultation.)

Proposed View: The development would not be visible.

Significance and Quality of Visual Effects: <u>No effect</u>.

Cumulative View: <u>No effect</u>.

5.8.3.16 Viewpoint 16 – East Link Bridge

Baseline View: n/a. (This view was requested by DCC in pre-planning consultation, to assess the effects on a gateway to the northern city centre from the south.)

Proposed View: The development would not be visible.

Significance and Quality of Visual Effects: <u>No effect</u>.

Cumulative View: <u>No effect</u>.

5.8.3.17 Viewpoint 17 – O'Connell Street Bridge

Baseline View: n/a. (This view was selected for assessment as it is identified on the map of 'key views and prospects', Figure 4 of the DCDP. It is an important view of the Liffey corridor experienced by numerous people.)

Proposed View: The development would not be visible.

Significance and Quality of Visual Effects: <u>No effect</u>.

Cumulative View: <u>No effect</u>.

5.8.3.18 Viewpoint 18 – George’s Dock

Baseline View: The George’s Dock basin serves as the main public open space in the IFSC and western North Lotts area. It is the site of regular outdoor gatherings of people. The view north across the dock is complex, with the CHQ building to the right, a row of low modern office buildings along George’s Dock Road central to the view and a cluster of modern office and apartment buildings of diverse design and materials to the left. There is also a single retained historic building, the former dock office/harbourmaster house. The generally squat forms of buildings around the dock is a notable characteristic. Viewpoint sensitivity: Medium.

Proposed View: Block C1 protrudes above the roofline of the office buildings along George’s Dock Road, presenting the top part of the slender south façade to the viewer. Magnitude of change: Low.

Significance and Quality of Visual Effects: Slight and positive. The development adds a minor but notable feature to the already complex composition, the height and design of Block C1 adding visual interest and suggesting a place of significance nearby in the townscape, contributing to legibility.

Cumulative View: Block A protrudes to the side of the office building on George’s Dock Road, its greater height (than the buildings surrounding the dock) also suggestive of a place of significance in the townscape. The classification of significance and quality (slight, positive) is not affected however.

5.8.3.19 Viewpoint 19 – Amiens Street Opposite Connolly Luas Stop

Baseline View: Amiens Street is the main north-south thoroughfare in the vicinity of the site and views from the street are experienced by a large number of people travelling into and out of the city centre. The view from this position is a complex composition. The historic station building is prominent fronting the street. Attached to this are several modern additions, including the distinctive structure over the Luas stop. To the right are modern office buildings of various design while to the left of the street modern apartment buildings are visible protruding above the railway bridge. Viewpoint sensitivity: Medium.

Proposed View: The development would not be perceivable.

Significance and Quality of Visual Effects: No effect.

Cumulative View: A small part of Block A would be visible in a gap between two modern office buildings to the side of the station, adding to the already complex composition of built elements. Magnitude of change: Low. The change would have no significant effect on the composition, character or quality of the view. Significance and Quality of Visual Effects: Slight and neutral.

5.8.3.20 Viewpoint 20 – Amiens Street Junction with Sheriff Street Lower

Baseline View: The junction/entrance to Sheriff Street Lower is framed by the Connolly Station building (of cut stone) to the right and the Irish Rail Head Office (red brick) to the left. A notable feature of the Irish Rail building is the campanile at the corner which is similar in form and proportions to that of the station building. The Train Shed behind and attached to both buildings’ crosses Sheriff Street Lower over a very wide bridge. This blocks the view along the street to the extent that it does not read as a public street and part of the public realm. While contributing to an unusual and valued composition of built elements, the Train shed limits visual and physical access to Sheriff Street Lower. To the left of the view beyond the railway bridge a modern office building can be seen. Viewpoint sensitivity: High.

Proposed View: Block C1 protrudes above the roofline where the Train Shed meets the Irish Rail building, although it will be largely screened when the trees in the foreground are in leaf. A notable characteristic of the building is the campanile-like top level, with a void visible behind columns at the south west corner. Magnitude of change: Low.

Significance and Quality of Visual Effects: Slight and positive. The development adds a minor but notable feature to the complex composition. The protected structures in the foreground can withstand the minor intrusion without negative effect. The evident height and distinctive design of Block C1 are suggestive of a place of significance in the nearby townscape beyond the station.

Cumulative View: Block A protrudes more substantially into the view, above the roof of the Train Shed and clearly positioned fronting Sheriff Street Lower. This would add to the mass of development beyond the station and indicate more clearly a place of significance, accessible by Sheriff Street Lower, thereby contributing to Legibility. The Magnitude of change rises to Medium. Therefore, the classification of significance and quality changes to significant and positive.

5.8.3.21 Viewpoint 21 – Amiens Street West of Site

Baseline View: Note. Planning permission has been granted for a six-storey hotel development on the site of the petrol station in this view (Reg. Ref. 3996/18). A further application for an increase in height to seven storeys is pending (Reg. Ref. 3840/19). This development (six or seven storeys) will screen the proposed development from view. However the viewpoint is included in this assessment as it represents the 'worst case scenario' for views from Amiens Street (being the closest point on the street to the site, with the least obstructed view), allowing conclusions to be drawn as to the potential effects on Amines Street overall.

Across the wide city street to the right is the Post Office parcel sorting office, a protected structure. To the left of the petrol station is a modern three storey red brick office building (Áras Fáilte). Behind the petrol station the Connolly Station platforms can be seen. The site occupies the entire vacant area behind the developments across the street. Viewpoint sensitivity: Medium.

Proposed View: The development protrudes above the roofline of the foreground buildings, the three B blocks in a row separated by corridors of space, and the Block C1 prominent between and rising above these. A part of C3 is also visible. Magnitude of change: High.

Significance and Quality of Visual Effects: Significant and positive. The development introduces a new character of development - and a new character area - to the townscape, adding visual interest and identity. Elements of the design response to the context are evident in the view, notably the formal/structured arrangement of built form in response to the parallel railway and Amiens Street corridors (both wide, straight transport corridors arriving in the city centre); also the use of brick in the peripheral buildings (complementing the surrounding buildings), contrasting with the white metal of the landmark building. The gradation of height towards the centre of the cluster is appreciable.

Cumulative View: Block A is prominent to the right of the SHD cluster (with a small part of Block E also visible), adding substantially to the volume and variety of built form beyond the foreground, and to the overall presence of the development as an urban quarter. The classification of significance and quality of the visual effects (significant and positive) is not affected however.

Again, it should be noted that implementation of the planning permission Reg. Ref. 3996/18 (or 3840/19 if permitted) will eliminate the visual effects on this particular view, but similar views will remain from positions further north along the street.

5.8.3.22 Viewpoint 22 – Coburg Place

Baseline View: Coburg Place is a street of terraced artisan cottages and two storey houses dating from the 19th century, located to the north of the site beyond Seville Place. The alignment of the street is such that an unobstructed view directly south towards the site is afforded from the street (it should be noted that the site can't be seen from inside the houses). The small/intimate scale of the foreground elements is a characteristic of the streetscape and the view. Across Seville Place in the middle distance is a high stone wall marking the boundary of the Connolly Station area, with various modern buildings protruding above the wall, as well as conspicuous antennae. These detract from the quality of the view. Viewpoint sensitivity: High.

Proposed View: The development protrudes well above the wall and buildings across Seville Place, with Block B3 (to the right) particularly dominant in the view, presenting its broad north façade to the viewer. The C blocks to the left are of more slender form and step down in height from the high-rise Block C1 at the centre of the cluster. A corridor of open space between the B and C blocks (the internal street, 'Connolly Street') aligns with Coburg Place. A street level entrance to the development through an arch in the station wall (leading from Seville Place beneath the existing buildings behind the wall) leads into this space/street. Magnitude of change: Very high.

Significance and Quality of Visual Effects: Very significant and positive. The development introduces a new character of development - and a new character area - to the townscape, adding visual interest and identity. Elements of the design response to the context are evident in the view, notably the gradation in height from the central landmark building to the outer edges – although the change in scale from Block B3 in particular is abrupt and pronounced. The use of brick in the peripheral buildings (complementing the surrounding buildings) is also evident, contrasting with the white metal of the landmark building.

Cumulative View: There would be no increase in the magnitude of change with the addition of the S.34 buildings.

5.8.3.23 Viewpoint 23 – Seville Place at Guild Street Junction

Baseline View: The ongoing development of Docklands/North Lotts and developments such as the Docklands station have changed the status of Seville Place. It is now a key thoroughfare and a busy pedestrian route into the city, and its intersection with Guild Street and Sheriff Street Upper is an important junction. In the view from this junction three storey terraced houses line the street and the St Laurence O'Toole church is prominent. The street trees are a notable feature; these are rare in the area. In the distance beyond the railway bridge over Seville Place a seven storey office building marks the junction with Amiens Street. Other than this there is no indication of the proximity of the city centre. Viewpoint sensitivity: Medium.

Proposed View: Block C1 protrudes marginally to the side of the church spire, and small parts of the other buildings are discernible between the foreground trees and buildings (the photograph was taken in July; in the winter with the trees out of leaf the development would be more exposed).. Magnitude of change: Low.

Significance and Quality of Visual Effects: Slight and positive. The intrusion of the development in the view is minor but notable for its divergence in scale, type and design from the foreground buildings. It would add some visual interest, with its presence increasing as the viewer moves west along the street.

Cumulative View: The S.34 buildings would not be visible.

5.8.3.24 Viewpoint 24 – Seville Place Approaching Oriel Street Junction

Baseline View: Some 200m along the street the visual enclosure is reduced for a stretch and a view opens towards the south west in the direction of the site and the city centre. Despite the location only minutes' walk from Connolly Station there are no indications in the view of the city centre's proximity, no built features of note; legibility is poor. Viewpoint sensitivity: Medium.

Proposed View: The development protrudes well above the buildings fronting the south side of the street, stepping up in height from five storeys fronting Oriel Street Upper to the landmark Block C1 at the centre of the cluster. Variations in design and materials/colours combine with the variations in height to create visual interest in the cluster. A corridor of space between the C blocks and D1 indicates the alignment of the internal street across the site, leading to Sheriff Street Upper and on to Amiens Street/Connolly Station. Magnitude of change: Very high.

Significance and Quality of Visual Effects: Very significant and positive. The development introduces a new character of development - and a new character area - to the townscape. It is of sufficient scale and architectural variety to read as an urban quarter (as opposed to a large individual development such as the Spencer Dock apartments). It adds visual interest, identity and would have a transformative effect on legibility. However, the presence of the low-rise street front buildings is substantially diminished by the abrupt and pronounced contrast in scale with the new buildings adjacent.

This is an inevitable consequence of introducing a high-density cluster to an area (in part) characterised by uniformly low-density development. (This is prescribed for the Connolly Station area in the DCDP, owing to the area's (a) mixed townscape character, (b) access to public transport, (c) availability of large brownfield sites (the subject site) and (d) relative distance from established 'activity nodes'. It is also encouraged by the national policy of compact growth, specifically at transport hubs and specifically on large brownfield sites where the land use yield can be significant).

While the change in visual character would be very significant at this location and on Coburg Place (Viewpoint 22) and Oriel Street (Viewpoint 25), this is not uncommon nor undesirable in a city. It has occurred successfully in Docklands where there is similar juxtaposition across Barrow Street and the contrast between character areas has proved to be mutually beneficial.

Cumulative View: There would be no increase in the magnitude of change with the addition of the S.34 buildings.

5.8.3.25 Viewpoint 25 – Oriel Street Upper

Baseline View: This view illustrates the mixed character of the townscape and the disconnectedness in the area due in part to the use and condition of the subject site. On the east side of the street (left in the view) is a row of two and three storey residential buildings. To the right is the gable end of the terrace fronting Oriel Hall. The high wall around the site is a key element in the view, with fencing, antennae and a particularly unsightly modern office building protruding above it, reducing visual amenity. In the middle distance the Harbourmaster Place apartments form the backdrop to the view. These can also be considered a detractor. Viewpoint sensitivity: Medium.

Proposed View: The street is transformed by the opening of a wide entrance through the wall leading into a new street cross the site. Block D1 has frontage to the street beside the entrance – five storeys at the street front, stepping up to a volume of eight storeys and 14 storeys further into the site, each volume with a different façade treatment and material. Block C2 is visible to the right of the entrance, also five storeys at the edge, stepping up to an 11-storey volume further back. The landmark building, Block C1, rises above these at the centre of the site. Another site entrance is opened in the wall further along the street. Magnitude of change: Very high.

Significance and Quality of Visual Effects: Very Significant and positive. The composition, character and quality of the view and the streetscape would be transformed by the development, with all existing detractors on the site removed or modified (the openings through the wall), and a large volume of new buildings, spaces/streets and uses - a new character of development - introduced. The response of the development (in height/massing and materials) to the lower density area east and north of the site is appreciable. In addition to the physical changes there would be an increase in activity/footfall, and perceptual changes (movement of people, cafes and shops adding colour and smells to the street, etc.).

Cumulative View: Block D3 would be a prominent addition to the street front in the middle distance, adding to the overall volume and architectural diversity of the new urban quarter, and heightening the definition of the second entrance to the site on the street. The classification of significance and quality of the visual effects (significant and positive) is not affected however.

5.8.3.26 Viewpoint 26 – Commons Street

Baseline View: Commons Street is the only direct link from the IFSC/North Lotts area (and the Liffey quays) to the site. Currently, visual amenity and legibility along the street north of George's Dock/Mayor Street are poor. On the west side of the street is a very high stone wall (with a fence/net protruding above) behind which are the Harbourmaster apartment buildings, hidden from view. To the right is a community building attached to an open space (football pitch) out of sight to the right. Beyond the community building, hidden by the trees, is a substation surrounded by a high wall topped by razor wire (the cars are parked in front of the wall). In the middle distance a low, red brick early 20th century office building can be seen. This is part of the site. The concrete walled parking area on the site is beyond that and the business premises on the far side of the site fronting Seville Place form the backdrop. Viewpoint sensitivity: Low.

Proposed View: The view is transformed by the introduction of Blocks D1 and C1 to the site, the landmark tall building C1 positioned on the axis of Commons Street for maximum visual impact, with D1 to the side, lower and clad in brick. New street trees on the site frontage to Commons Street and Sheriff Street Lower are also visible. Magnitude of change: High.

Significance and Quality of Visual Effects: Moderate and positive. A new character of development would be added to the townscape, changing the character (which is currently indistinct) and indicating a new place of significance, thereby improving legibility.

Cumulative View: Block D3 would be a prominent addition to the view, strengthening the building line to Commons Street and – with its wedge shape – indicating the alignment of Oriel Street. Block E also protrudes into the view, more clearly defining a gateway into the site from Commons Street. The overall volume and architectural diversity of the cluster would be increased, so that is reads as an urban quarter (as opposed to an isolated development of two buildings). The classification of significance changes to significant and positive.

5.8.3.27 Viewpoint 27 – Sheriff Street Lower

Baseline View: To the right, out of view but contributing to the character and quality of the streetscape, is the rear façade of the Custom House Plaza office building. The seven-storey building has no windows or entrances at street level other than service entrances. The site across the street is bounded by the wall of the 19th century railway warehouses that once occupied the site. The wall is in poor condition with an unsightly palisade fence projecting above it, partially screening a variety of containers and disused vehicles. A tall antenna structure is also prominent projecting above the wall. At the end of the street the unsightly late 20th century office building on the site can be seen, as well as a low, red brick residential building across Oriel Street Upper. The street is used for bus parking. Viewpoint sensitivity: Low.

Proposed View: The warehouse wall is refurbished and modified to function as a multi-arched gateway to the site, leading into the main north-south aligned open space which in turn opens into the central square. The cluster of tall buildings rises well above the wall and the surrounding townscape, with a clear gradation in height towards Block C1 at the centre of the site, and a wide range of design treatments and materials between the buildings. It is notable that none of the buildings directly addresses Sheriff Street Lower so the objectives for the street are not yet fully realised (see Cumulative View below). Magnitude of change: Very high.

Significance and Quality of Visual Effects: Significant and positive. The composition, character and quality of the view (and the streetscape) would be transformed by the development, with all existing detractors on the site removed or modified, and a large volume of new buildings, spaces/streets and uses - a new character of development - introduced. In addition to the physical changes there would be an increase in activity/footfall, and perceptual changes (movement of people, cafes and shops adding colour and smells to the street, etc.).

Cumulative View: The addition of the three S.34 buildings to the composition would be significant. This would have the effect of re-defining Sheriff Street Lower as a city street in spatial and use terms, with a strong building line, built enclosure and an active street-building interface. The S.34 buildings would partly screen the SHD buildings, but Block C1 would be visible at the centre of the site through the wide entrance to the quarter between Blocks A and E. A new connection between Sheriff Street Lower and Oriel Street Upper is visible beneath Block D3 at the end of the street. The Magnitude of change rises to Medium. The classification of significance changes to very significant and positive.

5.8.3.28 Views of Historic Significance

Policy SC17 of the DCDP states with regard to all proposals for mid-rise and taller buildings: "*all new proposals must demonstrate sensitivity to the historic city centre, the River Liffey and quays, Trinity College, the cathedrals, Dublin Castle, the historic squares and the city canals, and to established residential areas, open recreation areas and civic spaces of local and citywide importance*."

Several of the viewpoints assessed above address these sensitivities, e.g. the views from O'Connell Street (Viewpoint 4) and O'Connell Street Bridge (Viewpoint 6 and 7), views of the Custom House and from City Quay (Viewpoints 6, 7, 8), the view from George's Dock (Viewpoint 18) and from the Royal Canal at Spencer Dock (Viewpoint 9).

12 no. additional viewpoints were selected by the Built Heritage chapter author, to specifically address the potential impacts on historic planned views and other sensitive cultural/historic locations such as Trinity College and the city's historic squares. The impacts on these views are assessed in **Chapter 14**. The impacts are not assessed in this chapter, but it is noted that the proposed development would cause no change in 11 of the 12 views, and only minor change in one view (Viewpoint H01, Buckingham Street).

5.8.3.29 Summary of Visual Impact Assessment

The potential changes to the views are summarised in **Table 5.10**.

No.	Location	Sensitivity	Magnitude of Change	Significance & Quality of Visual Effects	Cumulative Effects (with S.34 application)
1	Annesley Bridge/North Strand Road	Medium	Low	Slight, Positive	Slight, Positive
2	Portland Row/North Circular Road	Medium	Medium	Moderate, Positive	Moderate, Positive
3	Junction of North Strand/Amiens Street and Seville Place	High	High	Very Significant, Positive	Very Significant, Positive
4	Junction of North Earl Street and O'Connell Street	High	Medium	Significant, Positive	Significant, Positive
5	Junction of Talbot Street and Gardiner Street	Medium	Medium	Moderate, Neutral	Moderate, Positive
6	George's Quay Near Loopline Bridge	High	Negligible	Not Significant, Neutral	Not Significant, Neutral
7	George's Quay Opposite the Custom House	High	Negligible	Not Significant, Neutral	Not Significant, Neutral
8	City Quay Beside Sean O'Casey Bridge	Medium	Medium	Moderate, Positive	Moderate, Positive
9	Spencer Dock Near Mayor Street Upper	Medium	Medium	Moderate, Positive	Moderate, Positive
10	East Road Bridge, East Wall	Low	High	Moderate, Positive	Moderate, Positive
11	Church Road, East Wall	Medium	Medium	Moderate, Positive	Significant, Positive
12	Alfie Byrne Road	Medium	Low	Slight, Positive	Slight, Positive
13	East Wall Road at Dublin Port Entrance	Low	Medium	Slight, Positive	Slight, Positive

No.	Location	Sensitivity	Magnitude of Change	Significance & Quality of Visual Effects	Cumulative Effects (with S.34 application)
14	Sheriff Street Upper Near East Wall Road Junction	Low	Low	Not Significant, Neutral	Not Significant, Neutral
15	Point Square/Mayor Street Upper	-	No Change	-	-
16	East Link Bridge	-	No Change	-	-
17	O'Connell Street Bridge	-	No Change	-	-
18	George's Dock	Medium	Low	Slight, Positive	Slight, Positive
19	Amiens Street Opposite Connolly Luas Stop	Medium	No Change	-	Slight, Neutral
20	Amiens Street Junction with Sheriff Street Lower	High	Low	Slight, Positive	Significant, Positive
21	Amiens Street West of Site	Medium	High	Significant, Positive	No Effect
22	Coburg Place	High	Very High	Very Significant, Positive	Very Significant, Positive
23	Seville Place at Guild Street Junction	Medium	Low	Slight, Positive	Slight, Positive
24	Seville Place Approaching Oriel Street Junction	Medium	Very High	Very Significant, Positive	Very Significant, Positive
25	Oriel Street Upper	Medium	Very High	Very Significant, Positive	Very Significant, Positive
26	Commons Street	Low	High	Moderate, Positive	Significant, Positive
27	Sheriff Street Lower	Low	Very High	Significant, Positive	Very Significant, Positive

TABLE 5-10 POTENTIAL CHANGE TO TOWNSCAPE CHARACTER AREAS

5.9 Mitigation

5.9.1 Incorporated Design Mitigation

The proposal involves the comprehensive redevelopment of a large, underutilised brownfield city centre site beside one of the city's main transport hubs. In its policy statement on building height, the DCDP (referencing the non-statutory document *Managing Intensification and Change: A Strategy for Dublin Building Height, 2000*) identifies the Connolly area - in which the subject site is the only available development opportunity – as suitable for high-rise (50m+) development.

The DCDP states:

- "*Clustering of taller buildings of the type needed to promote significant densities of commercial and residential space are likely to be achieved in a limited number of areas only. Taller buildings (over 50m) are acceptable at locations such as at major public transport hubs, and some SDRAs…*
- "*There are also a few areas where there are good transport links and sites of sufficient size to create their own character, such that a limited number of mid-rise (up to 50m) buildings will help provide a new urban identity.*
- "*taller buildings can also play an important visual role and can make a positive contribution to the skyline of a city. Dublin City Council recognises the merit of taller buildings, including landmark buildings, in a very limited number of locations at a scale appropriate for Dublin".*

The subject site can be considered one of the limited number of areas/sites in the city at which the above policies can be realised.

The DCDP policy for the Connolly area is also supported by the more recently published NPF and Building Height Guidelines, both of which encourage high density/taller development particularly at public transport hubs and on large, underutilised brownfield sites.

These policies have significant implications for the Connolly area and receiving environment. Implementation of the policy will inevitably result in very significant townscape and visual change, as it encourages a new development/design paradigm including new building typologies and scale, which will contrast with existing/previous development types.

Such change has been identified in the assessments in Section 5.7.3 (townscape impacts) and 5.8.3 (visual impacts) above. However, the effects have been assessed as positive since (a) they are supported by policy, and (b) the proposal exhibits understanding of and appropriate response to the sensitivities and opportunities presented by the townscape context. No further mitigation measures other than those incorporated in the design are proposed.

5.9.2 Construction Phase Mitigation

No mitigation is proposed other than standard best practice construction site management.

5.9.3 Operational Phase Mitigation

No mitigation is proposed.

5.10 Residual Impact

No mitigation measures have been proposed. Therefore, the predicted residual townscape and visual effects as described and classified in Sections 5.7.3 (townscape impacts) and 5.8.3 (visual impacts) above.

5.11 Cumulative Effects

At the wider town/cityscape scale there are a number of existing and permitted developments of similar type to the proposed development, i.e. clusters of mid-rise to high buildings and/or landmark tall buildings. These include:

- **The Exo building** currently under construction at Point Square. This is a 17-storey office building which marks the 'Point Village' hub at the eastern edge of the Docklands quarter, in a gateway position with respect to Docklands, the city centre and the Liffey;
- **Capital Dock**. This is a mid-rise cluster with a landmark 22 storey (79m) residential building at the corner of Sir John Rogerson's Quay where the River Dodder and the Grand Canal meet the Liffey River. Capital Dock occupies a similar gateway position and also marks one of the designated Docklands hubs ('Britain Quay').
- **Boland's Mills**. This is a cluster of tall buildings around the Inner Grand Canal Dock, also marking one of the Docklands hubs. The buildings include the 17 storey (67m) 'Google Docks' (formerly known as the Montevetro building), the 16 storeys Alto Vetro residential tower, Boland's Quay (three towers up to 14 storeys) and the 16 storey (63m) Millennium Tower.
- **Liberty Hall**. The 17 storey (59.4m) building was Dublin's first tall building, standing on the north Quays near the Custom House.
- **Tara Street tower**. Planning permission has been granted for a 22 storey (88m) building on Tara Street diagonally across the Liffey from Liberty Hall.
- **George's Quay Plaza**. This is a development set back from George's Quay opposite the Custom House. It comprises seven interconnected volumes, the tallest rising to 13 storeys (59m).

The photomontages show that there are few views in which the proposed development would feature along with any of the above buildings. In certain long-distance views from the north George's Quay Plaza currently features as the tallest building and in these views (Viewpoints 1 and 12) the proposed development would supplant George's Quay as the main indicator of the city centre.

When constructed the Tara Street tower would also feature along with the proposed development in some views. The two tall buildings – both located at sites identified by DCC for tall buildings - would be some 800m apart and separated by the Liffey River. They are too far apart to result in any significant accumulation of visual effects in any one view. However, they would individually contribute to a general shift in character – in the city area east of the Loopline and Butt Bridge - towards a townscape of more diverse scale and architecture.

It is noteworthy that the recently developed Docklands hub *clusters* have been particularly successful interventions in the townscape, generating distinct local character and identity as well as improving legibility. These developments were also plan-led, as the proposed development is plan-led. Connolly was originally identified in *Managing Intensification and*

Change – A Strategy for Dublin Building Height (DEGW, 2000) as one of 15 potential locations for high rise buildings *and* one of three potential locations for a high intensity cluster. The current Development Plan policy on building height 'updates and refines' the recommendations of that strategy.

It is also noteworthy that the most successful of the developments above is the Boland's Mills hub, which is the most extensive/widespread cluster – the most likely to be identified as a distinct quarter. A number of the Cumulative photomontages show that the non-residential buildings on the Masterplan site (to be the subject of a future S.34 application) would broaden the cluster to a scale more identifiable as a 'quarter', as well as balancing the height across the cluster to best effect and adding further diversity in building form and materials. It was generally found that the cumulative effect of the S.34 buildings in addition to the SHD development would be to improve the views.

5.12 Worst Case Scenario

No worst-case scenario has been identified.

5.13 Monitoring

No monitoring of townscape and visual impacts is proposed.

5.14 References and Sources

- Dublin City Development Plan 2016-2022, Dublin City Council.
- Guidelines for Landscape and Visual Impact Assessment, 3rd edition, 2013, Landscape Institute and Institute of Environmental Management and Assessment.
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, 2017, Environmental Protection Agency.
- Managing Intensification and Change – A Strategy for Dublin Building Height, DEGW, 2000.
- Townscape Character Assessment, Technical Information Note 05/2017, Landscape Institute.
- Urban Design Manual – A Best Practice Guide, Department of Environment, Heritage and Local Government, 2009.
- Urban Development and Building Height Guidelines for Planning Authorities, December 2018, Department of Housing, Planning and Local Government.

CHAPTER 6

MATERIAL ASSETS: TRAFFIC AND TRANSPORT

OCTOBER 2019

Table of Contents

Table of Figures

Table of Tables

6 Material Assets: Traffic & Transport

6.1 Introduction

This chapter assesses the potential impact of the proposed development in terms of traffic and transportation. This chapter aims to provide a detailed and conservative assessment of the potential impact of the proposed development on the operation of the links and junctions which form the local road network. The assessment of the traffic section of this report has been prepared by qualified Civil Engineers from O'Connor Sutton Cronin and Associates Multi-Disciplinary Consulting Engineers (OCSC) who have particular expertise in the area of traffic and transport engineering.

6.2 Statement of Authority

The assessment of the traffic section of this report has been prepared by Patrick Raggett of O'Connor Sutton Cronin Multidisciplinary Engineers, a Chartered Civil Engineer with over 11 years' experience and with specific expertise in traffic & transport engineering, having been involved in the successful planning, design and completion of a wide range of projects in Ireland and the UK, ranging from a mix of commercial, residential, healthcare and leisure developments to major road and civil infrastructural schemes. Works completed included detailed traffic & transportation assessments and planning, road and scheme design, mobility management planning and peer review. This assessment has been carried out in accordance with relevant guidelines including the Guidelines for Traffic Impact Assessment (1994), as published by The Chartered Institution of Highways and Transportation (CIHT) and the Traffic & Transport Assessment Guidelines (2014) as published by the former National Roads Authority, now Transport Infrastructure Ireland (TII).

Full details of the assessment carried out can be found in the **Traffic Impact Assessment** submitted under separate cover in support of this application.

6.3 Methodology

This assessment has been carried out in accordance with relevant guidelines including:

- Traffic & Transport Assessment Guidelines (2014) as published by the former National Roads Authority (NRA) now Transport Infrastructure Ireland (TII);
- Guidelines for Traffic Impact Assessment (1997) as published by the Chartered Institute of Highways & Transportation;
- Dublin City Development Plan 2016-2022.

The assessment was carried out based on existing traffic conditions on the local study area which were established through a number of surveys carried out on Thursday 4th October 2018 at the locations set out overleaf in **Figure 6.1**.

By combining these base flows with the traffic generation estimates for the proposed development, the following peaks were identified:

- A.M. Peak Hour: 07:00 – 08:00;
- P.M. Peak Hour: 16:15 – 17:15.

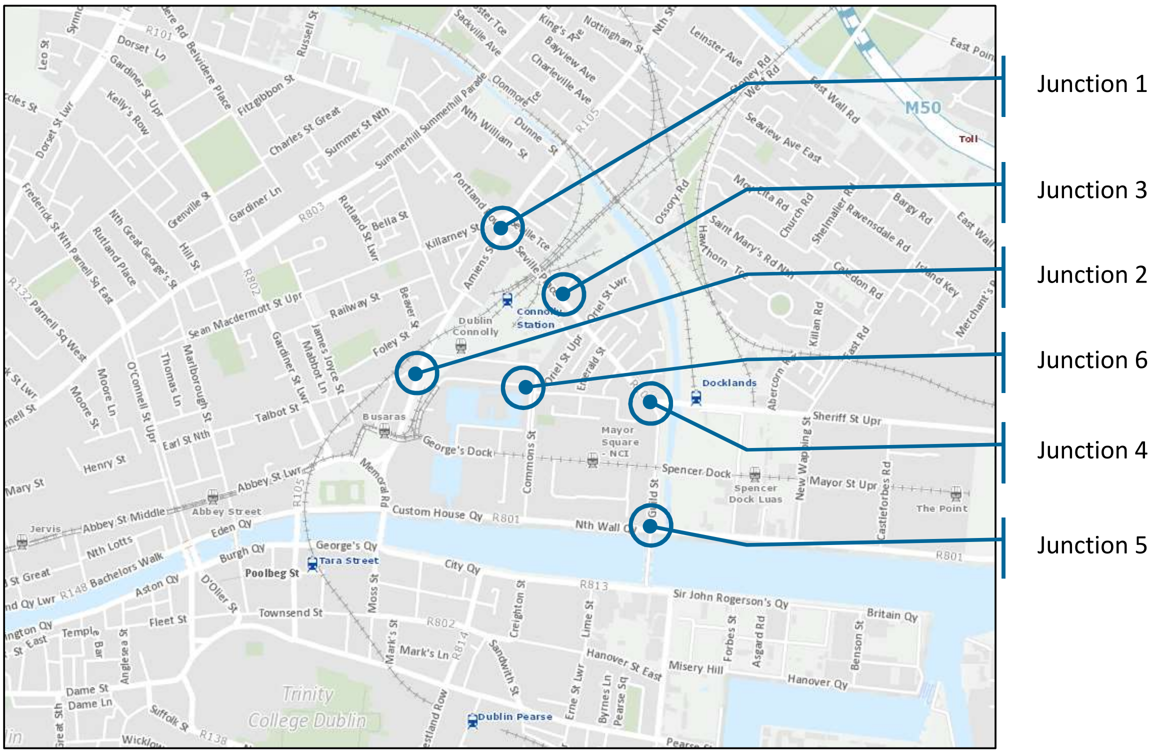


FIGURE 6-1 TRAFFIC SURVEY LOCATIONS

The surveys included junction turning counts, queue lengths surveys and pedestrian crossing counts and the results can be seen in **Appendix 6.1**. The survey data was combined with the TII factors for expansion to future years (2027 & 2037) and annual average daily traffic (**Table 6.1**).

Year	Growth Rates	
	Light Vehicles	*Heavy vehicles*
2022	0.80%	1.21%
2037	3.87%	2.12%

TABLE 6-1 BACKGROUND TRAFFIC GROWTH FACTORS

The trip generation potential of the proposed development was estimated using data obtained from the Trics database, an industry standard tool for this purpose. The estimated additional traffic was assigned to the local road network and its impact on the operation of the local links and junctions was assessed using guidance from TII, CIHT, the Design Manual for Roads and Bridges (DMRB) and TRANSYT 15 traffic modelling software.

Traffic flows diagrams indicating the associated volumes for reach scenario assessed can be found in **Appendix 6.2**.

6.4 Baseline Scenario

The receiving environment is urban in nature. The main transportation arteries in the study area are the Amiens Street, Seville Place and Oriel Street Upper.

In order to assess the traffic impact of the proposed development it was first necessary to assess the current traffic situation in the area. Fully classified traffic counts in the environs of the proposed development were undertaken by Nationwide Data Collection on Thursday 4th of October 2018.The traffic count locations were agreed with Dublin County Council prior to the commissioning of the counts.

Outside of the study area development generated traffic will dissipate considerably and so is expected to have a negligible impact on the operation of the wider network. While there is substantial variation in the type of traffic travelling on the links locally, during the peak travel hours, they would be expected to mainly carry commuter traffic.

As noted earlier, base traffic levels have been surveyed on the local network in October 2018. By combining these base flows with the traffic generation estimates for the proposed development, the following peak traffic hours were identified:

- A.M. Peak Hour: 07:00 – 08:00;
- P.M. Peak Hour: 16:15 – 17:15.

TA 79/99 "Traffic Capacity of Urban Roads" from the DMRB provides information on the capacity of urban roads based on classification and width. **Table 6.2** following shows the capacities of various road types based on this manual and using a 60:40 split in flow.

2 Way Single Carriageway – Busiest Direction of Flow (60/40 split)										
		Total Number of lanes								
Carriageway Width (m)		2				2–3	3	3–4	4	4+
		6.10	6.75	7.30	9.0	10.0		12.3	13.5	18.0
Road Type	UM	Not Applicable								
	UAP1	1020	1320	1590	1860	2010	2550	2800	3050	3300
	UAP2	1020	1260	1470	1550	1650	1700	1900	2100	2700
	UAP3	900	1110	1300	1530	1620	*	*	*	*
	UAP4	750	900	1140	1320	1410	*	*	*	*

TABLE 6-2 URBAN ROAD CAPACITIES

The local links have been classified as UAP 1 and UAP 3 as appropriate based on the associated definitions in the DMRB. Using this table, link capacities have been calculated and current Ratio of Flow to Capacity (RFC) values have been assessed and are shown for the base year peak hours in **Table 6.3**. RFC is a measure of the capacity level a traffic link (i.e. section of road) or junction is operating at and the reserve capacity available. An RFC value of 100%

indicates that a link or junction has reached maximum capacity while anything below this indicates that there is reserve capacity available.

Link	Width (m)	Link Capacity (veh/hr)	A.M. Peak (veh/hr)	RFC (%)	P.M. Peak (veh/hr)	RFC (%)
North Wall Quay	6.10	1,020	531	52.1	501	49.1
Guild Street	9.00	1,530	442	28.9	579	37.8
Sheriff Street Upper	6.75	1,110	290	26.1	493	44.4
Seville Place	6.10	900	665	73.9	625	69.4
Amiens Street	9.00	1,650	1,372	83.2	1,120	67.9
North Strand Road	9.00	1,650	1,169	70.8	1,003	60.8
Portland Row	9.00	1,530	852	55.7	651	42.5
Oriel Street	6.10	750	359	47.9	234	31.2

TABLE 6-3 BASE YEAR LINK RFC VALUES FOR LOCAL NETWORK

As can be seen, there are variations about how the links are operating depending on the time of day with RFC values ranging between 26 – 83% indicating that there is reserve capacity available on all links.

The development site currently forms part of the Irish Rail lands associated with Connolly Station. It is bound by Sheriff Street Lower to the south, Oriel Street to the southwest, third party commercial and residential developments such as Oriel Hall to the northeast and Irish rail lands to the northwest. The lands are primarily used as a car parking area for both staff and train users with a number of disused structures also present on the site. The existing site entrance is located on the corner of Sheriff Street Lower. There are currently 390 no. Irish Rail car parking spaces on the site which is to be reduced to 180 no. spaces.

6.4.1 Site Accessibility

The site is highly accessible by all modes of transport with a wide variety of options other than travel by private car:

- Dublin Connolly Train Station is located a short walk away, this station provides convenient links to other urban areas such as Belfast, Drogheda, bray, Sligo and Maynooth on the DART service and Commuter Routes;
- Luas Red Line approximately 500 metres (6 min) walk away providing access to Tallaght/Saggart and to 3 Arena;
- 16 no. Dublin Bus routes within 800m (10 min) walk with further improvements planned under the Bus Connects;
- Cycle tracks/lanes on adjacent roads infrastructure (Seville Place and Amiens Street) and further provision locally by the development and delivery of Greater Dublin Area Cycle Network Plan;

- Good quality pedestrian infrastructure on adjacent links and through the proposed development linking to key destinations locally within a short walking distance.

6.5 Proposed Development

6.5.1 Development Overview

See **Chapter 2** for the full development description. The development will consist of:

- the demolition of 4 no. structures with a combined gross floor area of 3,028sq.m;
- the construction of 741 no. Build to Rent (BTR) residential units in 8 no. apartment blocks ranging in height from 4 storeys to 23 storeys with lower height buildings located adjacent to the northeast and east site boundaries, with a cumulative gross floor area of 68,535sq.m comprising;
  - Block B1 (maximum building height 54.917m, total gross internal floor area 11,260sq.m, Apartment Mix: Studio: 25, 1-bed: 37, 2-bed: 51);
  - Block B2 (maximum building height 54.917m, total gross internal floor area 10,831sq.m, Apartment Mix: Studio: 20, 1-bed: 35, 2-bed: 51,);
  - Block B3 (maximum building height 51.767m, total gross internal floor area 9,766sq.m, Apartment Mix: Studio: 22, 1-bed: 60, 2-bed: 27, 3-Bed: 1);
  - Block C1 (maximum building height 79,450m, total gross internal floor area 12,705sq.m, Apartment Mix: Studio: 84, 1-bed: 40, 2-bed: 41);
  - Block C2 (maximum building height 39,615 m, total gross internal floor area 4,890 sq.m, Apartment Mix: Studio: 9, 1-bed: 33, 2-bed: 3, 3-Bed: 4);
  - Block C3 (maximum building height 39,650 m, total gross internal floor area 6,775sq.m, Apartment Mix: Studio: 40, 1-bed: 18, 2-bed: 23);
  - Block D1 (maximum building height 53,392 m, total gross internal floor area 8,418 sq.m, Apartment Mix: Studio: 10, 1-bed: 25, 2-bed: 44, 3-Bed: 1);
  - Block D2 (maximum building height 30,950 m, total gross internal floor area 3,890 sq.m, Apartment Mix: Studio: 18, 1-bed: 8, 2-bed: 11);
- residential support amenities including 1 no. gyms, a resident's lounge, work areas, meeting rooms, dining rooms, recreational areas with a combined GFA of 1,444 sq.m;
- change of use from club house to pedestrian passageway of the existing vault (137sq.m GFA) fronting Seville Place, a Protected Structure (RPS No. 130);
- a basement of 7,253.4 sq.m with vehicular access from Oriel Street Upper incorporating residents' car parking (58 no. spaces), residents cycle parking (640 no. spaces) 7 no. plant rooms (combined 2,228sq.m), waste management facilities (393 sq.m)
- 766 no. covered cycle parking spaces for residents and visitors, concierge office (233 sq.m) and waste management facilities (126 sq.m);
- 'other uses' including 10 no. units providing retail, commercial, and community use with a combined GFA of 3,142 sq.m;
- A total of 18,562 sq.m of hard and soft landscaping comprising both public, communal and private open space located throughout the development;
- A service and emergency vehicle only access ramp from the Oriel Street Upper site entrance to serve CIE's transport needs at Connolly Station;
- Enabling works of a non-material nature to safeguard the existing vaults (Protected Structures - RPS No. 130) that form part of the subject site fronting Sheriff Street Lower, Oriel Street Upper, and Seville Place during the construction phase;

- All associated ancillary development works including drainage, 6 no. electricity substations, pedestrian access; and
- Works to the Masonry wall fronting Oriel Street and the Vaults fronting Seville Place (both a Protected Structure) consisting of the creation of a new vehicular and pedestrian entrance.

Of note is the proposal to provide just 58 car parking spaces to serve the SHD development, all of which are to be exclusively for use by car club vehicles only meaning there will be no private parking provision for residents. This will be subject to a strict parking management regime which is set out in further detail in the Traffic Impact Assessment, submitted as part of this application under separate cover.

As noted earlier, in addition to the SHD development, the buildout of the masterplan development has also been allowed for in the traffic assessment. While this will be subject to a separate, future planning application, for the purposes of this assessment it is estimated to consist of:

- 24,747m^2 Office;
- 7,765m^2 Hotel;
- 2,834m^2 Retail.

6.5.2 Trip Generation

It is noted that the albeit reduced allocation of Irish Rail car parking will continue to be a trip generator but re-routed through the new access on Oriel Street. The associated revised trip patterns of the reduced Irish Rail car parking have been developed on a pro-rata basis using the traffic survey data from the existing car park entrance.

With regard to the proposed SHD development and masterplan development, the primary trip generators are expected to be the residential, commercial and hotel elements which make up the majority of uses. The remaining elements are expected to be ancillary meaning they will not generate bespoke trips by car and so have not been included in the trip generation estimates.

The traffic generation potential of the proposed and masterplan development has been estimated using the Trics software modelling database.

When developing traffic generation estimates for any development, a number of surveys are selected from the database based on a range of factors including development type, size, location, public transport etc. The results are then used to establish trip rates for the development in question which are ultimately used to derive estimates for traffic generation. The Trics output files relative to this assessment can be found in **Appendix 6.3** of this report.

Given the location of the development site, a particular emphasis was put on the level of parking provided at the respective survey sites. Despite this, it should be noted that the majority of suitable sites provided a level of parking considerably in excess of that proposed as part of this development, which intends to dedicate all residential car parking to car club vehicles which are not appropriate for commuting use. Nevertheless, this assessment has not allowed any reductions to account for this, thereby ensuring a robust and conservative assessment.

The cumulative trip generation estimates for the proposed masterplan development is shown following. It is noted that the trip generation estimates for the proposed SHD development subject to this application are as per the column head "Apartments".

Of note is that the cumulative trip generation for the apartments is considerably beyond the proposed parking allocation of 58 no. car club spaces meaning these estimates are again highlighted as being very conservative.

Time Range	**Apartments**		**Office**		**Hotel**	
	Arrivals	*Departures*	*Arrivals*	*Departures*	*Arrivals*	*Departures*
00:00-01:00	0	0	0	0	0	0
01:00-02:00	0	0	0	0	0	0
02:00-03:00	0	0	0	0	0	0
03:00-04:00	0	0	0	0	0	0
04:00-05:00	0	0	0	0	0	0
05:00-06:00	0	0	0	0	0	0
06:00-07:00	0	0	0	0	0	0
07:00-08:00	9	30	67	5	26	50
08:00-09:00	25	64	83	4	32	83
09:00-10:00	28	33	59	5	34	52
10:00-11:00	16	27	15	5	37	35
11:00-12:00	30	21	9	6	22	35
12:00-13:00	23	26	10	7	26	20
13:00-14:00	24	30	8	6	26	21
14:00-15:00	17	21	3	12	13	26
15:00-16:00	23	21	9	50	29	26
16:00-17:00	28	21	6	66	39	25
17:00-18:00	36	21	5	83	37	29
18:00-19:00	39	32	7	23	27	22
19:00-20:00	36	30	0	0	34	26
20:00-21:00	30	20	0	0	21	12
21:00-22:00	0	0	0	0	14	8
22:00-23:00	0	0	0	0	0	0
23:00-24:00	0	0	0	0	0	0
Daily Trips:	363	396	281	273	415	470

TABLE 6-4 ESTIMATED MASTERPLAN DEVELOPMENT TRIP GENERATION

The additional traffic outlined above was assigned to the study area based on existing traffic flows in the area combined with an assessment of the local network layout. Consideration was also given to the revised entrance to the Irish Rail car parking as part of the future year traffic scenarios.

6.6 Do Nothing Scenario

The do-nothing scenario would involve leaving the subject site in its current state. This would have a negative impact on the overall development of the area while simultaneously showing no real benefit in transportation terms. In particular, local permeability would not be improved through the site for pedestrians and cyclists.

6.7 Impact Assessment

6.7.1 Construction Phase

Relative to the operation stage, the construction period will be temporary in nature. Construction traffic is expected to consist of the following categories:

- Private vehicles owned and driven by site construction staff and by full time site supervisory staff and occasional professional supervisory staff e.g. design team members and supervisory staff from utility companies;
- Materials delivery and removal vehicles.

It is difficult to assess the exact impact of traffic during the construction period. Nevertheless, a number of estimates have been made with respect to this:

- In general, the construction day will begin and end outside of peak travel hours. As a result, the majority of workers travelling to and from the site will arrive before the a.m. peak hour and depart after the p.m. peak hour;
- Limited on-site parking will be provided to encourage staff to use alternate options such as car-sharing or public transport. However, this will also take into consideration the required demand to prevent any overspill of parking into adjacent areas;
- Adequate on-site compounding will be provided to prevent any potential overflow onto the local transport network;
- The potential for construction staff to be brought to the site in vans/minibuses will be investigated. This would serve to reduce the overall trip generation potential of the construction period;
- Delivery vehicles travelling to and from the site will be spread across the course of the working day meaning the number of HGV's travelling during the peak hours will be relatively low.

Overall it is expected that the level of traffic generated by the construction works will be less than that generated by the masterplan operational phase of the development. As a result, a detailed analysis of this stage has not been deemed necessary.

6.7.2 Operational Phase

In order to assess the actual impact of the development on the local road network, a number of different scenarios have been analysed. These are summarised as follows:

- Base Year (2018) – The current performance of the local road network was initially assessed along with the impact of the proposed development to establish which junctions require more detailed analysis;
- Year of Opening (2022) – The performance of the local road network was then assessed for both peak hours at the year of opening. In order to show the true impact of the proposed development;
- Design Year (2037) – The local road network was assessed for design year.

In order to establish which junctions, require more detailed analysis, the impact of the proposed development relative to the existing traffic flows has been assessed. The criteria used for this scoping exercise is national criteria is based on the guidance set out in the TII Traffic & Transport Assessment Guidelines (2015) which states that an assessment is required when:

"Traffic to and from the Development exceeds 5% of the traffic flow on the adjoining road where congestion exists, or the location is sensitive"

Regarding the scope of the assessment, the guidelines state:

"*In general, the study area should include all road links and associated junctions where traffic to and from the development may be expected to exceed 10% of the existing traffic movements, or 5% in congested or other sensitive locations, including junctions with national roads. Where two or more of the supplementary criteria as indicated in Table 2.3 apply in relation to any of the adjoining links or junctions, then those links and junctions should also be considered for inclusion in the study area*"

Due to the location of the site and the percentage impact of the development on the local road network, it was established that Junctions 1, 3 and 4, also including the development entrance, were deemed to require further analysis. In order to ensure an accurate assessment, the models for each junction has first been calibrated by comparing its output results for queues against those recorded on-site during the traffic surveys. This can be seen in **Appendix 6.4**.

6.7.2.1 Year of Opening

Prior to the analysis of the individual junctions, the main links in the network have been assessed for the Year of Opening Do-Something scenario, with the results shown in **Table 6.5** following.

Link	Width (m)	Link Capacity (veh/hr)	A.M. Peak (veh/hr)	RFC (%)	P.M. Peak (veh/hr)	RFC (%)
North Wall Quay	6.10	1,020	561	55.0	508	49.9
Guild Street	9.00	1,530	489	31.9	627	41.0
Sheriff Street Upper	6.75	1,110	312	28.1	528	47.6
Seville Place	6.10	900	758	84.2	695	77.3
Amiens Street	9.00	1,650	1,434	86.9	1,184	71.7
North Strand Road	9.00	1,650	1,259	76.3	1,060	64.2
Portland Row	9.00	1,530	917	59.9	697	45.6
Oriel Street	6.10	750	473	63.1	348	46.4

TABLE 6-5 2022 LINK RFC VALUES FOR LOCAL NETWORK – DO SOMETHING

As can be seen, the local links continue to operate within normal capacity limits with RFC values ranging from 26-86%.

The detailed analysis of the junction was performed using TRANSYT 15 for the signalised junctions and Junctions 9 for uncontrolled junctions. When considering the results, the following should be taken into account:

- The signalised junctions have been modelled based on the signal plan currently in place;
- TRANSYT has been allowed to optimise the signal timings at signalised junctions for both the Do nothing and Do Something scenarios, thereby showing their optimal performance;
- The development entrance (Junction 7) has only been assessed for the Do Something Scenario as it is not present in the Do Nothing;
- Queue lengths, shown in the following table under the column headed “Queues” are shown in Passenger Car Units (PCU) as this is the how the data is outputted from the software used. PCU is a measure of vehicle units used to assess capacity and 1 PCU is the equivalent of a car;
- TRANSYT outputs capacity data under the heading Degree of Saturation (DOS). This is identical in meaning with RFC as defined earlier and is an indication of the reserve capacity available at the junction being assessed;
- All values shown represent the maximum experienced by the respective arm;
- All modelling output files can be found in **Appendix 6.5**.

Junction 1

Approach	A.M. Peak Hour		P.M. Peak Hour	
	DOS	*Queue*	*DOS*	*Queue*
Seville Place	36	7.7	63	12.1
Amiens Street	25	4.5	57	12.7
Portland Row	67	17.9	60	15.0
North Strand Road	81	22.0	58	12.8

TABLE 6-6 JUNCTION 1 – 2022 PEAK HOUR DO NOTHING ANALYSIS RESULTS

Approach	A.M. Peak Hour		P.M. Peak Hour	
	DOS	*Queue*	*DOS*	*Queue*
Seville Place	38	7.9	65	12.2
Amiens Street	25	4.4	58	12.8
Portland Row	71	19.4	60	15.3
North Strand Road	83	23.1	61	13.5

TABLE 6-7 JUNCTION 1 – 2022 PEAK HOUR DO SOMETHING ANALYSIS RESULTS

The results in **Table 6.6** and **Table 6.7** show that the impact of the proposed development is relatively minor with increases in RFC limited to 1 – 3% while queue lengths experience a similar negligible impact.

Junction 3

Approach	A.M. Peak Hour		P.M. Peak Hour	
	DOS	*Queue*	*DOS*	*Queue*
Seville Place (S)	32	4.8	34	3.7
Oriel Street Upper	6	0.2	24	1.6
Seville Place (N)	56	12.3	38	3.3
Oriel Street Lower	1	0.0	4	0.1

TABLE 6-8 JUNCTION 3 – 2022 PEAK HOUR DO NOTHING ANALYSIS RESULTS

Approach	A.M. Peak Hour		P.M. Peak Hour	
	DOS	*Queue*	*DOS*	*Queue*
Seville Place (S)	34	5.0	35	3.8
Oriel Street Upper	11	0.5	31	2.0
Seville Place (N)	68	14.4	41	10.7
Oriel Street Lower	1	0.0	4	0.0

TABLE 6-9 JUNCTION 3 – 2022 PEAK HOUR DO SOMETHING ANALYSIS RESULTS

The results in **Table 6.8** and **Table 6.9** show that the junction continues to operate within capacity, with DOS values increasing by between 1 – 12%. Queue length impacts are similarly low with the exception of Seville Place (N) which see the largest increase of 7 vehicles.

Junction 7

Approach	A.M. Peak Hour		P.M. Peak Hour	
	DOS	*Queue*	*DOS*	*Queue*
Oriel Street Upper (W)	5	0.0	16	0.0
Development Entrance	8	0.0	10	0.0
Oriel Street Upper (E)	25	0.0	12	0.0

TABLE 6-10 JUNCTION 7 – 2022 PEAK HOUR DO SOMETHING ANALYSIS RESULTS

The results show that the junction operates well within normal capacity limits with extremely low DOS values and queue lengths on all arms during both peak hours.

6.7.2.2 Design Year

The main links in the network have again been assessed for the Design Year, with the results shown in **Table 6.11** following.

Link	Width (m)	Link Capacity (veh/hr)	A.M. Peak (veh/hr)	RFC (%)	P.M. Peak (veh/hr)	RFC (%)
North Wall Quay	6.10	1,020	660	64.7	604	59.2
Guild Street	9.00	1,530	560	36.6	716	46.8
Sheriff Street Upper	6.75	1,110	358	32.2	605	54.5
Seville Place	6.10	900	863	95.8	796	88.5
Amiens Street	9.00	1,650	1,656	100	1,366	82.8
North Strand Road	9.00	1,650	1,449	87.8	1,223	74.1
Portland Row	9.00	1,530	1,051	68.7	798	52.2
Oriel Street	6.10	750	530	70.7	384	51.2

TABLE 6-11 2035 LINK RFC VALUES FOR LOCAL NETWORK – DO SOMETHING

The above shows that all links operate within capacity, with the majority of links experiencing RFC values below 90%. Amiens Street is shown to reach capacity at this time. However, it is noted that the assessment has taken conservative values for road widths to account for the existing bus lanes as well as additional growth factors for background traffic which may not materialise given the significant time period in question.

The following tables (**Table 6.12** to **Table 6.16**) show the results of the Do Nothing and Do Something analysis for the Design Year, thereby allowing for a direct comparison of both scenarios to highlight the true impact of the proposed development. When considering the below results, the considerations outlined for the Year of Opening results continue to apply.

Junction 1

Approach	A.M. Peak Hour		P.M. Peak Hour	
	DOS	Queue	DOS	Queue
Seville Place	50	11.4	65	9.9
Amiens Street	29	5.5	76	18.0
Portland Row	81	24.3	63	16.6
North Strand Road	92	30.8	78	18.5

TABLE 6-12 JUNCTION 1 – 2037 PEAK HOUR DO NOTHING ANALYSIS RESULTS

Approach	A.M. Peak Hour		P.M. Peak Hour	
	DOS	Queue	DOS	Queue
Seville Place	52	12.0	66	12.2
Amiens Street	29	5.5	78	18.4
Portland Row	84	26.2	64	17.0
North Strand Road	96	34.8	82	19.8

TABLE 6-13 JUNCTION 1 – 2037 PEAK HOUR DO SOMETHING ANALYSIS RESULTS

The results show that the impact of the proposed development is relatively minor with increases in RFC limited to 1 – 3% while queue lengths experience a similar negligible impact.

Junction 3

Approach	A.M. Peak Hour		P.M. Peak Hour	
	DOS	Queue	DOS	Queue
Seville Place (S)	37	5.9	39	4.8
Oriel Street Upper	7	0.3	31	2.3
Seville Place (N)	68	15.9	45	3.4
Oriel Street Lower	1	0.0	5	0.1

TABLE 6-14 JUNCTION 3 – 2037 PEAK HOUR DO NOTHING ANALYSIS RESULTS

Approach	A.M. Peak Hour		P.M. Peak Hour	
	DOS	Queue	DOS	Queue
Seville Place (S)	40	6.2	40	5.0
Oriel Street Upper	13	0.6	41	3.6
Seville Place (N)	77	18.3	50	4.8
Oriel Street Lower	1	0.0	6	0.1

TABLE 6-15 JUNCTION 3 – 2037 PEAK HOUR DO SOMETHING ANALYSIS RESULTS

The results show that the junction continues to operate within capacity, with DOS values increasing by between 1 – 12%. Queue length impacts are similarly low with the exception of Seville Place (N) which see the largest increase of 7 vehicles.

Junction 7

Approach	A.M. Peak Hour		P.M. Peak Hour	
	DOS	Queue	DOS	Queue
Oriel Street Upper (W)	6	0.0	18	0.0
Development Entrance	9	0.0	11	0.0
Oriel Street Upper (E)	29	0.1	13	0.0

TABLE 6-16 JUNCTION 7 – 2037 PEAK HOUR DO SOMETHING ANALYSIS RESULTS

The results show that the junction operates well within normal capacity limits with extremely low DOS values and queue lengths on all arms during both peak hours.

6.8 Mitigation

6.8.1 Construction Phase Mitigation

This stage of the development will be dealt with by the appointed contractor through the development and implementation of a *Construction & Environmental Management Plan*. This plan will be agreed with the Local Authority prior to the commencement of construction and will ultimately include details on the following:

- Daily and weekly working hours;
- Agreed haul routes for incoming materials;
- Licensed hauliers to be used;
- Disposal sites, if necessary;
- Travel arrangements for construction personnel;
- Appropriate on-site parking arrangements for construction personnel to prevent overspill parking on the local road network;
- Temporary construction entrances to be provided;
- Wheel wash facilities if required;
- Road cleaning and sweeping measures to be put in place if required;
- Temporary construction signage to be put in place and maintained;
- Any proposed traffic management measures such as temporary traffic lights and signage on any public roads.

6.8.2 Incorporated Design Mitigation

A series of mitigation measures have been incorporated into the design of the development with respect to traffic & transportation while others have been identified as part of the detailed analysis of the local road network.

6.8.2.1 Car Parking

Given the highly accessible nature of the development site by all modes of public transport operating in Dublin including heavy rail, light rail, intercity and regional bus and Dublin Bus combined with the proximity to the major employment centres in Dublin City, it has been deemed appropriate to restrict the level of car parking provided at the site. This is in accordance with the allowances set out in the Dublin City Council (DCC) Development Plan and the standards set out in the Guidelines for Planning Authorities, Design Standards for New Apartments. This strategy has been further developed through discussion with DCC Transportation Planners and the National Transport Authority who have identified the site as a candidate for zero parking provision.

On this basis, it is proposed to provide just 58 no. parking spaces for the Strategic Housing Development (SHD) development, all of which will be for use by an on-site car club only. This will ensure access to a vehicle for essential, infrequent trips is maintained while preventing commuting trips by car which are not feasible with a car club as use of vehicles is charged until it is returned to the original pickup location.

This measure will be supported by the implementation of a parking management plan which will include:

- Early and ongoing engagement with residents with respect to the availability of car parking;
- Strict control of access to car parking including on-site monitoring of car parking usage with associated control measures e.g. clamping.

This overall parking strategy will ensure minimal car usage at the site which in turn considerable limits and potential associated impact.

6.8.2.2 Travel Plan

A development specific Travel Plan will be implemented at the site which sets out a series of measures to facilitate and encourage a positive modal shift towards more sustainable modes of transport. These measures will be refined based on travel surveys conducted at the occupied development but typically include:

- Appointment of a site Mobility Manager to oversee the implementation of the plan;
- Ongoing liaison with relative bodies including public transport providers such as Dublin Bus and Irish Rail;
- Providing ongoing information with respect to existing, amended and proposed public transport, cycle and pedestrian infrastructure and services;
- Providing information with respect to technological advances which improve the use of public transport such as apps and integrated ticketing systems;
- Developing new or advising of existing databases to facilitate and promote car sharing, walking groups, cycle groups etc.;

- Organising learning opportunities which promote travel by sustainable means such as bike repair tutorials;
- Advising of and providing information with respect to available initiatives such as tax saver tickets and the Cycle to Work scheme which may be of benefit to residents.

6.8.2.3 Cycle Parking

To ensure travel by bicycle continues to be facilitated and encouraged, a total of 1,406 no. covered cycle parking spaces are to be provided for use by residents and visitors.

The above measures will facilitate a considerable modal share towards more sustainable means of transportation including public transport, walking and cycling. This in turn will lead to a more active population at the development while also mitigating against increased emissions associated with travel by car.

6.8.3 Operational Phase Mitigation

The operational stage impact of the proposed development will be negligible in terms of traffic as can be seen in the traffic modelling results. The proposed entrance on Oriel Street Upper is proposed as simple priority junction meaning existing traffic will not be impeded. As a result, there will be no impact on traffic congestion or road safety in the area.

Drawing from the above, it is considered that the impact of the operational phase on Traffic and Transport will be likely, positive, moderate and permanent.

6.9 Monitoring

While it has been demonstrated that the proposed development has negligible impact on the operation of the local network, it is nevertheless recommended that the local area should be monitored in terms of transportation efficiencies into the future.

6.10 Cumulative Assessment

The assessment has considered the build out of the expected masterplan development which includes the currently proposed SHD development and additional adjacent development which will be subject to separate planning applications in the future. In addition, background traffic growth has been allowed for which would account for a degree of additional development in the area as well as population growth and changes in car ownership levels.

Taking this into consideration, the assessment is considered to be both conservative and a representation of the worst-case scenario.

6.11 Residual Impact Assessment

6.11.1 Construction Phase

The impact of the proposed development construction on the existing road network will be negligible with slight negative impacts experienced during the construction phase with construction traffic on the local road network, though this is temporary in nature only.

The assessment which forms the basis of this chapter has been wholly conservative to ensure a worst-case scenario is considered. This includes allowing for background traffic growth based on TII guidance and conservative trip generation estimates which do not fully take into consideration the full effect of the reduced car parking provision. On that basis, the assessment and the associated results are considered to represent the worst-case scenario.

The impact of the construction stage is assessed as follows:

- Increased vehicles numbers are expected to be limited during peak hours meaning congestion impacts are expected to be a negligible increase on background levels. As a result, associated health impacts from emissions and increased safety risk with respect to potential accidents involving vehicles will also be expected to be a negligible increase on background levels;
- There will be increased vehicle and HGV movements, however, these will be routed to use the most appropriate routes to limit the associated impact and minimise potential interaction with vulnerable road users where possible;
- The urban nature of the local road infrastructure lends itself to lower speeds and the limited increase in vehicle numbers means there is expected to be no real increase in risk to other vulnerable road users.

The impact of the proposed development construction will be managed by the measures set out in the Construction & Environmental Management Plan. Drawing from the above, it is considered that the impact of the construction phase on Traffic and Transport will be likely and adverse but moderate and short-term.

6.11.2 Operational Phase

The increased traffic as a result of the proposed development has been shown to be minimal and will have a negligible impact in terms of traffic. The associated impact on human beings will be limited.

The increased permeability of the site and the provision of high-quality pedestrian and cycle facilities will result in increased numbers of cyclists which in turn will promote healthier living and a more active population.

The potential for increased accidents is also considered low as a result of the relatively minor traffic increases associated with the development.

Thus, taking the above into consideration, the potential impact of the development operational stage is summarised as follows:

- The link capacities for the study area road network will continue to operate within acceptable limits even by the design year;
- The impact on the junctions in the study area is considered to be negligible with relatively low increases in RFC values at each;
- The development will increase pedestrian and cycle permeability through the local area and increase connectivity;
- The proposed development entrance has a negligible impact on the operation of the local road network;
- The increased traffic levels associated with the development are relatively low, particularly when compared to existing traffic flows locally meaning the associated impact in terms of road safety will be negligible.

Drawing from the above, it is considered that the impact of the operational phase on Traffic and Transport will be likely, neutral, slight and permanent.

Full details of traffic modelling assumptions and results are included in the Traffic Impact Assessment completed by O'Connor Sutton Cronin Consulting Engineers for the proposed development, which is included with this planning application. Although it should be noted that the impact is expected to be negligible relative to the existing scenario.

6.12 References and Sources

- Design Manual for Roads and Bridges (DMRB), February 1999;
- Design Manual for Urban Roads and Streets (DMURS), March 2013;
- Transport Infrastructure Ireland (TII) Traffic and Transport Assessment Guidelines, May 2014;
- Guidelines for Traffic Impact Assessment, Chartered Institute of Highways & Transportation 1997;
- Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections, TII October 2016;
- Project Appraisal Guidelines for National Roads Unit 16.1 - Expansion Factors for Short Period Traffic Counts, TII October 2016;
- Transport Infrastructure Ireland (TII) Project Appraisal Guidelines, August 2012;
- Dublin City Development Plan 2016-2022;
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Draft), August 2017.

Appendices (See Volume III)

Appendix 6.1 – Traffic Survey Data

Appendix 6.2 – Traffic Flow Diagrams

Appendix 6.3 – Trics Output Files

Appendix 6.4 – Junction Calibration Summary

Appendix 6.5 – Traffic Model Output Files

CHAPTER 7

MATERIAL ASSETS: BUILT SERVICES

OCTOBER 2019

Table of Contents

Table of Tables

7 Material Assets: Built Services

7.1 Introduction

This chapter addresses issues relating to the material assets of surface water drainage, wastewater drainage, water supply and utilities in respect of the subject lands and assesses the impact of the proposed development on these aspects of the existing environment.

7.1.1 Statement of Authority

The author is a Chartered Engineer; has obtained Bachelor of Engineering and Master of Science degrees, with specialisation in hydrology; and has twenty years' experience in the design and delivery of urban development schemes, with particular focus on flood risk management and drainage and water supply infrastructure. He has advised a range of clients including government bodies, local authorities, water companies and private developers. He has provided designs for projects in Ireland, the UK, Poland, Libya and the UAE taking account of local technical standards and hydrological conditions.

7.2 Methodology

A detailed Flood Risk Assessment was conducted and submitted under separate cover with the planning application for the proposed development.

Utility record information on the existing infrastructure were obtained from the following:

- Dublin City Council;
- Irish Water;
- Electricity Supply Board Networks;
- Gas Networks Ireland and;
- multiple telecommunications utility providers.

Information on all services is supplemented with information obtained from site topographical survey, site inspections and Ordnance Survey Ireland mapping.

In order to further determine the existing utilities environment, an Underground Utilities Survey was carried out by Murphy Surveys Ltd. at the subject site between August and October 2018. The survey methods adopted included manhole surveys, ground penetrating radar (GPR) surveys, radio detection and surveys of visible services using GPS/Total Station. The results provide further clarification as to the existence and location of utilities.

A desk study of records received in digital format from the various utility companies/authorities, survey information and supplementary sources was undertaken. Consultations with the utility companies/authorities were conducted in order to identify their particular requirements during construction and for permanent arrangements.

7.3 Proposed Development

7.3.1 Surface Water Drainage

The proposed surface water drainage system therefore comprises a Sustainable Urban Drainage System (SUDS) consisting of green roofs, blue roofs, pervious paving, bio-retention areas, attenuation storage and flow control. The proposed SUDS devices provide a treatment train for rainfall runoff, delivering interception storage, water quality treatment, runoff volume reduction and runoff rate reduction. The proposed drainage system will include attenuation of surface water discharge – see calculated impact in **Table 7.1**.

Storm Return Period and Duration	Site Discharge without attenuation	Site Discharge with attenuation	Impact of Attenuation on Surface Water Discharge
	(l/s)	(l/s)	(%)
5-year 120 minute	86	5.8	-93
30-year 120 minute	139	5.8	-96
100-year 120 minute	186	5.8	-97

TABLE 7.1 IMPACT OF ATTENUATION ON SURFACE WATER DISCHARGE

7.3.2 Wastewater Drainage

Based on the nature and extent of the proposed development, the expected daily wastewater generation is 340m3/day with an equivalent Dry Weather Flow (DWF) of 3.9l/s and a total Biological Oxygen Demand (BOD) of 126kg/day – see calculation in Table 7.2. With peaking factors of 3.0 and 4.5 for domestic and non-domestic flow respectively, the resulting peak flow is expected to be 12.0l/s.

	Population	Flow	BOD	Infiltration	Total Flow	Total BOD	DWF
		(l/unit/day)	(g/unit/day)	(% of flow)	(m^3/day)	(kg/day)	(l/s)
741 Apartments	2000.7	150	60	10%	330.1	120.0	3.8
3,142m² Retail, Commercial and Community	125.7	50	30	10%	6.9	3.8	0.08
1,444m² Amenity	57.8	50	30	10%	3.2	1.7	0.04
Total					**340**	**126**	**3.9**

TABLE 7.2 CALCULATION OF WASTEWATER FLOW

7.3.3 Water Supply

Based on the nature and extent of the proposed development, the expected water demand is 309.3m^3/day with an equivalent average flow of 3.6 l/s – see calculation in Table 7.3. With a peak week factor of 1.25 and pipe-sizing factors of 3.0 and 5.0 for domestic and non-domestic flow respectively, the resulting peak flow is expected to be 13.7l/s. It is proposed to provide a water storage tank at basement level with booster pumps to supply the development via internal watermains.

	Population	Flow (l/unit/day)	Total Flow (m^3/day)	Average (l/s)
741 Apartments	2000.7	150	300.1	3.5
3,142m^2 Retail, Commercial and Community	125.7	50	6.3	0.07
1,444m^2 Amenity	57.8	50	2.9	0.03
Total			**309.3**	**3.6**

TABLE 7.3 CALCULATION OF WATER DEMAND

It is proposed to connect to existing watermains in Sheriff Street Lower and in Oriel Street Upper. Irish Water has advised that an upgrade of water infrastructure, consisting of a 300mm-diameter watermain connecting to the existing 600mm-diameter trunk watermains at North Wall Quay and running for approximately 430m along Commons Street to the location of the site, will be required.

The proposed watermain infrastructure is designed in accordance with Irish Water's *'Code of Practice for Water Infrastructure'* (IW-CDS-5020-03 Revision 1).

7.3.4 Electricity Supply

There are no existing ESB power cables within the site. All proposed power cables within the development will be underground or internal within the building. The estimated maximum demand for the proposed development is in the region of 8MVA. Six new ESB sub-stations will be constructed within the subject site.

7.3.5 Gas Supply

Subject to connection agreement with Gas Networks Ireland, it is proposed to connect to the gas supply system and provide underground gas pipelines within the development. It is anticipated that the new development will require approximately 9MW peak heating output.

7.3.6 Telecommunications

Any telecommunications networks in the proposed development will consist of cables in underground ducts or internally within the building. New connections will be provided via ducting connections to the existing on-street network.

7.4 Baseline Scenario

7.4.1 Surface Water Drainage

Runoff from the existing site is collected via gullies and downpipes through a network of below ground pipes. Trapped gullies provide limited grit removal, and runoff from car parking areas passes through hydrocarbon separators. There is no interception or other form of runoff volume reduction. There is no flow control and attenuation of runoff from the site. As there is no flow control, runoff from the site will vary with the intensity of rainfall; representative discharge rates have been calculated and are presented in **Table 7.4**.

Storm Return Period and Duration	Pre-development Discharge (l/s)
5-year 120 minute	86
30-year 120 minute	139
100-year 120 minute	186

TABLE 7.4 PRE-DEVELOPMENT SURFACE WATER DISCHARGE

All surface water runoff from the site is directed to existing combined sewerage infrastructure draining to Irish Water's Mayor Street Pumping Station. Combined Sewer Overflows (CSOs) on the receiving sewerage network discharge the Liffey Estuary at North Wall Quay. The Mayor Street Pumping Station discharges to existing gravity sewerage in Amiens Street that ultimately drains to Ringsend Wastewater Treatment Works.

7.4.2 Wastewater Drainage

In the vicinity of the subject site, there is an extensive network of combined sewers (collecting both wastewater and surface water) in the ownership of Irish Water that is operated and maintained in conjunction with Dublin City Council. Drainage Record Plans provided by Dublin City Council indicate that there are no foul sewers (collecting only foul sewage) in the vicinity of the subject site. The existing combined sewers provide services to domestic, commercial and industrial customers in the immediate vicinity of the site and in the wider area.

The primary land use of the site is surface car parking. Existing office space provides limited accommodation, with existing wastewater flow estimated as 12.6m3/day with an equivalent DWF of 0.15l/s and a total Biological Oxygen Demand (BOD) of 5.8kg/day. With a peaking factor of 4.5 for non-domestic flow, the resulting peak flow is estimated to be 0.66l/s.

All wastewater generated on the site is directed to existing combined sewerage infrastructure draining to Irish Water's Mayor Street Pumping Station. Combined Sewer Overflows (CSOs) on the receiving sewerage network discharge the Liffey Estuary at North Wall Quay. The Mayor Street Pumping Station discharges to existing gravity sewerage in Amiens Street that ultimately drains to Ringsend Wastewater Treatment Works. Effluent from the treatment works is discharged to the Irish Sea at Dublin Bay.

Ringsend Wastewater Treatment Plant serves Dublin City and the City environs in the neighbouring counties. Its contributing residential population is in the order of 1.1 million. Together with the non-domestic contribution, the existing treatment works is currently operating at its full capacity of 1.65 million population equivalent (PE).

In November 2012, Dublin City Council received planning permission to improve the plant to 2.1M PE firm capacity, equivalent to 2.4M PE ultimate design capacity. This decision was challenged by way of judicial review and in November 2013, the decision to approve the scheme was confirmed by the High Court. Irish Water has inherited the treatment plant and plan to upgrade the existing plant to meet a capacity of up to 2.1M PE; this is currently being implemented.

The upgrade and expansion of the treatment works will be implemented in three phases. Phase 1 has already been completed and comprises advanced works to improve certain aspects of the existing works, including additional odour treatment and improved sludge handling capacity. Phase 2 will expand capacity to 2.1M PE and is programmed to become available for wastewater treatment by the end of 2018. Phase 3 comprises an upgrade to nutrient removal at the existing works, with an anticipated completion timescale of the end of 2020.

In April 2019, An Bord Pleanála granted permission (ref: ABP-301798-18) to Irish Water for works at Ringsend WWTP, amending the proposals for works permitted in 2012.

The Greater Dublin Drainage Project, currently being prepared by Irish Water to go for planning approval, is a regional wastewater project to serve the Greater Dublin Area, with a planned treatment plant in north County Dublin. The project includes an orbital sewer and two pumping stations which will divert drainage from the north of Dublin City to the new treatment plant thus freeing up additional treatment capacity at the Ringsend treatment works which is currently treating drainage from this area. Subject to being granted planning approval, it is anticipated that this project will be operational in 2026.

7.4.3 Water Supply

In the vicinity of the subject site, there is an extensive network of watermains in the ownership of Irish Water that is operated and maintained in conjunction with Dublin City Council. These watermains provide services to domestic, commercial and industrial customers in the vicinity of the site and across the city centre area. The public watermains are buried beneath public roads and footpaths with numerous private connections branching from the main services.

The majority of existing watermains to the south of the site are small diameter cast iron watermains dating from 1900. In Seville Place, to the north of the site, there is a 250mm-diameter ductile iron watermain dating from 1987.

The primary land use of the site is surface car parking. Existing office space provides limited accommodation, with existing water demand estimated as 11.5m^3/day with an equivalent average flow of 0.1 l/s.

7.4.4 Electricity Supply

There is no over ground or underground ESB line traversing the subject site. There are multiple underground low and medium voltage cables in the streets surrounding the subject site. A high voltage power line runs along Seville Place to the north of the site. The ESB's Oriel Street substation is located on the eastern site boundary.

The primary land use of the site is surface car parking. Existing office space provides limited accommodation, with relatively low demand on the electricity supply network.

7.4.5 Gas Supply

In Sheriff Street Lower, to the south of the site, there is a 180PE low pressure distribution pipe and a 125PE medium pressure distribution pipe. In Oriel Street, to the east of the site, there is a 125PE low pressure distribution pipe. In Seville Place, to the north of the site, there are two 125PE low pressure distribution pipes.

The primary land use of the site is surface car parking. Existing office space provides limited accommodation. It is understood that there is no existing gas supply to the subject site.

7.4.6 Telecommunications

There are a number of telecommunication service provider networks in the vicinity of the subject site, comprising a combination of overhead and underground cables.

The primary land use of the site is surface car parking. Existing office space provides limited accommodation, with relatively low demand on the telecommunications network.

7.5 Do Nothing Scenario

If the proposed development were not undertaken, it is expected that there would be no change on the subject site and therefore no impact on surface water drainage, wastewater drainage, water supply and other utilities arising from the subject site.

7.5.1 Surface Water Drainage

In the absence of this proposed development, surface water runoff from the site would continue to flow un-attenuated into the receiving combined sewerage infrastructure. Un-attenuated flow contributes to the frequency of CSO discharges of combined sewage to the Liffey Estuary in times of high rainfall.

7.5.2 Wastewater Drainage

In the absence of this proposed development, wastewater flow from the site would continue to discharge to the receiving sewerage network. The expected increase in wastewater flow arising from the proposed development would not be discharged to the existing sewerage network. However, surface water runoff from the site would continue to flow un-attenuated into the receiving combined sewerage infrastructure. Un-attenuated flow contributes to the frequency of CSO discharges of combined sewage to the Liffey Estuary in times of high rainfall.

7.5.3 Water Supply

In the absence of this proposed development, water demand from the site would continue to be supplied from the existing local watermain network in the immediate vicinity of the site. As the proposed development is to be supplied from the remote trunk watermain at North Wall Quay, there would not be the resultant reduction in demand on the local antiquated watermain network. However, the overall demand on the trunk network in Dublin City would not increase as a result of the expected increase in water demand arising from the proposed development.

7.5.4 Electricity Supply

In the absence of this proposed development, there would be no change to the existing electricity supply network.

7.5.5 Gas Supply

In the absence of this proposed development, there would be no change to the existing gas supply network.

7.5.6 Telecommunications

In the absence of this proposed development, there would be no change to the existing telecommunications network.

7.6 Impact Assessment

7.6.1 Construction Phase

7.6.1.1 Surface Water Drainage

Due to the absence of natural watercourses and surface water sewers in the vicinity of the site, it is expected that surface water runoff during construction would be discharged to Irish Water's combined sewerage network, subject to the conditions of a discharge licence from Irish Water. While the combined sewerage network normally conveys flow to the Ringsend Wastewater Treatment Works, Combined Sewer Overflows (CSOs) on the network present a residual risk that untreated surface water runoff from the construction site would enter the Liffey Estuary.

Surface water runoff during construction activities may contain increased silt levels or become polluted from construction activities. Waterborne silt can arise from dewatering excavations, exposed ground, stockpiles and site roads. Construction materials such as concrete and cement are alkaline and corrosive and can cause pollution in watercourses. The development will require the removal of topsoil and earthworks. Such works could potentially cause deoxygenation of water in the receiving watercourses, the gills of fish to become obstructed with waterborne silt and aquatic plants and invertebrates to be smothered by settled silt, limiting exposure to sunlight and oxygen.

Heavy siltation or grit in the surface water runoff would lead to maintenance issues for the receiving gravity sewerage network and at Mayor Street Pumping Station. In the absence of mitigation measures, these potential impacts are considered to be adverse, significant and temporary. Mitigation measures (as described in Section 7.7 below) are available to control and manage these risks.

7.6.1.2 Wastewater Drainage

During construction it is envisaged that the contractor will put in place temporary drainage facilities to manage water within excavations. Water entering areas of excavation may be collected and discharged to the sewerage system following treatment (such as silt traps and interceptors) and at a flow rate subject to the conditions of a discharge licence from Irish Water. During the construction phase, welfare facilities for construction personnel will be located on site. Wastewater effluent from these facilities will be discharged to the sewerage system at a location and at a flow rate subject to the conditions of a discharge licence from Irish Water. Discharge from the excavated areas could potentially lead to siltation, surcharge and flooding within the sewerage system. Effluent from the welfare facilities could potentially lead to pollution of watercourses and flooding within the sewerage system. In the absence of mitigation measures, these potential impacts are considered to be adverse, significant and temporary. Compliance with the conditions of the discharge licence will effectively mitigate potential risks to the sewerage system.

7.6.1.3 Water Supply

During the construction phase, welfare facilities for construction personnel will be located on site. These welfare facilities will lead to an increase in demand for potable water. Supply from the public watermains will be subject to the conditions of a connection agreement with Irish Water. The increase in demand for potable water could potentially lead to a drop-in pressure in the existing mains and a resulting reduction in service to existing customers. In the absence of mitigation measures, these potential impacts are considered to be adverse, not significant and temporary. Compliance with the conditions of the connection application will effectively mitigate potential risks to the public watermains network.

7.6.1.4 Electricity Supply

During the construction phase, the contractor could apply to ESB for a supply to provide for temporary site lighting, power and security, resulting in an increase in demand on the existing network. This increase in demand could potentially lead to temporary outages in electricity supply in the vicinity of the subject site. In the absence of mitigation measures, these potential impacts are considered to be adverse, slight and temporary. However, the demand during the construction phase will be relatively small scale and it is expected that ESB will make provision to accommodate increase in demand.

7.6.1.5 Gas Supply

During construction of the proposed development and installation of gas connection, there is a potential for temporary loss of gas supply to surrounding areas to facilitate the installation of the new gas connection. In the absence of mitigation measures, these potential impacts are considered to be adverse, slight and brief / temporary. The connection to the existing gas network will be managed by Gas Networks Ireland.

7.6.1.6 Telecommunications

During construction of the proposed development, the removal of the existing telecommunication masts and the installation of telecommunications connections, there is a potential for temporary loss of service to surrounding areas. In the absence of mitigation measures, these potential impacts are considered to be adverse, slight and temporary. The connection to the telecommunications network will be managed by utility service providers.

7.6.2 Operational Phase

7.6.2.1 Surface Water Drainage

As the existing site is currently predominantly in hardstand, the proposed development will result in no significant increase in surface water runoff volume or runoff rates. The primary land use of the existing site is surface car-parking, with a resultant risk of surface water runoff containing elevated hydrocarbons. The proposed change from the existing scenario to the proposed development provides an inherent improvement for surface water.

The proposed Sustainable Urban Drainage System (SUDS) for the development incorporates flow control and attenuation of discharge from the site to the receiving sewerage network. This will result in a significant decrease in surface water discharge from the site, as illustrated in **Table 7.5** below. The decrease in surface water discharge from the site will reduce the risk of flooding in the receiving sewerage network and will reduce the risk of CSO discharges to the Liffey Estuary.

Storm Return Period and Duration	Pre-development Discharge	Post-development Discharge (attenuated)	Percentage Change in Surface Water Discharge
	(l/s)	(l/s)	(%)
5-year 120 minute	86	5.8	-93
30-year 120 minute	139	5.8	-96
100-year 120 minute	186	5.8	-97

TABLE 7.5 COMPARISON OF PRE- AND POST-DEVELOPMENT SURFACE WATER DISCHARGE

The proposed drainage system for the development incorporates interception in the form of green roofs and bio-retention areas that facilitate losses through evapo-transpiration, thereby reducing the annual volume of surface water runoff.

The impacts on surface water discharge from the site are considered to be positive, significant and permanent.

7.6.2.2 Wastewater Drainage

The proposed development will increase the quantity of wastewater discharged to receiving wastewater sewerage network, Mayor Street Pumping Station and Ringsend Wastewater Treatment Works. However, as described earlier in Table 7.5, the proposed development will result in a significant reduction in surface water discharge to the existing combined sewerage infrastructure. The combined surface water and wastewater discharges are presented in **Table 7.6**.

Storm Return Period and Duration	Pre-development Discharge			Post-development Discharge (attenuated)			Percentage Change in Total Discharge
	(l/s)			(l/s)			(%)
	SW	WW	Total	SW	WW	Total	Total
5-year 120 minute	86	0.66	86.66	5.8	12.0	17.8	-79
30-year 120 minute	139	0.66	139.66	5.8	12.0	17.8	-87
100-year 120 minute	186	0.66	186.66	5.8	12.0	17.8	-90

TABLE 7.6 COMPARISON OF PRE- AND POST-DEVELOPMENT SURFACE WATER AND WASTEWATER DISCHARGE

The receiving wastewater infrastructure is combined (surface water and wastewater flows) and includes Combined Sewer Overflows (CSOs) that discharge to the Liffey Estuary during extreme rainfall events. Therefore, it is the efficacy of the receiving wastewater infrastructure during extreme rainfall events that is critical for the assessment of environmental impacts. While the wastewater-only dry weather flow from the site is expected to increase as a result of the proposed development, the figures presented in **Table 7.6** illustrate that, during extreme rainfall events, the loading on the existing wastewater infrastructure arising from the subject site will reduce as a result of the proposed development.

Irish Water has identified works required to increase the capacity at Mayor Street Pumping Station to facilitate the development. Ringsend Wastewater Treatment Works has been upgraded to accommodate development of zoned lands.

There is the possibility that new wastewater sewers would leak, allowing wastewater to leak out of the sewers, potentially causing contamination of groundwater and surface waters in the area. In the absence of mitigation measures, these potential impacts are considered to be adverse, significant and permanent. However, all pipes will be tested prior to allowing wastewater effluent to discharge to them, in accordance with the requirements of Irish Water.

7.6.2.3 Water Supply

The proposed development will be supplied via a new connection to the existing watermains adjacent to the site. Irish Water has advised that an upgrade of water infrastructure, consisting of a 300mm-diameter watermain connecting to the existing 600mm-diameter trunk watermains at North Wall Quay and running for approximately 430m along Commons Street to the location of the site, will be required. As such, it is considered that the impacts on the trunk watermain network are considered to be neutral, not significant and permanent.

7.6.2.4 Electricity Supply

The proposed development will increase the demand on the electricity supply system. However, it is expected that infrastructural requirements for future development will be accommodated by ESB Networks. Therefore, the impact of the proposed development on the electricity supply network is expected to be neutral, negligible and permanent.

7.6.2.5 Gas Supply

The proposed development will increase the demand on the gas supply network. The increase in demand could potentially lead to a reduction in pressure and interruption of supply in the vicinity of the subject site. In the absence of mitigation measures, these potential impacts are considered to be adverse, moderate and permanent. It is expected that infrastructural requirements for future development will be accommodated by Gas Networks Ireland.

7.6.2.6 Telecommunications

The proposed development will increase the demand on the telecommunications systems. The increase in demand could potentially lead to a reduction in the level of service to existing customers. In the absence of mitigation measures, these potential impacts are considered to be adverse, slight and permanent. It is expected that infrastructural requirements for future development will be accommodated by utility service providers.

7.7 Mitigation

7.7.1 Incorporated Design Mitigation

7.7.1.1 Surface Water Drainage

Surface water runoff from the proposed development will be managed in accordance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS), with surface water attenuation and retention included as part of the main surface water drainage system.

The surface water management proposals would reduce the overall impact of the subject site on the existing environment by adopting a SuDS approach by combining elements such as green roofs, blue roofs, bio-retention areas, pervious paving, attenuation storage and flow control within the proposed development.

7.7.1.2 Wastewater Drainage

The proposed wastewater drainage system is designed in accordance with I.S. EN12056: 2000 *‘Gravity Drainage Systems inside Buildings’*, I.S. EN752: 2017 *“Drain & Sewer Systems outside Buildings*” and Irish Water’s *‘Code of Practice for Wastewater Infrastructure’* (IW-CDS-5030-03 Revision 1). The proposed drainage system will therefore be designed with appropriate capacity for the development and ensure self-cleansing velocities are achieved to reduce the risk of blockages and odours.

7.7.1.3 Water Supply

The proposed watermain infrastructure is designed in accordance with Irish Water's *'Code of Practice for Water Infrastructure'* (IW-CDS-5020-03 Revision 1). The proposed system will therefore provide appropriate capacity for the development to minimise the risk of low service pressure.

7.7.1.4 Electricity Supply

All proposed power cables within the development will be underground or internal within buildings and will be installed according to ESB Networks specifications.

7.7.1.5 Gas Supply

Natural gas works will be designed and constructed in accordance with I.S. 820, I.S. 329, I.S. 265 and Bord Gais Networks "Industrial Commercial Guidelines for Designers/Builders".

7.7.1.6 Telecommunications

All proposed telecommunications cabling within the development will be underground or internal within buildings.

7.7.2 Construction Phase Mitigation

7.7.2.1 Surface Water Drainage

The Contractor will be required to prepare and implement a Surface Water Management Plan that ensures avoidance and minimisation of effects. Surface water storage in excavations may be directed to on-site settlement ponds, where silt removal will be facilitated prior to discharge off site at a controlled rate. Periodic testing of the surface water discharge may also be undertaken.

If concrete mixing is carried out on site, the mixing plant will be sited in a designated area with an impervious surface.

To minimise any impact on the water environment from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas or chemical storage containers.

7.7.2.2 Wastewater Drainage

Any construction phase discharge to the wastewater sewerage infrastructure shall comply with the conditions of a Discharge Licence from Irish Water. In order to reduce the risk of defective or leaking sewers, all new sewers will be pressure tested and CCTV surveyed to ascertain any possible defects. Such defects, if they arise, would be repaired prior to the connection of any future development to the sewers.

7.7.2.3 Water Supply

The watermains will be tested according to the requirements of Irish Water prior to commissioning.

7.7.2.4 Electricity Supply

The ESB will install all of the new incoming supplies to the proposed development. All electrical work will be carried out by authorised personnel who have the required expertise. ESB will also liaise with residents and keep customers fully informed of any brief outages which may be required. Any construction phase site lighting or security installed by the contractor will be looking inwards to the compound and will not impact on neighbouring properties.

7.7.2.5 Gas Supply

Gas Networks Ireland will carry out all works on the gas supply network in a controlled manner to avoid loss of service to existing customers. All work in the vicinity of gas transmission network will be completed in compliance with the Bord Gais Networks document 'Code of Practice 2011 – Working in the Vicinity of the Transmission Network'.

7.7.2.6 Telecommunications

The relevant utility provider will install all of the new incoming supplies to the new development. All of the work will be carried out by authorised personnel who have expertise in the required works. This will minimise disruption to surrounding areas.

7.7.3 Operational Phase Mitigation

7.7.3.1 Surface Water Drainage

Surface water runoff from the proposed development will be managed in accordance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS), with surface water attenuation and retention included as part of the main surface water drainage system.

The surface water management proposals will reduce the overall adverse effects of the subject site on the existing environment by adopting a SuDS approach by combining elements such as green roofs, blue roofs, bio-retention areas, pervious paving, attenuation storage and flow control.

The proposed drainage system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

7.7.3.2 Wastewater Drainage

The proposed wastewater drainage system is designed in accordance with I.S. EN12056: 2000 *'Gravity Drainage Systems inside Buildings'*, I.S. EN752: 2017 *"Drain & Sewer Systems outside Buildings*" and Irish Water's *'Code of Practice for Wastewater Infrastructure'* (IW-CDS-5030-03 Revision 1). The proposed drainage system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

7.7.3.3 Water Supply

The proposed watermain infrastructure is designed in accordance with Irish Water's *'Code of Practice for Water Infrastructure'* (IW-CDS-5020-03 Revision 1). The proposed water supply system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

7.7.3.4 Electricity Supply

All proposed power cables within the development will be underground or internal within buildings. The proposed electricity supply system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

7.7.3.5 Gas Supply

All natural gas works will be designed and constructed in accordance with I.S. 820, I.S. 329, I.S. 265 and Bord Gais Networks "Industrial Commercial Guidelines for Designers/Builders". The proposed gas supply system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

7.7.3.6 Telecommunications

All proposed telecommunications cabling within the development will be underground or internal within buildings. The proposed telecommunications system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

7.8 Monitoring

7.8.1 Surface Water Drainage

Upon installation of new surface water drains, pressure tests will be carried out to assess the potential for leaks to occur in the newly constructed drains. Following completion of the proposed drainage systems, a short-term flow and rainfall survey (involving in-pipe flow monitors and rain gauges on site) will be carried out to identify misconnections and allow for comparison with watermain meter readings to facilitate assessment and identification of any leakages.

7.8.2 Wastewater Drainage

Upon installation of new wastewater drains, pressure tests will be carried out to assess the potential for leaks to occur in the newly constructed drains. Following completion of the proposed drainage systems, a short-term flow and rainfall survey (involving in-pipe flow monitors and rain gauges on site) will be carried out to identify misconnections and allow for comparison with watermain meter readings to facilitate assessment and identification of any leakages.

7.8.3 Water Supply

Upon installation of new watermains, pressure tests will be carried out to assess the potential for leaks to occur in the newly constructed watermains. The proposed watermain system will incorporate water meters at all points of connection to the public watermain network; this will facilitate ongoing monitoring of demand and assessment for potential leakage.

7.8.4 Electricity Supply

ESB will test and commission all of their work and will monitor and maintain their ESB sub-stations and network cabling post installation. All supplies will be metered to allow the new loads on the network to be monitored in use.

7.8.5 Gas Supply

Natural gas pipework will be installed, and pressure tested in accordance with I.S. 820 and Gas Networks Ireland guidelines and a non-domestic certificate of conformance will be required from the contractor prior to gas being switched on. Gas detection systems will be provided where appropriate and will be linked to the Building Management System to shut off the gas supply in the event of a leak.

7.8.6 Telecommunications

The providers of incoming telecommunications supplies will test and commission all of their cabling/ work and will monitor and maintain their network cabling post installation.

7.9 Cumulative Impacts.

7.9.1 Surface Water Drainage

The site is located in an area with a long history of urban development. Much of the surrounding area was developed without application of modern techniques of Sustainable Drainage Systems (SuDS). Any redevelopment in the area complying with current best-practice methods will likely lead to an improvement in surface water runoff conditions, similar to the subject proposed development.

7.9.2 Surface Water Drainage

The site is located in an area with a long history of urban development. Much of the surrounding area was developed with the use of combined surface water-wastewater drainage systems, leading to increased flows in the receiving combined sewerage network during rainfall events and associated environmental spills from Combined Sewerage Overflows (CSOs). While any redevelopment in the area resulting in an intensification of land use or increased density of occupation would likely lead to an increase in wastewater contributing to the receiving combined sewerage network, the application of modern techniques of Sustainable Drainage Systems (SuDS), similar to the subject proposed development, would tend to reduce the frequency of environmental spills. In addition, to use of separated drainage systems within any new development sites would facilitate the eventual separation of surface water and wastewater in the receiving sewerage network, thereby improving the performance of the sewerage network and wastewater treatment works.

7.9.3 Water Supply

Any redevelopment in the area resulting in an intensification of land use or increased density of occupation would likely lead to an increase in water demand on the water supply network. While there is substantial existing water supply infrastructure in place, continued cumulative such development will tend to necessitate future provision of new water supply infrastructure with increased capacity.

7.9.4 Electricity Supply

Any redevelopment in the area resulting in an intensification of land use or increased density of occupation would likely lead to an increase in demand on the electricity supply network. While there is substantial existing electricity supply infrastructure in place, continued cumulative such development will tend to necessitate future provision of new electricity supply infrastructure with increased capacity.

7.9.5 Gas Supply

Any redevelopment in the area resulting in an intensification of land use or increased density of occupation would likely lead to an increase in demand on the gas supply network. While there is substantial existing gas supply infrastructure in place, continued cumulative such development will tend to necessitate future provision of new gas supply infrastructure with increased capacity.

7.9.6 Telecommunications

Any redevelopment in the area resulting in an intensification of land use or increased density of occupation would likely lead to an increase in demand on the telecommunications networks. While there is substantial existing telecommunications infrastructure in place, continued cumulative such development will tend to necessitate future provision of new telecommunications infrastructure with increased capacity.

7.10 Residual Impact Assessment

7.10.1 Surface Water Drainage

As the existing site is primarily in hardstand and the primary land use is surface car parking, the proposed development design provides inherent improvement in surface water runoff on the site due to the change in surface finishes and uses. Furthermore, the provision of a Sustainable Urban Drainage System (SUDS) for the proposed development will provide betterment of the existing scenario. Green roofs and bio-retention areas will facilitate a reduction in surface water runoff volumes discharged from the site. Collection of surface water runoff via green roofs, pervious paving and bio-retention areas provides improvement to water quality. Provision of attenuation storage and flow control will reduce surface water runoff rates discharged from the site.

As surface water runoff from the site is discharged to the receiving combined sewerage infrastructure which includes Combined Sewer Overflows (CSOs), the proposed development will result in a reduction in combined sewage discharges to the Liffey Estuary.

7.10.2 Wastewater Drainage

While the wastewater-only dry weather flow from the site will increase as a result of the proposed development, with a corresponding increase in BOD loading at the receiving wastewater treatment plant, during extreme rainfall events the loading on the existing wastewater infrastructure arising from the subject site will reduce as a result of the proposed development.

Irish Water has identified works required to increase the capacity at Mayor Street Pumping Station, which will facilitate the development. Ringsend Wastewater Treatment Works has been upgraded to accommodate development of zoned lands in the area.

The decrease in surface water discharge from the site will reduce the risk of flooding in the receiving sewerage network and will reduce the risk of CSO discharges to the Liffey Estuary.

7.10.3 Water Supply

It is considered that the residual effects on the trunk watermain network will be neutral, not significant and permanent.

7.10.4 Electricity Supply

The proposed development will increase the demand on the electricity supply system. However, it is expected that infrastructural requirements for future development will be accommodated by ESB Networks.

7.10.5 Gas Supply

The proposed development will increase the demand on the gas supply network. However, it is expected that infrastructural requirements for future development will be accommodated by Gas Networks Ireland.

7.10.6 Telecommunications

The proposed development will increase the demand on the telecommunications systems. However, it is expected that infrastructural requirements for future development will be accommodated by utility service providers.

7.11 Unplanned Events

The proposed infrastructure is designed in accordance with the relevant regulations, codes of practice and guidelines to provide sufficient capacity for the expected loading. However, in the design of the proposed development, the potential impact of these planned loads being exceeded was assessed. Where the designed capacity of piped drainage is exceeded, flow will travel over ground along roads; the street infrastructure has been designed to convey overland flow away from highly vulnerable receptors. In the event of unplanned interruptions to water supply, water will be available to future occupants of site from on-site water storage tanks. All proposed electricity, gas and telecommunications infrastructure will be placed below ground, where the risk of accidental damage is minimised.

7.12 References and Sources

- Greater Dublin Strategic Drainage Study (2005) – Fingal County Council, Dublin City Council, Dún Laoghaire-Rathdown County Council, South Dublin County Council, Wicklow County Council, Kildare County Council, Meath County Council
- The Greater Dublin Region Code of Practice for Drainage Works (2012) – Fingal County Council, Dublin City Council, Dún Laoghaire-Rathdown County Council, South Dublin County Council, Wicklow County Council, Kildare County Council, Meath County Council
- I.S. EN12056: 2000 Gravity Drainage Systems inside Buildings (2000) – National Standards Agency Ireland
- I.S. EN752: 2017 Drain & Sewer Systems outside Buildings (2017) – National Standards Agency Ireland
- Code of Practice for Water Infrastructure (2017) – Irish Water
- Code of Practice for Wastewater Infrastructure (2017) – Irish Water
- Wastewater Treatment Manuals (1999) – Environmental Protection Agency
- Pollution Prevention Guideline PPG3 Use and design of oil separators in surface water drainage systems (2006) – UK Environment Agency
- Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009) – National Roads Authority
- Control of Water Pollution from Construction Sites (2001) – Construction Industry Research and Information Association
- Environmental Handbook for Building and Civil Engineering Projects (2000) – Construction Industry Research and Information Association

CHAPTER 8
LAND & SOILS

OCTOBER 2019

Table of Contents

Table of Figures

Table of Tables

8 Land & Soils

8.1 Introduction

The following topics will be assessed in this chapter of the EIAR:

- Subsoil and Bedrock

- Hydrogeology

This Chapter was completed by O'Connor Sutton Cronin and Associates Limited and assesses the likely and significant impacts associated with the proposed mixed-use development on the geological and hydrogeological environment.

This chapter provides; a description of the project (in connection with soils, geology and hydrogeology); the baseline soils, geology and hydrogeology environments for the project site; and a statement of the likely significant impacts associated with both the construction and operation phases of the development. A 'do nothing' scenario has also been considered. Mitigation measures are proposed in the form of avoidance, prevention, reduction, offsetting, and reinstatement or remedial measures and recommendations for monitoring are included where appropriate predicted residual effects are described.

Assessments for the site are detailed in this Chapter with relevant technical information included in:

- Appendix 8.1 OCSC Generic Quantitative Risk Assessment (GQRA) Report;

8.1.1 Statement of Authority

The author is an Environmental Engineer; has obtained a Bachelor of Engineering (Civil) and Master in Engineering (Environmental) degrees, with specialisation in geo-environmental engineering; and has five years' experience in ground/contaminated land investigations in Ireland. The author has been involved in numerous brownfield redevelopment projects in the Dublin Docklands.

8.2 Assessment Methodology

The Assessment has been carried out generally in accordance with the following guidelines:

- Guidelines on the Information to be contained in Environmental Impact Assessment Reports DRAFT (EPA, August 2017);
- Advice Notes for preparing Environmental Impact Statements DRAFT (EPA, September 2015);
- Guidelines on Information to be contained in Environmental Impact Statements (EPA, 2002);
- Advice Notes on Current Practice in the preparation of Environmental Impact Statements (EPA, 2003);
- Guidelines for the preparation of Soils Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013);
- Geology in Environmental Impact Statements, A Guide (IGI, 2002);
- Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA 2009);
- Control of Water Pollution from Construction Sites (CIRIA, 2001); and
- Environmental Handbook for Building and Civil Engineering Projects (CIRIA, 2000).

The assessment followed a phased approach as outlined in Chapter 4.4 of the Advice Note (EPA, 2015) and the IGI Guidelines (IGI 2013). A Conceptual Site Model (CSM) was developed in order to identify any likely Source-Pathway-Receptor linkages relating to the site and the proposed development. The phases of assessment are outlined below.

8.2.1 Phase 1: Initial Assessment

An initial assessment was carried out which; defined the project in terms of location, type and scale; established the baseline conditions; established the type of soil/ geological environment; established the activities associated with the project and; initial assessment and impact determination.

These objectives were achieved by way of a geological desk study and baseline data collection. A full list of sources for the desk study together with relevant legislation are included in the Section 8.7 and are briefly listed below:

- Ordnance Survey of Ireland maps;
- Geological Survey of Ireland Groundwater and Geotechnical mapviewer;
- Environmental Protection Agency Envision Maps; and
- National Monuments Service maps.

Additional information has been compiled through consultation and feedback from the project/EIS Team.

The information obtained from the above listed sources were utilised to establish the baseline conditions for the site and all available information was compiled into a preliminary Conceptual Site Model (CSM). The CSM is based on the accepted Source-Pathway-Receptor model for assessing environmental impacts. The CSM went through iterative reviews and was updated with site specific data obtained through site investigations and studies.

8.2.2 Phase 2: Direct and Indirect Site Investigations and Studies

Under the supervision of Buro Happold, Glover Site Investigations Ltd., undertook a preliminary site investigation between July to September 2008. An interpretative report based on the site investigation and sampling exercise is documented in the Buro Happold report contained in **Appendix A of The GQRA report in Appendix 8.1 of this report**. The intrusive investigation completed included the following:

1. Drilling of 12No. windowless sample boreholes;
2. Drilling of 7No. cable percussion boreholes;
3. Drilling of 3No. rotary core boreholes which are follow on from the 7No. cable percussion boreholes;
4. Logging and sampling of borehole arisings;
5. Analysis of a selection of samples for geotechnical and chemical properties;
6. Installation of 14No. groundwater and/or ground gas monitoring wells;
7. Measurement of groundwater levels and ground gas;
8. Assessment of the soil chemistry results.

The soil analysis laboratory certificates and site investigation logs were not made available to OCSC at the time of writing this report (August 2019).

8.2.3 Phase 2: Refinement of the Conceptual Site Model

Throughout the desk based study the CSM was continually updated, tested and refined. The outcome is presented in this Chapter, associated figures and technical reports.

8.2.4 Phase 2: Detailed Assessment and Impact Determination

A Detailed Assessment and Impact Determination was carried out which incorporates the full range of site investigations and studies, the refined CSM and a full assessment of any potential impacts.

The approach adopted is as per the IGI Guidelines (IGI, 2013) and each potential effect of the Connolly Square Development has been described in terms of Quality, Significance, Extent, Probability and Duration. The classification of impacts/effects in this chapter follows the definitions provided in the Draft Guidelines (EPA, 2017).

Additional guidance and EIA definitions are contained in NRA Guidelines (NRA, 2009). These guidelines provide useful matrices outlining how additional assessment criteria based on the Importance of a feature to be protected and the magnitude of the potential impact. This approach has been adopted where appropriate.

Where the Initial Impact Determination concluded that the level of potential impact is capable of measurable and noticeable consequences it is carried into the next assessment phase.

8.2.5 Phase 3: Mitigation, Residual and Final Impact Assessment

Phase 3 builds on the outcome of the initial assessment and detailed site assessments, by identifying mitigation measures to address the identified impacts. Mitigation measures which are known to be effective have been built into the project design have also been considered in this process.

The development, including all identified mitigation measures (assumed implemented), is then subject to impact assessment, to identify any residual impacts.

The Final Impact Assessment presented in this Chapter incorporates the outputs from the Detailed Assessment and Impact Determination, Mitigation Measures and Residual Impact Assessment.

8.2.6 Phase 4: Completion of the EIAR Section

The final phase of work was the completion of this EIAR Section with associated Figures and Appendices. The format follows the EPA Guidance Note and Design Team Template.

8.2.7 Assumptions and Limitations

The description of existing conditions is based on the available desk study and information supplied by the design team as outlined in Section 8.2.

Geological conditions have been inferred from the Buro Happold interpretative report as the Glover Site Investigation report including logs, in addition to soil and groundwater laboratory certificates were not available for review. A supplementary geotechnical/environmental ground investigation programme is proposed to commence in October/November 2019, the main objectives are to establish the depth to rock head and also to obtain soil samples for chemical analysis. The chemical analysis results will inform suitable disposal facilities for the soils to be dug as part of the basement construction. However, the findings from the planned supplementary investigation will not alter or supersedes the findings and conclusions of this chapter.

8.3 Proposed Development

The description of the proposed development and the consideration of alternatives is detailed in **Chapter 2**. The study area for this assessment chapter includes the site and a 2km radius from the site.

The development site is located on Sheriff Street Lower with a total area of 2.88 hectares. The site is currently used as a car park, the Ordnance Survey maps show that the site was formerly used as a Goods shed around the year 1888. The proposed development will integrate the 1No. Protected structure (RPS No.130) (11No. arches and an old office building and the wall along Oriel Street Lower) within the new development and facilitates the comprehensive regeneration of the subject lands to provide for a high quality mixed-use residential, commercial and public open space development.

At the time of writing this report, OCSC understand that Oxley Holdings Ltd. intend to apply to An Bord Pleanála for permission for a Strategic Housing Development at this site (c. 2.88 hectares) to the rear of Connolly Station, Sheriff Street Lower, Dublin 1, Eircode D01 V6V6.

The development will consist of;

- the demolition of 4 no. structures with a combined gross floor area of 3,028sq.m;
- the construction of 741 no. Build to Rent (BTR) residential units in 8 no. apartment blocks ranging in height from 4 storeys to 23 storeys with lower height buildings located adjacent to the northeast and east site boundaries, with a cumulative gross floor area of 68,535sq.m comprising;
- Block B1 (maximum building height 54.917m, total gross internal floor area 11,260sq.m, Apartment Mix: Studio: 25, 1-bed: 37, 2-bed: 51);
- Block B2 (maximum building height 54.917m, total gross internal floor area 10,831sq.m, Apartment Mix: Studio: 20, 1-bed: 35, 2-bed: 51);
- Block B3 (maximum building height 51.767m, total gross internal floor area 9,766sq.m, Apartment Mix: Studio: 22, 1-bed: 60, 2-bed: 27, 3-Bed: 1);
- Block C1 (maximum building height 79,450m, total gross internal floor area 12,705sq.m, Apartment Mix: Studio: 84, 1-bed: 40, 2-bed: 41);
- Block C2 (maximum building height 39,615 m, total gross internal floor area 4,890 sq.m, Apartment Mix: Studio: 9, 1-bed: 33, 2-bed: 3, 3-Bed: 4);
- Block C3 (maximum building height 39,650 m, total gross internal floor area 6,775sq.m, Apartment Mix: Studio: 40, 1-bed: 18, 2-bed: 23);
- Block D1 (maximum building height 53,392 m, total gross internal floor area 8,418 sq.m, Apartment Mix: Studio: 10, 1-bed: 25, 2-bed: 44, 3-Bed: 1);
- Block D2 (maximum building height 30,950 m, total gross internal floor area 3,890 sq.m, Apartment Mix: Studio: 18, 1-bed: 8, 2-bed: 11);
- residential support amenities including 1 no. gyms, a resident's lounge, work areas, meeting rooms, dining rooms, recreational areas with a combined GFA of 1,444 sq.m;
- change of use from club house to pedestrian passageway of the existing vault (137sq.m GFA) fronting Seville Place, a Protected Structure (RPS No. 130);
- a basement of 7,253.4 sq.m with vehicular access from Oriel Street Upper incorporating residents' car parking (58 no. spaces), residents cycle parking (640 no. spaces) 7 no. plant rooms (combined 2,228sq.m), waste management facilities (393

sq.m)

- 766 no. covered cycle parking spaces for residents and visitors, concierge office (233 sq.m) and waste management facilities (126 sq.m);
- ‘other uses’ including 10 no. units providing retail, commercial, and community use with a combined GFA of 3,142 sq.m;
- A total of 18,562 sq.m of hard and soft landscaping comprising both public, communal and private open space located throughout the development;
- A service and emergency vehicle only access ramp from the Oriel Street Upper site entrance to serve CIE’s transport needs at Connolly Station;
- Enabling works of a non-material nature to safeguard the existing vaults (Protected Structures - RPS No. 130) that form part of the subject site fronting Sheriff Street Lower, Oriel Street Upper, and Seville Place during the construction phase;
- All associated ancillary development works including drainage, 6 no. electricity substations, pedestrian access; and
- Works to the Masonry wall fronting Oriel Street and the Vaults fronting Seville Place (both a Protected Structure) consisting of the creation of a new vehicular and pedestrian entrance.

The site is currently higher than the surrounding Sheriff Street Lower and Oriel Street Upper by about 7m. It is proposed that the ground floor of the proposed development will be at approximately the same level as the street level at 1.850mOD and the finished floor level of the basement will be at -2.585mOD. The basement will occupy approximately the whole site footprint except the areas where protected structures are present. The basement and the buildings will be formed and supported using a secant piled wall and piles of 900mm diameter. The secant piled wall and structural piles will extend to the top of rock which underlie the site at depth. It is also planned that Irish Rail will divert the 2No. railway tracks currently within the site boundary and move them further north prior to the commencement of site redevelopment. The overall detailed development layout plan is still under discussion/study by the design team.

Overall, the proposed development proposes to have a negligible to minor impact on the land, soils and hydrogeology beneath and surrounding the site area. The impact of basement construction within granular soils is discussed in section 8.3.14. Excavation and disposal offsite at appropriate facilities of a large volume of contaminated made ground will be used as part of the design measures which will result in a slight improvement in the local soils environment since it will remove a large volume of potentially contaminated material.

Based on the groundwater chemistry results, on-site pre-treatment of groundwater prior to discharge to sewer might be required, this will be confirmed by the appointed dewatering contractor, any water discharged to the public sewer will be monitored frequently to ensure it meet the limits stipulated by the discharge licence. Settlement of nearby buildings and other negative impacts on nearby waterbodies can occur as a result of groundwater dewatering, this will be mitigated by the installation of a permanent secant piled wall prior to the start of the groundwater lowering programme. The proposed secant Continuous Flight Auger (CFA) piled wall will be founded on top of bedrock. The secant piled wall will ‘isolate’ the excavation from the nearby buildings.

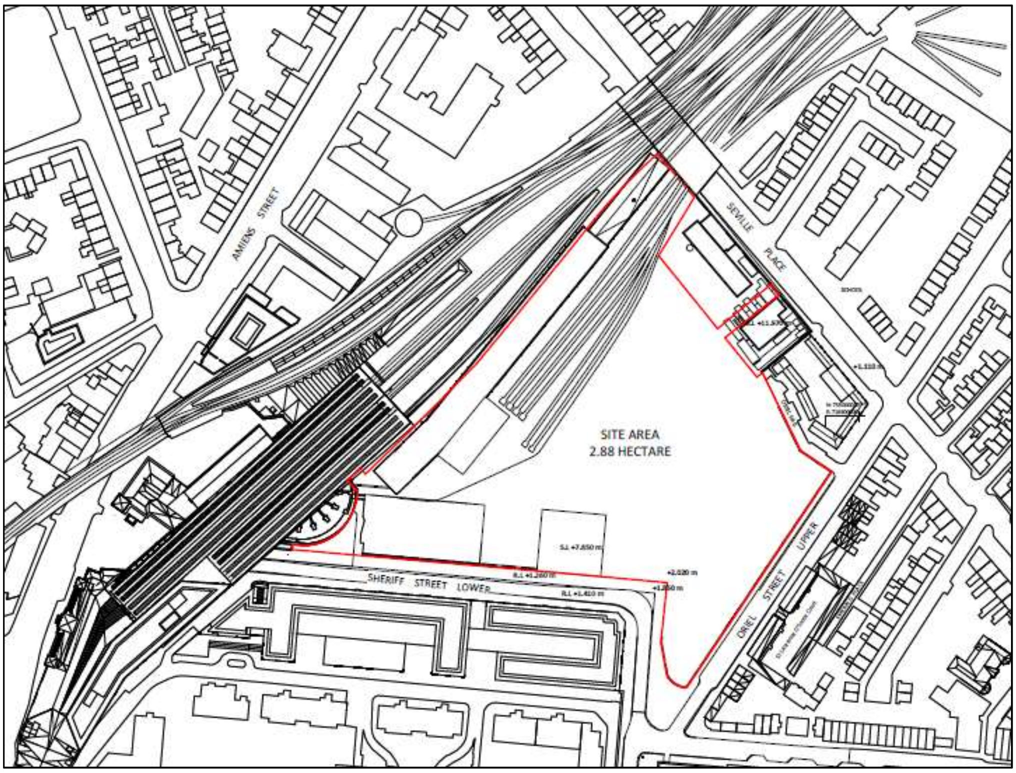


FIGURE 8.1 SITE LOCATION

The activities associated with the project which have the potential for impact are detailed in **Table 8.1**.

Phase	Activity	Description
Construction	Discharge to Ground	Run-off percolating to ground at the construction site.
	Earthworks: Excavation of Superficial Deposits	Removal of circa 70,000m^3 of soil for basement excavation (of which 44,100m^3 is Made Ground), this volume is an estimate and will be confirmed by the design team as the project progresses. It also does not include the waste which will arise from the piling activity for the secant piled wall around the basement nor for structural piles and localised excavation for lift pits and development associated services such as attenuation tank, etc. It also does not include the waste soil which will arise from reducing the overall site levels to the nearby street level.
	Storage of hazardous Material	Fuel for re-fuelling on-site machines and chemical storage (such as for concrete curing) during the construction phase.
	Import/Export of Materials	All suitable surplus subsoil, if any exists, will be exported for reuse off site where a suitable reuse site can be identified. Soil reuse will be subject to the requirements under the Waste Management Act (e.g. Article 27 or 28). Where material cannot be reused it will be recovered or disposed of in accordance with the Waste Hierarchy and Waste Management Act.

Phase	Activity	Description
		Aggregates will be required for sub-base under roads and buildings. All sub-base materials must meet the relevant engineering specification. The use of recycled or secondary aggregates should be considered as a replacement for primary aggregates.
Construction and operation	Construction of sub-surface structures	Construction of the car and bicycle parking basement within the granular Gravel deposits to a depth of approximately -3.0mOD. As this will be founded entirely within the Gravel layer overall the secant pile wall and the basement will provide some impediment to groundwater flow which is within the Gravel layer within the glacial till.
	Infilling	A degree of fill will be required during the works which will include the importation of concrete and stone. Construction materials which contain recycled/recovered content should be considered as part of the procurement stage.
Operation /unplanned events	Drainage Works	Altering of groundwater/surface water regime by drainage, increasing hard standing area and basement construction
	Storage of hazardous Material	No fuel oil storage required for operational phase. All heating will be provided by natural gas systems.

TABLE 8-1SITE ACTIVITIES SUMMARY

As outlined in **Table 8.1** the Construction Phase holds the highest number of activities which could potentially impact on the geological and hydrogeological environment. These activities primarily pertain to the excavation and infilling activities required to construct the basement car park. The operational phase of the project has very few if no activities which would constitute a risk to the soil, geological and/or hydrogeological environment.

8.3.1 Project Phases / Lifecycle

The mixed-use application will be submitted to An Bord Pleanála for determination around September 2019, as a Strategic Housing Development (SHD). The site's current usage as a car park will continue throughout this period.

8.4 Baseline Scenario

The receiving environment is discussed in terms of; geomorphology; superficial and solid geology; contamination; and hydrogeology. This Section and the accompanying Figures can be considered as the geo-environmental CSM for the project site.

8.4.1 Sourcing Baseline Information

The site is in the city centre of Dublin which has been well studied with regards to geology, including the properties and characteristics of the soil, subsoil and bedrock, and there are a number of case histories available for subsurface development/structures in the general area (Looby & Long, 2007; Long et al, 2012). See **Figure 8.2** for geo-environmental site investigation locations within the Dublin area region.

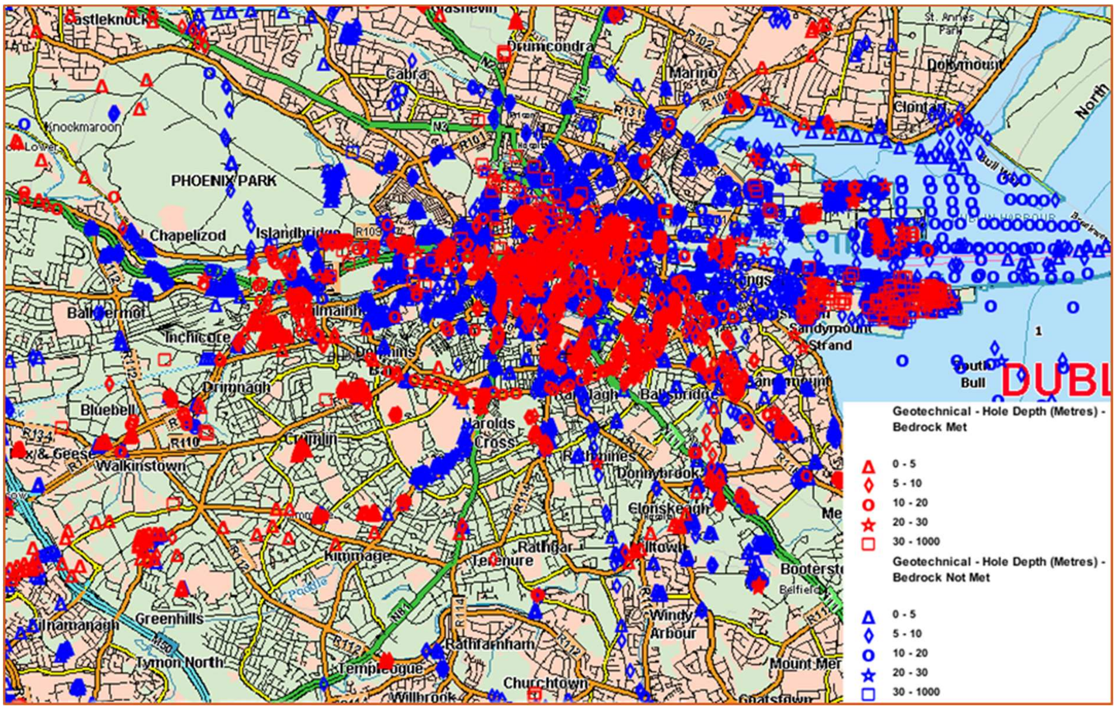


FIGURE 8.2 SITE INVESTIGATION LOCATIONS, DUBLIN (SOURCE: GSI DATABASE)

Additional sources of information were databases held by the Geological Survey of Ireland (GSI), Environmental Protection Agency (EPA), Ordnance Survey of Ireland (OSI) and National Parks and Wildlife Service (NPWS).

A full list of references is included in Section 8.9.

8.4.2 Topography & Setting

The regional topography of the area is generally flat, and urban. The site generally slopes north-south from an average of 8mOD at the Seville Place boundary to 6mOD at the centre of the site, before rising again to 8mOD in the southern portion of the site bordering Sheriff Street Lower. The site also slopes west-east from 8mOD bordering Connolly Station to 2.5mOD at the Oriel Street Upper boundary.

It is also important to note that the southern boundary with Sheriff Street Lower drops suddenly from 8mOD to 1mOD at the road surface below. In the north-eastern portion of the site, the elevation of the car park drops significantly at the boundary with Oriel Hall from 6.5mOD to 1mOD at the road surface. Similarly, at the northern boundary with Seville Place, the elevation at boundary wall drops from 8mOD to 1mOD at the road surface below.

According to DCC's Development Plan 2016-2022, the site is located in the Local Authority Zone of M2 - City/Town/village Centre, central area site. The Local Authority Zone description for the site is 'To consolidate and facilitate the development of the central area, and to identify, reinforce, strengthen and protect the civic design, character, and dignity of the site and its surrounds'.

The regional site location is illustrated in **Figure 8.3**.

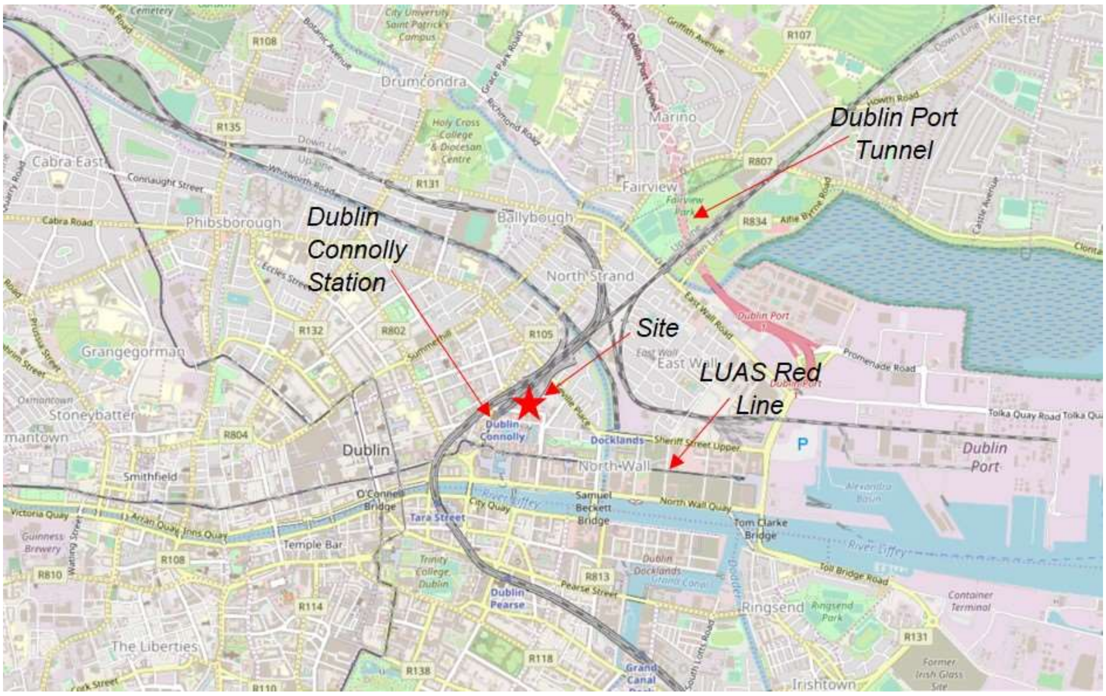


FIGURE 8.3 REGIONAL SITE LOCATION (SOURCE: OPENSTREET MAPS)

As shown in Figure 8.1, the site's surrounding area is urban in nature. The site is bordered by Seville Place and Oriel Hall to the north; Sheriff Street Lower to the south; Oriel Street Upper to the east; and Connolly Station (Protected Structure) to the west. Refer to **Figure 8.1** for an aerial photograph of the site. The adjacent land uses are listed in **Table 8.2** below.

Boundary	Land use
North	Residential properties and the Royal Canal.
South	Custom House Harbour apartments building, and the Harbourmaster place mixed used development further South.
East	Residential properties, St. Laurence O'Toole's Catholic Church and the Royal Canal further East.
West	Connolly Station railway lines, platforms and building, residential buildings and a Top Service station, Failte Ireland HQ along Amiens Street.

TABLE 8-2 ADJACENT LAND USES

8.4.3 Areas of Geological Interest & Historic Land-Use

The Geological Survey of Ireland (GSI) online mapping service was consulted regarding areas of geological interest in the area of the site. The nearest area of geological heritage is the 'General Post Office (GPO)' on O'Connell Street which is located approximately 1.1km west of the site. The reason for the listing of the GPO as a geological feature is listed as 'The sole use of three classic Irish marble types is a good example of building stone use'. The assessment of impacts on the cultural heritage of the GPO from the proposed development is detailed in built heritage, chapter 14. Given the distance to the building and its nature it is considered to be outside of the zone of influence of the proposed development in relation to land and soils as no physical works for the proposed development will occur near to the GPO.

Ordnance Survey of Ireland (OSI) Aerial images of the site from 1995 and 2000 show the site layout as it is today. Currently, the site consists of a CIE car park, CIE Group buildings, Rolling stock maintenance shed, and part of existing railway lines / sidings.

The 6" historical map (1837-1842) shows the site to be occupied by agricultural lands/pastures. Development of the area surrounding the site continued throughout the 1800s and then around 1847 the Drogheda Railway Terminus was built (known today as 'Connolly Station'). Railway lines, goods sheds, warehouses and an oil tank are shown in **Figure 8.4** to be occupying the site on the 25'' OSI maps 1888-1913. Around the early 1980's the site was developed as a car park for the Connolly station. The area surrounding the site is known for its industrial heritage such as vinegar works, coal yards, tobacco factories, railway depots, chemical works, timber yards, cattle yards and goods sheds'.

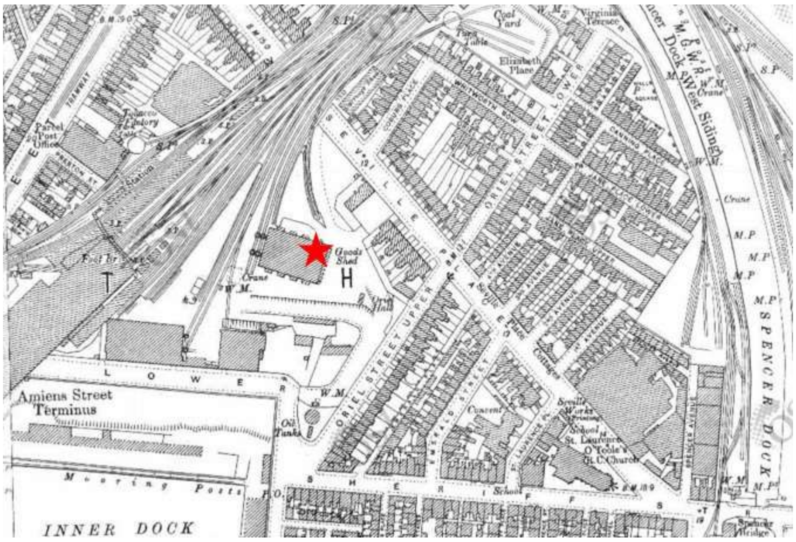


FIGURE 8.4 APPROXIMATE LOCATION OF THE PROPOSED DEVELOPMENT ON 1888-1913 25 INCH OS MAP (SOURCE: ORDNANCE SURVEY IRELAND)

8.4.4 Regional Soils

Made ground, concrete and tarmac covers the majority of the Dublin area as a result of development through the years. The majority of central Dublin has had some anthropogenic influence with made ground covering almost all of the central city and stretching out to the suburbs.

According to the Teagasc Soil Information System, the topsoil and subsoil beneath the site has been classified into one main category, made ground. This is expected given the urban nature of the site. The topsoil of the surrounding area is also made ground. Refer to **Figure 8.5** from the GSI online mapping for further information.

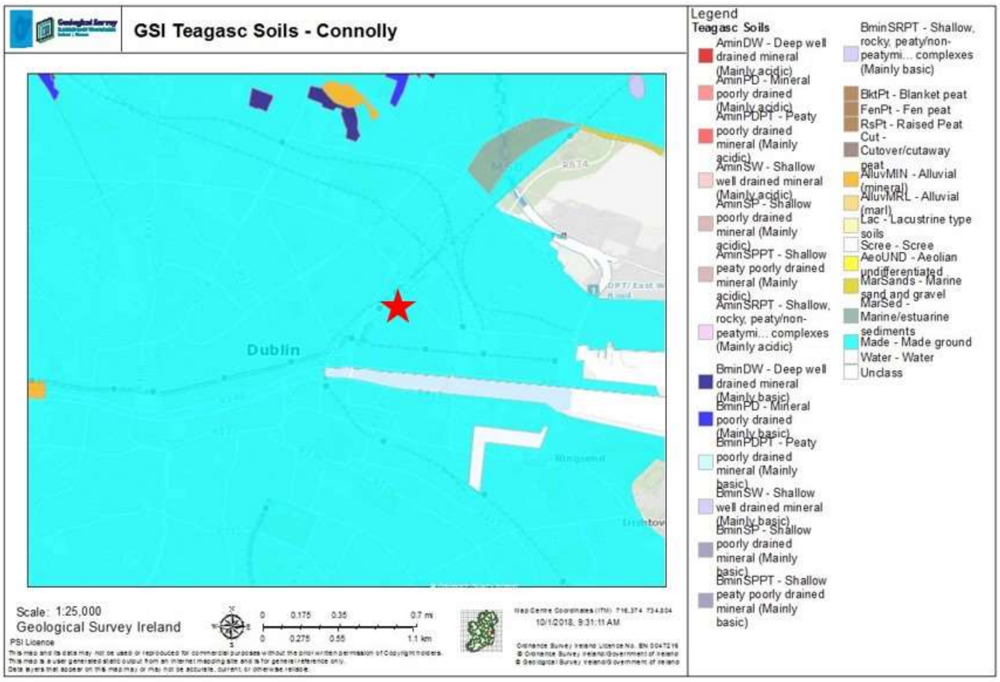


FIGURE 8.5 TEAGASC TOPSOILS

The subsoil has been classified as Limestone Till (Carboniferous). This is the dominant subsoil type in the region and is a glacial deposit which is known as Dublin Boulder Clay. This till resulted from glaciations which covered the region during the Pleistocene and Quaternary periods. It is known that the ice thickness in Dublin was c. 1km. The grinding action of this ice sheet as it eroded the underlying limestone and shale, together with the loading effect, resulted in the formation of a very dense low-permeability deposit with pockets of coarse gravel (Long et al, 2012). The lenses are generally less than 2m wide and less than 0.5m thick. They are generally self-draining within 24hrs and have poor interconnectivity.

Local withdrawal and recedence of the ice sheet led to the formation of fluvioglacial sediments (gravel and sand lenses) and glaciomarine sediments (stiff/firm laminated clays, silts and sands). The glacial deposits can exhibit significant lateral and vertical variations in grain size distribution over short distances.

Dublin Boulder Clay has been extensively studied and there are many publications describing its properties. Additionally, there are numerous examples of deep excavations (up to 25m) and constructions within Dublin Boulder Clay (e.g. Dublin Port Tunnel, Trinity College Library and Leinster House). Data and case history from these sites have shown that the walls in Dublin Boulder Clay are very rigid due to the inherent natural strength and stiffness of the material and the slow dissipation of excavation-induced depressed pore pressure or suctions (Long et al, 2012).

The recent construction of the Dublin Port Tunnel has allowed extensive study of Dublin Boulder Clay and four distinct formations within the clay have been identified namely; the upper brown boulder clay (UBrBC), the upper black boulder clay (UBkBC), the lower brown boulder clay (LBrBC) and the lower black boulder clay (LBkBC) (Skipper at al. 2005). The 2No. upper units are the most commonly encountered in excavations and hence are the most important from the point of view of retaining structures and basements.

Boulder clays generally exhibit very low permeability in the order of $1x10^{-7}$ to $1x10^{-9}$ m/s or lower. The glacial boulder clay will tend to act as an aquitard between the other more permeable formations namely the overlying made ground and the sands and gravels.

8.4.5 Regional Geology

The bedrock of the greater Dublin region consists of Dinantian Upper Impure Limestone which is part of the Lucan Formation. The limestone is colloquially known as Calp and is estimated to be up to 800m thick. The homogeneous sequence has been described as dark grey to black limestone and shale. The homogeneous sequence consists of dark grey massive limestones, shaley limestones and massive mudstones. The average bed thickness is less than 1m, but these normally thin-bedded lithologies can reach thicknesses of 2m or more. The local bedrock geology mapped by the GSI is illustrated on **Figure 8.6**.

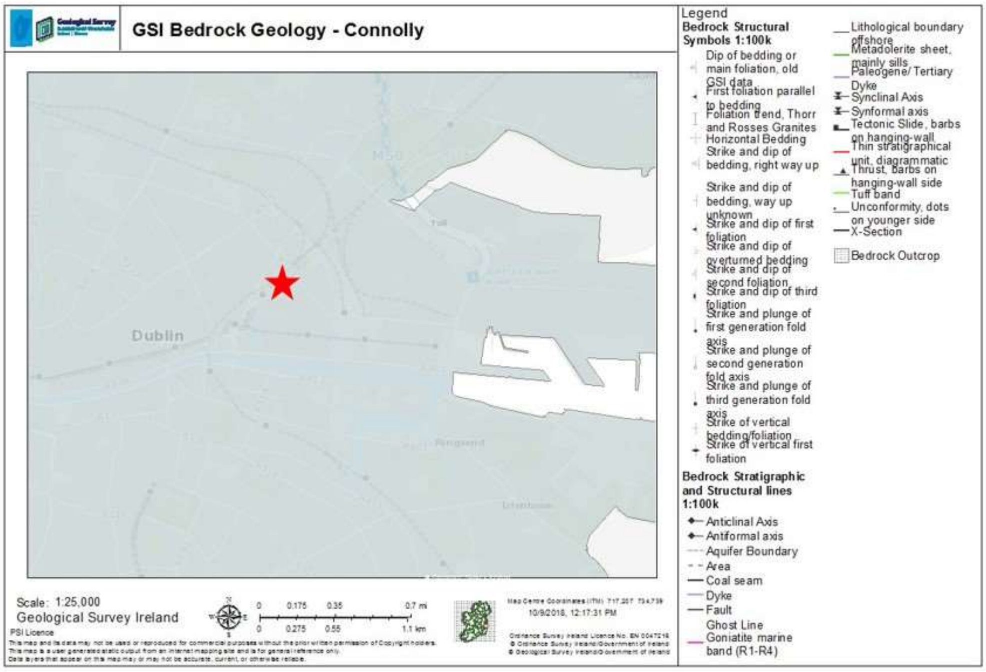


FIGURE 8.6 LOCAL BEDROCK GEOLOGY

The Calp is almost completely obscured across central Dublin under the Dublin Boulder Clay. A number of outcrops are recorded across Dublin. There are no major faults mapped in the vicinity of the site.

8.4.6 Regional Hydrogeology

The primary Groundwater Body (GWB) in the region is the Dublin Urban GWB, which is the Calp Limestone bedrock aquifer. The Dublin Urban GWB covers some 470km^2 and includes most of Dublin City to the eastern seaboard and extends west to include parts of Kildare and Meath. In addition to the Carboniferous limestones and shales, there are also some sandstones present. The bedrock aquifer is a fracture system i.e. it is dominated by secondary (fracture or fissure) flow with very little to no flow within the matrix i.e. the bedrock is largely impermeable. The limestone aquifer has low storage capacity in the order of 1 – 2%.

The Dublin Urban GWB comprises:

- LI: Locally important aquifer, moderately productive only in local zones, and;
- PI: Poor aquifer, generally unproductive except for local zones.

The Lucan Formation, located in the vicinity of the Connolly station site, is classified by the GSI as a Locally Important (LI) aquifer which is moderately productive in local zones only. In general, permeability in the Lucan Formation is low (1-10m^2/day). Fracture flow dominates and there is a distinct reduction in permeability with depth. Packer tests show permeabilities reduce an order of magnitude for each five metres of depth in the limestone (Aspinwall & Company, 1979). The majority of flow is in the upper weathered bedrock and is common within fractures and fissures at depths of up to 50m below ground level (mBGL). Regional groundwater flow is towards Dublin Bay and the Irish Sea to the east. The overlying Dublin Boulder Clay is not considered as an aquifer due to its low permeability properties. The Boulder Clay transmits very little water and also acts as a barrier to the recharge of the limestone bedrock aquifer.

8.4.7 Groundwater Vulnerability

The groundwater vulnerability beneath the proposed site is ***Low***, which indicates there is a thick layer of low permeability overburden (DoELG et al., 1999); (see **Figure 8.7** (GSI, 2018)). Vulnerability ratings are related to a function of overburden thickness and permeability which might offer a degree of protection and/or attenuation to the underlying aquifer from surface activities and pollution. There were no karst features identified adjacent to the site.

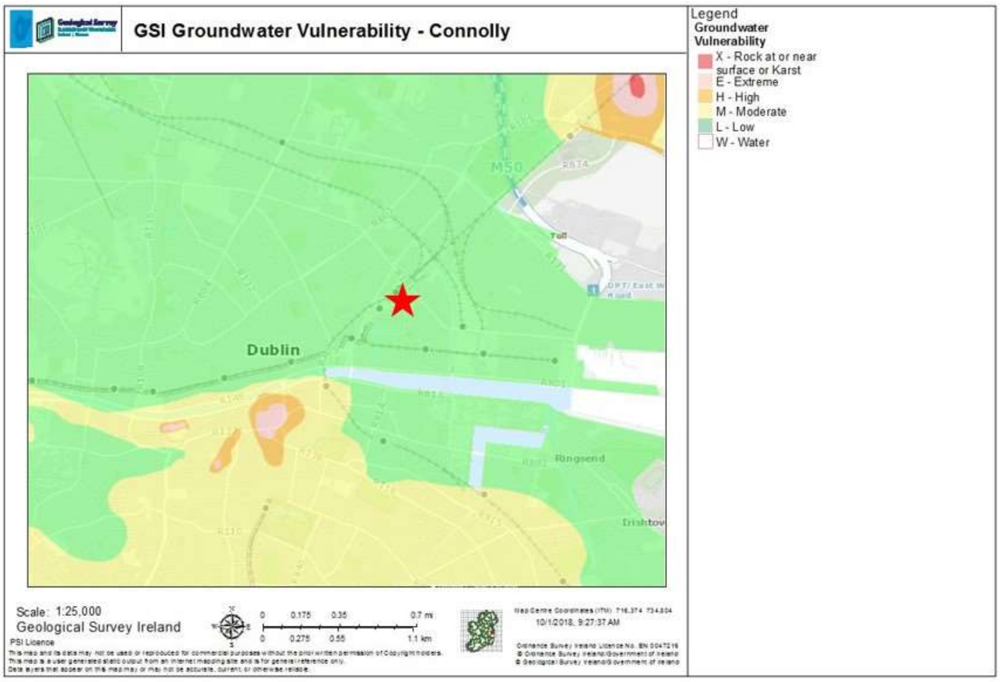


FIGURE 8.7 AQUIFER VULNERABILITY

8.4.8 Groundwater Status

An assessment carried out under the Water Framework Directive has concluded that the groundwater within the Dublin Urban GWB is presently of "Good status". The objective is to protect the "Good status" by recognizing that the quality of the groundwater in the Dublin Urban GWB is at risk due to point and diffuse sources of pollution which are normally found in an urban environment such as contaminated land and leaking sewer networks.

8.4.9 Groundwater Recharge

The Dublin urban area is generally made up of a cement and tarmacadamed impermeable cap which limits recharge to the bedrock. The only open areas where recharge may occur are at parks and gardens. It is conservatively estimated that 10% of the city is available for recharge. A significant amount of recharge occurs from leaking sewers, mains and storm drains due to the fact that non-revenue water is estimated to be around 40% in Dublin. Elsewhere diffuse recharge will occur via rainfall percolating through the subsoil. The proportion of the effective rainfall that recharges the aquifer is largely determined by the thickness and permeability of the soil and subsoil, and by the slope. Due to the generally low permeability of the aquifers within the Dublin Urban GWB, a high proportion of the recharge will run off and discharge rapidly to surface watercourses via the upper layers of the aquifer, effectively reducing further the available groundwater recharge to the aquifer.

Based on the GSI website the effective rainfall in the vicinity of the Connolly Station site is 302mm/year. Recharge to the aquifer can only occur where rainfall can percolate through any subsoil to the aquifer. However, given the thickness of low permeability boulder clay, any water which percolates through the subsoil is likely to be perched on the significant thickness of Dublin Boulder Clay and consequently it is likely that recharge to the Lucan Formation is minimal to insignificant in the area surrounding the site. The GSI have designated that the recharge coefficient in the immediate area of the site as 20% and this would account for the lenses of sand and gravels observed. Based on the GSI's Recharge Model the total recharge would be equivalent to approximately 60mm/year. In geology, a lens is a body of soil or rock that is thick in the middle and thin at the edges, resembling a convex lens in cross-section.

8.4.10 Groundwater Abstractions

A search of the GSI groundwater well database was conducted to identify registered wells in the surrounding area. None of the wells identified had any drilling details, or depth to water. The 2No. wells identified to the East of the site are noted to be 50mm in diameter and hence are assumed to be Site Investigation (SI) or Geotechnical/Groundwater monitoring wells. The well (GSI Name: 2923SEW012) which is located in the vicinity of Parnell Street to the West of the site located at E315950, N235050, was drilled in 1899 and has a total depth of 137mbGL. It was also noted to have a yield of 163.6m^3/day and a depth to rock of 9.1mbGL.

There are no other boreholes or wells within a 2km radius of the site. Mapped wells and springs in the general vicinity of the site identified by the GSI are illustrated on **Figure 8.8**.

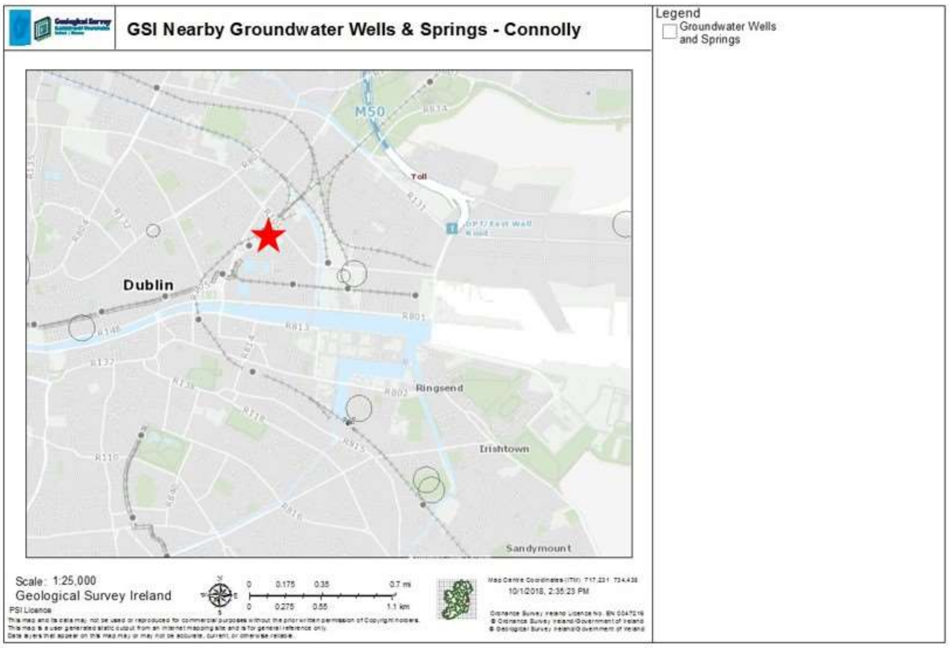


FIGURE 8.8 WELLS AND SPRINGS

The GSI (1999) also provides a framework for the protection of groundwater source zones (e.g. areas of contribution to water supply bores). There are no reported source protection zones (SPZs) within a 2km radius of the proposed site.

8.4.11 Nearby Site Investigations

The site is located in a well investigated area in Dublin City, the Geological Survey of Ireland (GSI) have compiled database from site investigations (SI) previously carried out in Ireland. **Figure 8.9** below show the nearby SI locations, For the Connolly Station site, the most relevant GSI reports for nearby investigations include R856, R2489, and R3464 which are attached in Appendix B of the GQRA report in Appendix 8.1 of this report. A slight discrepancy exists between the site's SI findings and the nearby SI due to the fact that the nearby SI show that the geology consists of Made Ground overlaying Gravels which are underlain by Boulder Clay. Whereas the Buro Happold report states that the site's geology is comprised of Made Ground underlain by a layer of glacial tills (gravels embedded among or between the Boulder Clay layer). This discrepancy exists due to the fact that the site investigation boreholes carried out in 2008 by Buro Happold extended to deeper depths than the other nearby boreholes, hence, the nearby boreholes didn't encounter the deeper gravel layers encountered on the Connolly Station car park site.

The nearby SI just to the south-west of the site consisted of 2No. cable percussion boreholes, carried out prior to the development of the apartment block on the intersection of Oriel Street Upper with Sheriff Street Lower. These 2No. boreholes which had a maximum depth of 5mbGL, showed that the site was underlain by a layer of 'Made Ground Fill' of 1m thickness overlying a 1.2m layer of 'Soft Black very Silty CLAY' which is lying over 2.8m thick layer of 'Fine to Coarse sandy GRAVEL'. Bedrock was not encountered in the SI.

SI records from the Custom House Harbour apartment blocks, show that the site was underlain by about 2.5m thick layer of 'Made Ground FILL' followed by a layer 3.5m thick of 'Fine to Coarse Sandy GRAVEL' which is overlying a 'very hard to stiff black gravelly silty CLAY' layer which is about 3.5m thick. The SI consisted of 6No. cable percussion boreholes advancing to a maximum depth of 10mbGL, bedrock was not encountered.

Finally, SI consisting of 6No. cable percussion boreholes from the site investigation of the LUAS Connolly Station development, shows the site to be underlain by an average of 2m thick layer of 'Made Ground' over a layer of 'Fine to Coarse sandy GRAVEL' which had an average of 10m thickness. In 4No. out of 6No. boreholes, a layer of 'Fine to Coarse SAND' was encountered to be sandwiched between the GRAVEL layer. The 'SAND' layer had an average thickness of 3m when it was encountered. Bedrock was not encountered in the SI.

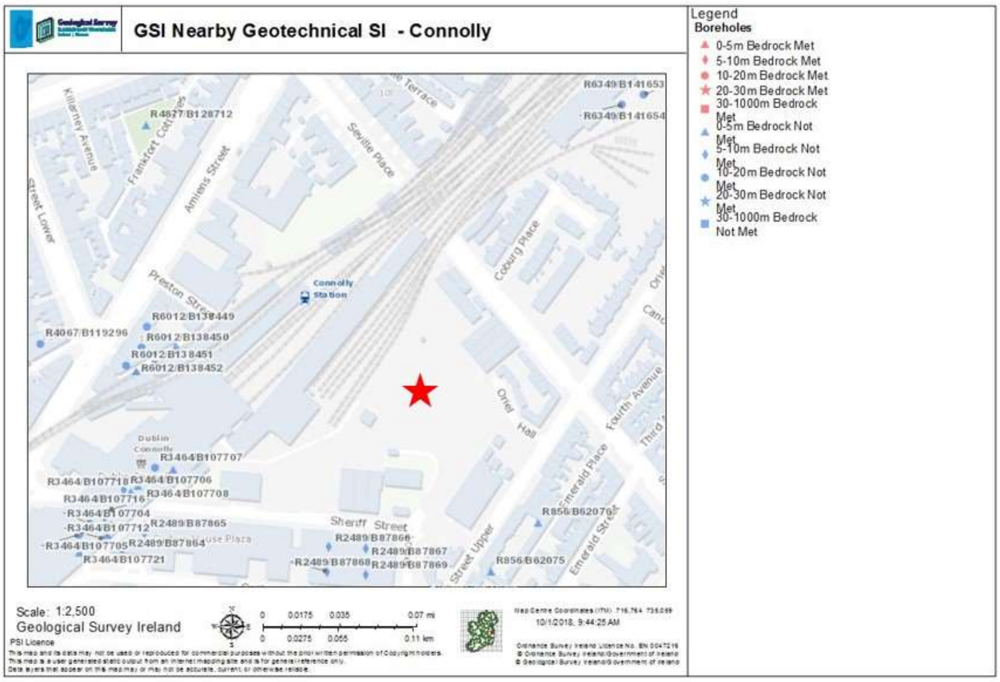


FIGURE 8.9 NEARBY SITE INVESTIGATIONS (SOURCE: GSI GEOTECHNICAL VIEWER)

8.4.12 Designated Area of Conservation

The nearest designated area of conversation is South Dublin Bay and River Tolka Special Protection Area (SPA), Site Code 004024, located approximately 1.2km northeast of the site, this area is also covered by a Proposed Natural Heritage Area (pNHA) North Dublin Bay (Site Code 000206). Other nearby conservation areas include the South Dublin Bay Special Area of Conversation (SAC), Site Code 000210, located approximately 2.8km east of the site and the North Bull Island SPA (Site Code 000206) is located 4.2km to the northeast of the site (NPWS, 2018). There is no direct link between the site and any of these areas. However, the site is located approximately 425m to the north of River Liffey which drains directly into these areas. See **Figure 8.10** below.

FIGURE 8.10 NPWS DESIGNATED AREA

8.4.13 Local Soils & Geology

- The site-specific site investigations have proven the topsoil and subsoil formations. The 2008 site investigation (SI) comprised of a total of 19No. SI points and 4No. Structural pits and the SI was undertaken by Glovers on behalf of Buro Happold. The SI and the environmental sampling took place between July and September 2008 and comprised of the following:
- Drilling of 7No. boreholes using cable percussion tool techniques (between 6.7 and 15.8m depth);
- Progression of 3No. boreholes (following on from cable percussion) using rotary core techniques (between depths of 39.5 and 42.3mbGL);
- 12No. window sample boreholes (up to 5.0m depth);
- Installation of groundwater and gas monitoring standpipes in 14No. boreholes; and
- Excavation of 4No. structural inspection pits.
- The geology of the site from the intrusive investigation can be summarised to be as follows:
- Made Ground comprising of 'a mixture of clay, sand and gravel containing cobbles and occasional boulders along with pieces of glass, brick, sea shells, ceramics, timber, rubber, concrete, ash and pottery'. The Made Ground varied in thickness from 0.1m to 7.2m. The thick layer of Made Ground is expected given that the site is higher than Sheriff Street Lower by approximately 7m. Standard Penetration Test (SPT) N value ranged between 3 to 24 in this layer;
- A discontinuous layer of Estuarine Deposit material comprising of '*grey gravelly sandy SILT with sea shells*' was encountered in 5No. SI locations mainly located in the lower half of the site towards the Sheriff Street Lower side. The thickness of this layer varied between 0.5 and 3.2m when it was encountered, No SPT N values were taken in this layer;
- In addition, a layer up to 1.9m thick of dark grey/black sandy silt with fibres and an organic odour below the Made Ground in WS03 and BH02. Hydrocarbon odours were noted within this strata in WS11 at depth of circa 2mbGL; the odour did not extend to the underlying glacial till layer;
- A glacial till layer of '*Dense dark grey sandy GRAVEL*' embedded among or between a frequent layer of '*firm to stiff brown/dark grey sandy gravelly CLAY with occasional cobbles* (Boulder Clay)' was encountered across the site. The layer of the GRAVEL ranged in thickness between 1.7 and 17m while the layer of the sandy gravelly CLAY ranged between 0.6 to 7m. The total thickness of this layer has not been proved but it extended to a maximum depth of 42.3mbGL. SPT N values ranged between 22 to 68 for the GRAVEL layer and from 12 to 48 for the CLAY layer; and
- Bedrock was not encountered throughout the SI although the bedrock geology is expected to be *LIMESTONE*.

8.4.14 The Impact of Basements on the Local Hydrogeology

The bedrock aquifer was not encountered during the site investigations with depth to rock being at least greater than 42.3mBGL. There are 2No. water tables that exist in the site and its surroundings, a water table in the unconfined granular GRAVEL and a confined water table existing within the Limestone bedrock. Standpipes were installed in a number of boreholes in order to monitor groundwater levels and the water levels were measured manually on seven occasions up to October 2008. The Buro Happold report states that the water table is relatively flat and at about 0mOD (Malin Head datum).

The impact of deep basements construction within the city centre of Dublin have not been studied/investigated thoroughly, however, a small number of developments such as the Metro North Environmental Impact Assessment study were requested by An Bord Pleanala (ABP) to the then 'Railway Procurement Agency' to consult a hydrogeologist to carry out a study on the potential impact of its proposed underground station boxes on surrounding groundwater flow and/or levels. The proposed route of Metro North passes within areas which had low permeability geology (Made Ground over Dublin Boulder Clay over Limestone bedrock) and it also crosses areas where there are layers of alluvial deposits above the Dublin Boulder Clay such as in Parnell Square area. The proposed underground station boxes for the Metro North had an average dimension of 25m deep, 30m wide and 165m long, the conclusions from the numerical modelling study carried out by Professor William Powrie from University of Southampton were as follows:

1. Where basements are founded in Low permeability tills such as Sandy Gravelly CLAY (Dublin Boulder Clay), there are no impact on groundwater regime since it is evident that there is very little water flow in these low permeability horizons regardless of their porosity;
2. If the basements are fully founded or partially founded in bedrock, the impact of the basement would be negligible since the extent of the basement (25m D x 30m W x 165m L) is small compared with the overall hydrogeological extent of the Limestone bedrock. The flow of groundwater is hence expected to find its 'new equilibrium' around the basement, it is also important to note that flow in Limestone occurs only through the fissures/cracks and not necessarily in the overall area in which the proposed basement is to be founded above;
3. The study also noted, that when a basement is founded in permeable soils (alluvial deposits) of limited extent, the impact would not be significant. The resultant rise in the water table due to a permanent structure would be within the seasonal variation of the water table, the rise was found not to be more than 20cm in the Parnell Square stop station. Parnell Square station was taken as the worst case scenario in this study, since it is underlain by alluvial deposits (fine to coarse Sandy Gravel) associated with the nearby River Liffey.

The alluvial deposits in Dublin city centre have not been classified as a groundwater body by the Geological Survey of Ireland due to the reason that these deposits are not suitable to be exploited for water supply purposes. The contribution of groundwater baseflow by these deposits to the River Liffey is also not likely as the quay wall along the Liffey in Dublin city centre was built around 1800's and is founded into the Limestone bedrock therefore, prohibiting connection of the upper soils with the river. Over the past decade, new bridges have been built across the Liffey connecting south and north quays and, site investigations

(SI) carried out prior to the construction of Samuel Beckett Bridge show that the Liffey river bed is underlain by a thin layer of Silt with an average thickness of 1m, overlying a 3-4m thick layer of Sandy Gravelly Clay (boulder clay), a thin discontinuous layer of Gravels of 1m thickness, followed by bedrock. In addition, boreholes further upstream drilled for the memorial bridge SI, show that the Liffey riverbed is underlain primarily by a layer of Silts overlying the bedrock.

OCSC's experience in groundwater monitoring for projects in Dublin docklands showed that the water table within the gravels is not tidal whereby the water table within the Limestone bedrock is tidal with minor or no delay. This lead to the conclusion that it is highly likely that the groundwater baseflow in the city centre stretch of the Liffey is primarily contributed by the limestone bedrock and not by the gravels. The baseflow contribution is occurring through rock outcrops in the river bed, or in the sections of the Liffey where boulder clay is absent such as the stretch near Memorial bridge.

The proposed finished floor level for the basement of the development will be at -3mOD, and the water table monitored by Glover Site Investigations in 2008 was at 0mOD. It is unlikely that significant change in water levels have occurred since the 2008 investigation. The site investigation showed the thickness of the Gravel layer on-site to be ranging from 1.7-17m thick. The basement will only be penetrating this layer by 3m and will be founded within it.

8.4.15 Soils Contamination Assessment

The site is considered to be a brownfield site with some anticipated historic contamination sources including chemical use, above ground tanks, railway lines and large volumes or fill (Made ground) present on site. An assessment of soil contamination/waste classification was carried out. A total of 40No. of soil samples were obtained across the site as part of the intrusive site investigation phase and submitted for analysis to ALcontrol Geochem Laboratories, a UKAS accredited laboratory. On average four samples were taken per sampling location. At least one sample was taken from the first one metre of soil with sample depths ranging from 0.5 – 6.5mbGL.

The soil analytical data was compared with a set of standard Generic Assessment Criteria (GAC) for Residential Use without Plant Uptake, Commercial and Public Open Space end use. The GACs are an extremely useful screening tool in the assessment of risks from land contamination. When used in conjunction with the Conceptual Site Model they can streamline the risk assessment process by reducing the number of contaminants or pollutant linkages requiring more detailed risk assessment and in many cases can help demonstrate that there are no unacceptable risks at a site. The use of standard residential without plant uptake GACs to assess residential risk in this scenario is conservative given that these are apartments with no gardens and additionally the receptors have the added protection of an underground basement, however this allowed the screening out of significant contaminants of concern. The risk to construction workers is not considered under the GAC methodology. It is assumed that health and safety guidelines will be adhered to and appropriate health and safety planning/assessments will be undertaken in advance of any on-site works.

In general, GACs are conservative screening criteria protective of human health. If the concentrations are below the GAC, then the risks to human health are considered negligible. If the concentrations are above the GAC, a potential risk to human health is identified and further assessment is required. The GACs are consistent with the principles of human health protection in Irish EPA, UK DEFRA and UK Environment Agency guidance.

With the exception of the eastern site boundary area with Oriel Street Lower, GAC exceedances were recorded across the site which were in the form of Polycyclic Aromatic Hydrocarbons (PAHs) and Heavy Metals. PAH exceedances were predominantly for Dibenzo(ah)anthracene for Residential, Public Open Space and Commercial GACs with the maximum concentration of 10.344mg/kg significantly exceeding all GAC limits. Other GAC exceedances included Benzo(a)pyrene, Benzo(a)anthracene and Naphthalene. Heavy metal contamination is widespread across the site with GAC exceedances predominantly consisting of Lead. The highest concentration of Lead observed across the site was determined at 2263mg/kg exceeding both the GAC for Residential and Public Open Space. GAC exceedances were also noted for Arsenic and two samples for mercury. GAC exceedances for the above heavy metals were for Residential and Public Open Space only. See the Tables section at the back of the GQRA report in Appendix 8.1 for OCSC's analytical soil and groundwater tabulated results which have been sourced from the Buro Happold analytical dataset and compared to current GAC.

All GAC exceedances were recorded in soil samples taken from the upper Made Ground. As part of the basement excavation, this Made Ground will be excavated and disposed of in line with the Waste Soil Assessment criteria thus removing the associated contamination risk. Sampling of the deeper glacial till layer was limited in the 2008 site investigation.

Waste Category	Title	Classification Category	Potential Outlet
Category A	Inert Waste Criteria	Reported concentrations less than inert waste guidelines, which are based on waste acceptance criteria set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002). Results found to be non-hazardous using the HazWasteOnline application.	Potentially suitable for reuse or recovery subject to Planning and/or Waste Permissions and acceptance criteria.
Category B	Inert (with elevated PAHs)	Acceptance Criteria as laid out in Waste Licence W0129-02 and W0254-01. Reported concentrations less than inert waste guidelines, which are based on waste acceptance criteria set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills	Disposal at Integrated Material Solutions (formerly Murphy's Hollywood Landfill) or Walshestown Restoration

Waste Category	Title	Classification Category	Potential Outlet
		pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002) with the exception of PAHs (Total 17 <100mg/kg). Results found to be non-hazardous using the HazWasteOnline application.	
Category C1	Non-Haz Criteria	Analytical results greater than Category A criteria but less than non- hazardous waste guidelines, which are based on waste acceptance criteria set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002) no limit for TOC. Results found to be non-hazardous using the HazWasteOnline application.	Disposal/Recovery at licensed Landfill (Ballynagran, Knockharley, Drehid). Material can be sent for recovery as engineering material rather than disposed of (no landfill tax)
Category C2	Non-Haz Criteria but with trace asbestos	Results as per C1 but with trace asbestos	Material will need to be disposed of at a licensed landfill if trace asbestos confirmed. If asbestos level is quantifiable then it may have to be disposed in N. Ireland or further abroad.
Category D	Hazardous	Analytical results found to be hazardous using the HazWasteOnline application.	None in Ireland (export) with the exception of Enva in Portlaoise.

TABLE 8-3 SOIL WASTE CATEGORIES

In total 40No. samples were collected during site investigation works, however only 9No. samples could be classified in accordance with the Waste Acceptance Criteria as the suite of analysis used on the other 31No. samples was not sufficient to classify the soils comprehensively.

The results of the Waste Acceptance Criteria testing from the available 9No. samples indicated that 100% of the soils underlying the Connolly site which may require excavation and disposal off site generally comply with the Non-Hazardous Landfill acceptance criteria. The HazWasteOnline (HWOL) outputs are attached in Appendix C of the GQRA report in Appendix 8.1.

Table 8.4 summarises the soil assessment carried out on the collected samples (i.e. from trial pits and boreholes).

	A	B	C1	C2	D
	Inert	Inert (PAHs)	Non-Haz	Non-Haz w/ trace asbestos	Hazardous
No. of samples	0	0	9	0	0

TABLE 8-4 SOIL CLASSIFICATION RESULTS

A total of 9No. samples were classified as C1 – Non-Hazardous due to elevated concentrations of PAHs, Total Dissolved Solids, Sulphate, Chloride, Fluoride, Dissolved Antimony, Dissolved Copper, Dissolved Chromium, Dissolved Molybdenum, Dissolved Arsenic, Dissolved Selenium, Dissolved Nickel and Total Organic Carbon (TOC).

The waste soil assessment made on this limited data set, indicates that the upper part of the soil is probably unlikely to be acceptable at an inert soil disposal or recovery facility. It is expected that excepting the potential for heavy metal hotspots the soil would generally be acceptable at a non-hazardous landfill. The laboratory certificates were not made available to OCSC at the time of writing this report.

8.4.16 Potential Pollutant Linkages

A critical element of the risk assessment process is the establishment of a Conceptual Site Model (CSM) for the site. A CSM describes the potential sources of contamination at a site, the migration pathways it may follow and the receptors it could impact. If complete source-pathway-receptor scenarios exist then there is a potential pollutant linkage that needs to be characterised and assessed (via formal risk assessment). All three elements need to be present for a viable risk to exist (e.g. if a source and receptor exist but no pathway is present then there is no pollutant linkage and hence no risk).

A. Sources

- The potential contamination sources identified on site are 1No. above ground fuel storage tank, evidence of one additional tank historically present on the site, imported made ground used to raise the site levels, chemical use on site, past and existing car parking on-site, 2No. railway lines and associated maintenance yards;
- There will be a source of potential contamination present on site during the construction phase (e.g. machinery oils, fuel, cement etc.);
- Run-off from construction sites can contain minor levels of pollutants (e.g. mineral oils) with high concentrations of suspended solids;
- To keep the excavation dry in the glacial till layer, dewatering will be required in order to lower the water table and a discharge to sewer will occur. Groundwater samples from the 2008 sampling event show elevated hydrocarbons therefore contaminated groundwater discharged into the public sewer during the dewatering scheme throughout the construction phase is hence a source of concern;
- Lowering the water table could have negative impact on nearby buildings, as the water table is lowered as the absence of water will crated a void space and the soil

particles will compress against each other to fill the void and hence settlement occurs;

- Piling in contaminated ground have the potential to transfer material from the upper layers of the ground to the deeper layers, and hence a risk assessment for the piling should be carried out;
- There will be no significant sources of potential contamination present on site during the operational phase of the development.

B. Receptors

- The bedrock aquifer constitutes a potential receptor;
- The surface water bodies in the area surrounding the site constitute a receptor;
- The surrounding land (buildings), soils and geology constitute a receptor.

C. Pathways

- Migration of contaminants from surface spills to land, soils, geology, groundwater or surface water constitutes a potential pathway;
- Migration of contaminated run-off (e.g. during construction phase or operational phase) to groundwater, surface water or surrounding geology constitutes a potential pathway.

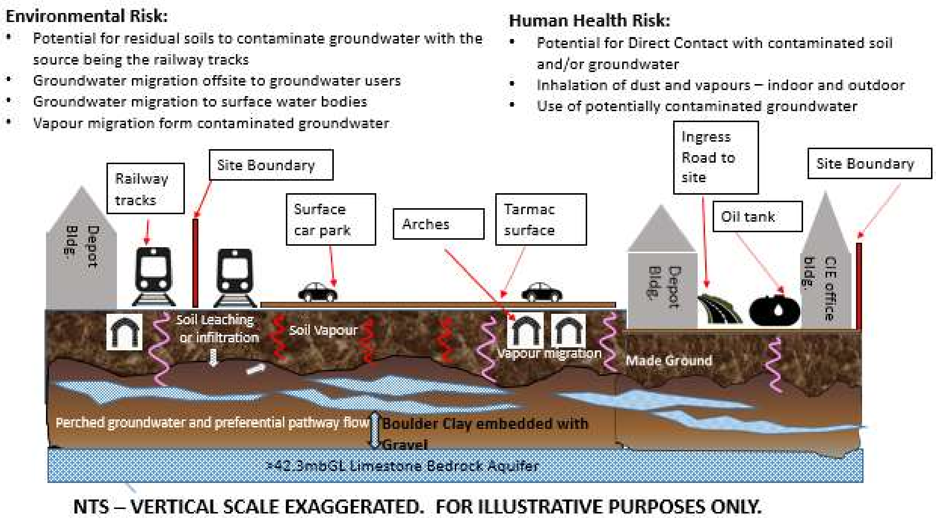


FIGURE 8.11 CONCEPTUAL SITE MODEL (CSM) BASED ON EXISTING SITE CONDITIONS

Potential Pollutant Linkages

An environmental risk is only present when a pathway links a source with a receptor. The potential pollutant linkage CSM for the Connolly Station development is summarised in **Table 8.5**:

Source	Pathway	Receptor	Potential Pollutant Linkage (Y/N)	Discussion
Deleterious materials stored on site during construction	Migration of surface spills/ contaminated run-off	Surrounding Land/Soils or Groundwater in the bedrock aquifer	N	All materials stored on site will be subject to strict control measures and local containment measures (e.g. bunded tanks and wood pallets) The bedrock aquifer will be protected by the thick depth of clay which is in place and will remain in place post construction.
Contaminated run-off from construction activities			N	Generation of contaminated run-off will be reduced through the Construction Management Plan and control measures implemented during the construction phase. The bedrock aquifer will be protected by the thick depth of clay which is in place and will remain in place post construction including beneath the single level basement.
Deleterious materials stored on site during construction	Migration of surface spills/ contaminated run-off	Potential water bodies Royal Canal 250m East. Tolka River Estuary is circa. 1.5km to the North-East of the site. George's Docks circa 90m south to the site.	N	All materials stored on site will be subject to strict control measures and local containment measures (e.g. bunded tanks and pallets. There are roads and other infrastructure between the site and the surface water receptors. Appropriate set back and protection measures to be implemented to ensure no direct discharge to river except where regulated under a Discharge Licence from the Regulating Authority.
Contaminated run-off from construction activities			N	Generation of contaminated run-off will be reduced through the Construction Management Plan and control measures implemented during the construction phase. Appropriate set back and protection measures to be implemented to ensure no direct discharge to water courses except where regulated under a

Source	Pathway	Receptor	Potential Pollutant Linkage (Y/N)	Discussion
				Discharge Licence from the Regulating Authority.
Contaminated groundwater from the groundwater dewatering scheme	Discharge into the public sewer	Nearby public sewers	N	The appointed dewatering contractor will be supplied with the lab analysis of the groundwater samples in order for them to design any pre-treatment system, if necessary. Hence, only groundwater which meets the discharge licence condition will be discharged into the public sewer. Weekly sampling will be carried out and will be audited by the client's environmental consultant.
Lowering of the water table	Pumping of groundwater through dewatering wells and/or pits	Nearby buildings and/or water bodies	N	A secant 900mm diameter piled wall is proposed to form the perimeter of the basement. The secant piled wall will be founded into bedrock and will effectively 'seal' or 'isolate' the basement footprint area from its surroundings. Hence, any pumping of groundwater will only deplete the groundwater stored inside the basement perimeter.
Piling through contaminated ground	Migration of contamination from the upper soils to the lower 'clean' soil	Limestone Bedrock	N	The proposed piling method for the site is the Continuous Flight Auger (CFA) method, the use of CFA will reduce and mitigate this risk. The process of the CFA pile installation will not result in a plug of contaminated material being driven into the below aquifer, this is because as the auger is being driven into the ground, the material will be forced up the auger as the auger penetrates the ground.

TABLE 8-5 CONCEPTUAL SITE MODEL (CSM) POLLUTANT LINKAGES GEOLOGY AND GROUNDWATER

The mitigation measures set out in **Table 8.5** are discussed in further detail in later sections.

8.4.17 Radon

According to the EPA (now incorporating the Radiological Protection Institute of Ireland) between one and five per cent of the homes within the Connolly Station development area are estimated to be above the Reference Level of 200 Bq/m^3. This is the second lowest classification; the lowest classification is for below one per cent of homes to be estimated to be above the Reference Level. A High Radon Area is any area where it is predicted that 10% or more of homes will exceed the Reference Level.

8.4.18 Summary & Type of Geological/Hydrogeological Environment

Based on the regional and site-specific information available the type of geological and/or hydrogeological environment as per the Institute of Geologists of Ireland (IGI) Guidelines is Type A – Passive geological and/or hydrogeological environment.

A summary of the site geology is outlined thus:

- The Connolly Station development site is essentially a brownfield site with previous light industrial site use and current commercial use;
- The only known potential contamination sources on site are 1No. above ground fuel storage tanks, 2No. railway lines, and the historical oil tank shown on the old Ordnance Survey maps discussed in section 8.3.3;
- There are no expected potential pollutant linkages associated with the construction or operation phases of the site provided the mitigation measured in Table 8.6 are implemented;
- The majority of the site is underlain by significant depth of made ground (c. 7.2m);
- The subsoils predominantly comprises glacial till which comprises of a layer of fine to coarse sandy Gravel embedded among or between layers of Sandy Gravelly Clay (Dublin Boulder Clay);
- Depth to bedrock have not been proven but expected to be at a minimum depth of 42.3mBGL and the bedrock comprises Calp Limestone;
- Groundwater lowering might be required due to the presence of a layer of granular GRAVEL. Samples from the groundwater show elevated hydrocarbons, hence on-site pre-treatment might be required prior to discharge to sewer;
- The appointed dewatering contractor will take into account the results from the groundwater sampling and ensure that no contaminated groundwater will be discharged into the public sewer and that all conditions stipulated by the discharge licence are met;
- The basement proposed is a 1No. storey basement and will be founded in the glacial till layer, see section 8.2 for the proposed development description.

8.5 Do Nothing Scenario

In the 'Do Nothing' scenario, if the construction of the development at the Connolly Station site does not take place, the existing baseline conditions will remain and there would be no resulting additional impacts on the Soils or Geology in the area of the project site.

8.6 Impact Assessment

There are a number of effects on the land, geological and hydrogeological environments that will occur due to the proposed development namely:

- Land take – change of use from light industrial to mixed use/residential;
- Soil excavation – removal of soil for lowering the site levels to existing road level and basement construction. The removal of the vast majority of made ground through this

excavation will consequently remove the contamination present on site.

Piling works, accidental spills, contaminated run-off and/or contaminated groundwater discharged to sewer during the construction phase also have the potential to have an impact.

8.6.1 Construction Phase

In line with EIA guidance, each potential impact for the development should be described in terms of its Quality, Significance, Extent, Probability, and Duration. The potential impacts, mitigation measures and resulting residual impacts have been combined in a Detailed Assessment Table in **Table 8.6** presented in Section 8.7 and are outlined below. These impacts also relate to and interact with other chapters within the EIAR specifically:

- Chapter 4, Population & Human Health
- Chapter 6, Material Assets: Traffic
- Chapter 7, Material Assets: Built Services
- Chapter 9, Hydrology & Water
- Chapter 10, Biodiversity
- Chapter 11, Noise and Vibration
- Chapter 12, Air Quality & Climate
- Chapter 13, Cultural Heritage
- Chapter 14, Built Heritage

Specific interactions are listed below, further detail is provided in the relevant chapters and in Chapter 15, Interaction.

Below are the summary of the potential impacts throughout the construction stage:

- Excavated and stripped soil can be disturbed and eroded by site vehicles during the construction phase. Rainfall and wind can also impact on non-vegetated/uncovered areas within the excavation or where soil is stockpiled. This can lead to run-off with high suspended solid content which can impact on water bodies. The potential risk from this indirect impact to water bodies and/or habitats from contaminated water would depend on the magnitude and duration of any water quality impact.
- There is a potential for dust from excavations or stockpiles to impact on air quality. This is discussed further in Chapter 12 Air Quality and Climate.
- Construction phase dewatering may be required to excavate the basement and to maintain dry working conditions in the excavation (for rainfall and potential groundwater ingress as the excavation progresses into the Gravel layer). Pumped water will require discharge offsite (discharge to sewer).
- Noise and vibration will be generated through the construction phase particularly during excavation work. Given that no rock excavation is required it is anticipated that conventional excavation techniques (i.e. hard digging) will suffice. Noise and vibration impacts are considered in detail in Chapter 11, Noise and Vibration.
- The construction phase and any import or export of material to the site (as part of excavation or infilling works) will have implications for traffic in the surrounding road network. These impacts are considered further in Chapter 6, Material Assets: Traffic.
- A number of areas of archaeological interest in the form of protected structures have been identified within the vicinity of the site in Chapter 13, Cultural Heritage. The areas of interest include the previous Great Northern Railways office located between Sheriff

Street Lower and Oriel Street Lower and the Railway Arches located along the site's southern boundary with Sheriff Street Lower. This is discussed in detail in chapter 13; Cultural Heritage.

- As with all construction projects there is potential for water (surface water and/or groundwater) to become contaminated with pollutants associated with construction activity. Contaminated water which arises from construction sites can pose a significant short-term risk to groundwater quality for the duration of the construction if contaminated water is allowed to percolate to the aquifer. The potential main contaminants include:
  - Suspended solids (muddy water with increase turbidity) – arising from excavation and ground disturbance;
  - Cement/concrete (increase turbidity and pH) – arising from construction materials;
  - Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage; and contaminated groundwater within the site from previous site activities;
  - Wastewater (nutrient and microbial rich) – arising from poor on-site toilet and washrooms.

8.6.2 Operational Phase

During the Operational Phase of the Connolly Station development there is limited impact on the geological environment of the area mainly associated with the basement being founded within the water bearing gravels. There is no requirement for any fuel oil stores as all heating will the fuelled by mains gas.

8.6.3 Risks to Human Health

There is no apparent risk to human health, due to changes in the geological and/or hydrogeological environment, resulting from this project. OCSC have prepared a separate report using the original data titled 'Generic Quantitative Risk Assessment (GQRA)'. This will be revised in 2020 following additional Site Investigation.

8.6.4 Cumulative Effects with other existing/approved developments

The cumulative impacts takes into account the combined effects of the proposed development and other proposed projects in the surrounding area. Cumulative impacts occur as a result of actions taking place in the same area and within the same timeframe as the proposed 'Connolly Station' development.

The Connolly Quarter Masterplan shows a design for the development of the entire site comprising the lands under agreement between CIE and Oxley Holdings Limited. Oxley Holdings Limited intended to submit an application under Section 34 to Dublin City Council for the development of office and hotel blocks. These are Blocks A, D3, and E detailed in the Masterplan. It is considered that the cumulative effects from the works required to implement the masterplan are neutral, not significant, and long term.

OCSC note that not many developments are being constructed and/or proposed to be constructed in the immediate surrounds of the site, apart from refurbishment to current buildings such as the Irish Life HQ etc. Most of the new developments in the IFSC area are currently taking place close to North Wall Quay, Sir John Rogerson's Quay, Hanover Quay and Spencer Place, etc. However, during the last economic boom, significant number of basements were built in the International Financial Services Centre (IFSC) area, for developments namely Harbourmaster Place, George's Dock offices and Custom House Square apartments in Mayor Square. The cumulative permanent impact of the basement for the Connolly Station development combined with the nearby already built basements is/will be slightly negative and Permanent on the surrounding land and soils environment.

8.7 Mitigation Measures

This section describes a range of recommendations and mitigation measures designed to avoid, reduce or offset any potential adverse geological impacts identified.

8.7.1 Incorporated Design Mitigation

In order to reduce the impact of the development on the lands and soils of the site, the proposed basement depths will be optimised in order to keep the excavations required to a minimum, and hence this will reduce the amount of soils to be exported off-site, reduce the amount of materials to be imported to the site, and a reduction in machinery operation time. It is proposed that where soils are to be exported off-site, a local facility will be chosen where feasible, and hence reduce the carbon footprint associated with the transport and handling of the material.

8.7.2 Construction Phase Mitigation

In order to reduce the impacts on the soils, geology and hydrogeological environment a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

- Control of Soil Excavation and Export from Site;
- Sources of Fill and Aggregates for the project;
- Fuel and Chemical Handling, transport and storage;
- Construction Management Plan; and
- Control of Water during Construction.

8.7.2.1 Control of Soil Excavation

Topsoil and subsoil will be excavated to facilitate the formation of basement levels, ramp access, construction of a new sewer and water mains connections, roadways and all other associated services. The project will incorporate the; reduce, reuse and recycle approach in terms of soil excavations on site. The construction will be carefully planned to ensure only material required to be excavated will be excavated with as much material left in situ as possible. All excavation arisings will be reused on site where possible/if suitable.

Soil stripping, earthworks and stockpiling of soil will be carried out during the works. Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated through the implementation of an appropriate earthworks handling protocol during construction. It is anticipated that any stockpiles will be formed within the boundary of the excavation and there will be no direct link or pathway from this area to any surface water body. It is anticipated that only local/low level of stockpiling will occur as the bulk of the material will be excavated either straight into trucks for transport off site or will be reused in other areas of the site as fill.

Dust suppression measures (e.g. damping down during dry periods), vehicle wheel washes, road sweeping and general housekeeping will ensure that the surrounding environment are free of nuisance dust and dirt on roads.

8.7.2.2 Export of material from Site

Where material cannot be reused off site it will be sent for recovery/disposal at an appropriately permitted/licenced site. This will be discussed further in the Construction and Demolition Waste Management Plan.

Site investigations have established that there is contamination present onsite in the upper 6.5m of soils and the limited number of soil samples available for waste soil classification were determined to be suitable for disposable as Non-Hazardous material. All material will be managed according to the applicable Waste Management Acts and subsequent regulations. Nonetheless material which is exported from site, if not correctly managed or handled, could negatively impact human beings as well as water and soil environments.

Additional Soil Classification will be undertake as part of the site development and control of any material will be carried out in accordance with the Waste Management Act and further details are included in the Construction Management Plan and the Construction and Demolition Waste Management Plan.

8.7.2.3 Sources of Fill and Aggregates

All fill and aggregate for the project will be sourced from reputable suppliers as per the project Contract and Procurement Procedures. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the project;
- Environmental Management status; and
- Regulatory and Legal Compliance status of the suppliers.

The use of fill and aggregate containing recycled or recovered materials shall be considered.

8.7.2.4 Fuel and Chemical Handling

The following mitigation measures will be taken at the construction site in order to prevent any spillages to ground of fuels and prevent any resulting soil and/or groundwater quality impacts:

- Designation of bunded refuelling areas on the site (if required);
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used the following measures will be taken:
    - Any flexible pipe, pump, tap or valve will be fitted with a lock and will be secured when not in use;
    - All bowser units to carry a spill kit and operatives must have spill response training; and
    - Portable generators or similar static operation fuel containing equipment will be placed on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during construction the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside concrete bunded areas;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site they should be done so secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

The aforementioned list of measures is non-exhaustive and will be included in the Construction Management Plan.

8.7.2.5 Construction Management Plan

In advance of work starting on site, the works Contractor will author a Construction Methodology document taking into account their approach and any additional requirements of the Design Team or Planning Regulator. The Contractor will also prepare a Construction Management Plan and Environmental Plan. The Construction Management Plan sets out the overarching vision of how the construction of the project will be managed in a safe and organised manner by the Contractor with the oversight of the Developer. The CMP is a living document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures in the EIAR and any subsequent conditions relevant to the project.

8.7.2.6 Control of Water during Construction

Run-off from excavations/earthworks cannot be prevented entirely and is largely a function of the prevailing weather conditions. Earthwork operations will be carried out such that surfaces, as they are being raised, shall be designed with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. Care will be taken to ensure that exposed soil surfaces are stable in order to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts. All run-off will be prevented from directly entering into any water courses.

During the basement construction, after the Made Ground has been dug, it is possible water ingress will occur when the dig progresses into the Gravel layer, a discharge licence will likely be required to enable discharge of water to sewer to keep the excavation dry.

Should any discharge of construction water be required during the construction phase, discharge to foul sewer will be regulated under a Discharge Licence obtained from the Regulator (Irish Water) issued under the Water Pollution Act. Attenuation, pre-treatment and monitoring of discharge water will likely be required under any Discharge Licence (Section 16 Licence). Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, silt sacks and settlement tanks) and hydrocarbon interceptors. Active treatment systems such as Siltbusters or similar may be required depending on turbidity levels and discharge limits. Qualitative and quantitative monitoring will be implemented as per the Conditions of any Discharge Licence. The client's environmental consultant will audit the sampling and analysis results as required to ensure conformance to the discharge licence limits and testing frequency requirements.

8.7.3 Operational Phase Mitigation

During the operational phase of the Connolly Station development the basement have the potential to impact on the geological environment of the area, the impact of the basement is unavoidable. The proposed scheme will have a combination of district and local heating systems, within the proposed development, all of which will be fuelled by mains gas. Therefore, there is no requirement for fuel oil storage thus removing any potential source.

8.8 Monitoring

Monitoring shall be carried out as specified in any water Discharge Licence associated with the construction phase of the project. Monitoring of dust and noise shall also be carried out as specified in the planning permission should the development be allowed to proceed.

Record keeping and monitoring of import and export of soils shall be carried out in accordance with the Waste Management Act. All waste hauliers and receiving facilities shall have valid permits in accordance with the Waste Management Acts and Planning Conditions.

There is no requirement for monitoring in the operational phase.

8.9 Residual Impact Assessment

The predicted residual impacts of the proposal are outlined in the Detailed Assessment in **Table 8.6**.

8.9.1 Construction Phase

The predicted impacts of the construction phase are described in **Table 8.6** in terms of quality, significance, extent, likelihood and duration. The relevant mitigation measures are detailed and the residual impacts are determined which take account of the mitigation measures.

The primary residual impacts from the construction phase is the land take/change of use and removal of soil to facilitate the basement construction. These impacts are unavoidable given the nature, requirement and design of the proposed development. The construction impact is assessed to be a slight negative short-term impact.

8.9.2 Operational Phase

During the Operational Phase of the Connolly Station development there is a negative Permanent imperceptible impact on the geological environment of the area due to the basement which is founded within the water bearing gravels. There is no requirement for any fuel oil stores as all heating will be fuelled by mains gas. The residual impact is assessed to be a negative imperceptible Permanent impact.

8.9.3 'Do Nothing' Scenario

In the event that the Connolly Station development does not progress, there would be no resulting additional impacts on the geological/hydrogeological environment in the area of the project site.

TABLE 8-6 IMPACT DETERMINATION – CONSTRUCTION PHASE

Constraint		Impact Assessment							
Activity/ Source	**Construction Element**	**Impact Description**	**Quality**	**Significance**	**Extent**	**Likelihood**	**Duration**	**Mitigation**	**Residual Impact**
Earthworks	Site Clearance Basement Excavation Basement Construction	Excavation of Natural Soils and Subsoil for basements, attenuation tanks, drainage etc.	Negative	Moderate	Local	Certain	Permanent	The minimum amount of space to construct the project has been designed for. Material will be reused on site where possible.	Moderate Negative
Earthworks	Basement Excavation	Soil erosion causing airborne dust and/or nuisance dust on public roads and neighbouring properties	Negative	Slight	Local	Unlikely	Short-term	Dust suppression measures will be implemented to minimise dust generation during extended dry periods. Dust monitoring will be conducted throughout the excavation period. Vehicle wheel wash facilities will be installed at site exits and a road sweeping programme will be implemented	Imperceptible negative
Earthworks Altering Groundwater /Surface water	Basement Excavation Basement Excavation Basement Construction	A degree of fill will be required during the works which will include imported fill and aggregates	Negative	Slight - Moderate	Local (maybe a number of quarry sites)	Likely	Permanent	Contract and Procurement Procedures will ensure that all aggregates and fill material required for the construction are sourced from reputable suppliers. Declarations of conformity/compliance certificates will be required to ensure all aggregates supplied meet the specified engineering specifications.	Imperceptible negative

Constraint		Impact Assessment							
Activity/ Source	**Construction Element**	**Impact Description**	**Quality**	**Significance**	**Extent**	**Likelihood**	**Duration**	**Mitigation**	**Residual Impact**
Earthworks Altering Groundwater /Surface water Dewatering/Lowering the water table	Basement Excavation	Excavation of a significant volume of Made ground within site	Positive	Slight	Local	Likely	Permanent	Made ground will have been classified in accordance with the Waste Soil Acceptance criteria as part of the site investigation and disposed of at the relevant suitable facility. Where soil is classified as suitably inert, it will be reused were possible in the build.	Slightly Positive
	Basement Excavation Basement Construction	Altering existing local groundwater regime	Negative	Slight	Local	Likely	Permanent	The basement will be founded within the permeable granular Gravel. A slight rise in groundwater level surrounding the site will occur as a result. The rise is expected to be within the seasonal variation of groundwater within this layer.	Slightly negative
	Basement Excavation Basement Construction	Discharge of contaminated groundwater to sewer and possible settlement of buildings as a result dewatering	Negative	Slight	Local (maybe a number of nearby buildings)	Likely	Short-term	The appointed dewatering contractor will be supplied with the 2008 and any subsequent groundwater analytical results. The contractor will design an on-site pre-treatment system based on the results. CFA piled-wall will form the basement perimeter and hence 'isolate' the excavation from nearby buildings.	Imperceptible negative
Storage of potentially polluting materials	Site Clearance and Basement Excavation	Potential leak or spillage from construction related liquids on site	Negative	Significant	Local	Unlikely	Short-term	Good housekeeping on all project sites and proper handling, storage and disposal of any potentially polluting substances can prevent soil and/or water contamination. Designated and bunded storage areas will be maintained.	Imperceptible negative

Constraint		Impact Assessment							
Activity/ Source	**Construction Element**	**Impact Description**	**Quality**	**Significance**	**Extent**	**Likelihood**	**Duration**	**Mitigation**	**Residual Impact**
Discharge to Groundwater	Basement Excavation and General Construction	Potential contaminated run-off percolating to ground and the underlying aquifer	Negative	Significant	Local	Unlikely	Short-term	There will be no direct discharge to groundwater during construction. However indirect discharges to the underlying bedrock aquifer may occur and the aquifer vulnerability will increase, albeit not significantly given the thickness of Boulder Clay beneath the site, as the subsoil is removed from site. Protection of groundwater from potentially polluting substances will be dealt with through a number of measures including correct handling and storage of potentially polluting substances.	Imperceptible negative

8.10 Reference and Sources

The sources for the geology desk study are referenced following:

- Environmental Protection Agency Envision Data Viewer: http://gis.epa.ie/Envision
- Environmental Protection Agency (2017). Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft)
- Farrell, E.R., and Wall D. (1990). Soils of Dublin, Institution of Engineers of Ireland, 115, 78-9.
- Geological Survey of Ireland Geotechnical Data Viewer http://spatial.dcenr.gov.ie/GeologicalSurvey/GeoTechnicalViewer/index.html
- Geological Survey of Ireland National Groundwater Viewer http://spatial.dcenr.gov.ie/GeologicalSurvey/Groundwater/index.html
- Geological Survey of Ireland General Data Viewer http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GSI_Simple
- Geological Survey of Ireland GeoUrban Data Viewer http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GeoUrban
- Geological Survey of Ireland Quaternary Geology map of Dublin.
- Geological Survey of Ireland Geotechnical Database (Reports No 1069, 56, 4901, 392, 707, 4688 and 4690).
- Looby, M. & Long, M. Deep Excavations in Dublin, Recent Developments. Paper first presented to a meeting of the Geotechnical Society of Ireland at Engineers Ireland, 22 Clyde Rd, Dublin 4, on 11th December 2007.
- Long, M., Brangan, C., Menkiti, C., Looby, M. & Casey, P. 2012. Retaining walls in Dublin Boulder Clay, Ireland. Proceedings of the ICE – Geotechnical Engineering [Online], 165. Available: http://www.icevirtuallibrary.com/content/article/10.1680/geng.9.0091.
- Long, M. & Menkiti, C.O (2007). Geotechnical Properties of Dublin Boulder Clay. Geotechnique, No. 7, 595-611.
- Long, M. & Murphy, B. (2003). Difficulties with Ground Anchorages in Hard Rock in Dublin, Ireland. Geotechnical & Geological Engineering, 21, 87-111.
- Metro North Railway Order Application – An Bord Pleanála Further Information Request, Item 19 Groundwater and Hydrogeology, Pages 18-34, 2010.
- McConnell, B. and Philcox, M., (1994). Geology of Kildare-Wicklow: A geological description to accompany the Bedrock Geology 1:100,000 Scale Map Series, Sheet 16, Kildare-Wicklow. Geological Survey of Ireland.
- Skipper, J., Follett, B., Menkiti, C.O., Long, M. & Clark-Hughes, J. (2005). The engineering geology and characterisation of Dublin Boulder Clay, QJEGH, 38, 171-187.

8.11 Appendix 8-1 (see Volume III)

Appendix 8-1 OCSC Generic Quantitative Risk Assessment (GQRA) Report

CHAPTER 9
WATER & HYDROLOGY

OCTOBER 2019

Table of Contents

Table of Tables

9 Water & Hydrology

9.1 Introduction

This chapter addresses issues relating to water and hydrology in respect of the subject lands and assesses the impact of the proposed development on these aspects of the existing environment. It should be noted that information relating to hydrogeology is presented in Chapter 8 Land and Soils.

9.1.1 Statement of Authority

The author is a Chartered Engineer; has obtained Bachelor of Engineering and Master of Science degrees, with specialisation in hydrology; and has twenty years' experience in the design and delivery of urban development schemes, with particular focus on flood risk management and drainage and water supply infrastructure. He has advised a range of clients including government bodies, local authorities, water companies and private developers. He has provided designs for projects in Ireland, the UK, Poland, Libya and the UAE taking account of local technical standards and hydrological conditions.

.

9.2 Methodology

An initial assessment was carried out which defined the project in terms of location, type and scale, established the baseline conditions, established the type of hydrological environment, established the activities associated with the project and initial assessment and impact determination. These objectives were achieved by way of a desk study and baseline data collection. A list of sources for the desk study together with relevant Legislation are included in the Section 9.11. Additional information has been compiled through consultation and feedback from stakeholders and the Design Team.

Under the Water Framework Directive (WFD) and corresponding Regulations, the water quality of Ireland's surface and groundwater is assessed biologically, physically and chemically. Assessments are conducted by the EPA and Local Authorities and have been compiled and presented in a standardised manner for River Basin Districts. Baseline information on the local and regional surface water bodies, their status and threats were obtained from a range of documents and online sources including the EPA's Water Quality database, Ireland's Water Framework Directive "Water Matters" online resource and the Eastern River Basin District (ERBD) website and reports.

A Site-Specific Flood Risk Assessment was carried out by O'Connor Sutton Cronin Consulting Engineers. This assessment considered flood risk to the proposed development from all potential sources and the possible impact of the proposed development on flood risk elsewhere. Relevant sources/mechanisms of flooding include tidal/coastal, fluvial, pluvial, existing drainage and water infrastructure, proposed drainage and water infrastructure and groundwater. The assessment was conducted in accordance with:

- The Planning System and Flood Risk Management Guidelines for Planning Authorities (Department of Environment, Heritage and Local Government and the Office of Public Works);
- C624 Development and Flood Risk (Construction Industry Research and Information Association, CIRIA) and;

- Dublin City Development Plan 2011-2017.

Record information on the existing infrastructure were obtained from the following:

- Dublin City Council and;
- Irish Water.

Information on all services is supplemented with information obtained from site topographical survey, site inspections and Ordnance Survey Ireland mapping.

In order to further determine the existing environment, an Underground Utilities Survey was carried out by Murphy Surveys Ltd. at the subject site between August and October 2018. The survey methods adopted included manhole surveys, ground penetrating radar (GPR) surveys, radio detection and surveys of visible services using GPS/Total Station. The results provide further clarification as to the existence and location of utilities.

Assessment of existing and proposed infrastructure for wastewater drainage, water supply and surface water drainage was conducted in accordance with I.S. EN12056: 2000 '*Gravity Drainage Systems inside Buildings*', I.S. EN752: 2017 '*Drain & Sewer Systems outside Buildings*', '*The Greater Dublin Region Code of Practice for Drainage Works*', Irish Water's '*Code of Practice for Wastewater Infrastructure*', Irish Water's '*Code of Practice for Water Infrastructure*' and the recommendations of the '*Greater Dublin Strategic Drainage Study*', (GDSDS).

Allowable surface water runoff from the development site has been calculated using the '*Greater Dublin Strategic Drainage Study*' (GDSDS) in accordance with Dublin City Council requirements and the Institute of Hydrology Report No.124 to estimate existing Greenfield runoff rates.

9.3 Proposed Development

9.3.1 Local Hydrology

The site of the proposed development comprises approximately 2.9 hectares. Of this total, approximately 0.4 hectares comprises existing railway sidings that will be retained and built over at high level. An additional 0.3 hectares of the site is occupied by existing protected historical structures that will be retained and partially built over at high level. The development will incorporate "green roof" landscaped areas, with a range of soil depths. In accordance with CIRIA Report C644 Building Greener (Construction Industry Research and Information Association, 2007), green roofs provide interception of rainfall, reducing the rate and volume of rainfall runoff. The ground level streets and public square will be drained through linear drains, pervious paving and bio-retention areas (rain-gardens) to underlying drainage medium. In accordance with CIRIA Report C753 The SuDS Manual (Construction Industry Research and Information Association, 2015), pervious paving and bio-retention areas provide water quality treatment and runoff rate reduction. As all car parking spaces are to be provided in covered areas, no surface water runoff from car parking spaces will enter the surface water drainage system.

Surface water runoff from the proposed development will be attenuated to equivalent greenfield runoff rates, in accordance with the Greater Dublin Strategic Drainage Study (GDSDS) and Dublin City Council requirements. The equivalent greenfield runoff rate for the subject site is

2.0l/s/ha, resulting in a total discharge rate from the site of 5.8l/s. Attenuation storage will be provided at roof level in the green roof drainage medium (“blue roofs”); roof water outlets will incorporate flow control devices to limit discharge from roof level down to lower levels. The streets and public square will drain through pervious paving and planted bio-retention areas to be stored in the underlying drainage medium, which will be provided over the basement level and in pervious paving sub-strata. Runoff will be conveyed through the drainage medium and outfall through flow control chambers to the receiving sewerage network. It is proposed to discharge surface water to the existing combined sewerage network adjacent to the site, which drains to Irish Water’s Mayor Street Pumping Station.

The proposed surface water drainage system therefore comprises a Sustainable Urban Drainage System (SUDS) consisting of green roofs, blue roofs, pervious paving, bio-retention areas, attenuation storage and flow control. The proposed SUDS devices provide a treatment train for rainfall runoff, delivering interception storage, water quality treatment, runoff volume reduction and runoff rate reduction.

The proposed surface water drainage system is designed in accordance with I.S. EN12056: 2000 ‘*Gravity Drainage Systems inside Buildings*’, I.S. EN752: 2017 ‘*Drain & Sewer Systems outside Buildings*’, ‘*The Greater Dublin Region Code of Practice for Drainage Works*’ and the recommendations of the ‘*Greater Dublin Strategic Drainage Study*’, (GDSDS).

9.3.2 Wastewater Drainage

Based on the nature and extent of the proposed development, the expected daily wastewater generation is 340m3/day with an equivalent Dry Weather Flow (DWF) of 3.9l/s and a total Biological Oxygen Demand (BOD) of 126kg/day – see calculation in **Table 9.1**. With peaking factors of 3.0 and 4.5 for domestic and non-domestic flow respectively, the resulting peak flow is expected to be 12.0l/s.

	Population	Flow	BOD	Infiltration	Total Flow	Total BOD	DWF
		(l/unit/day)	(g/unit/day)	(% of flow)	(m^3/day)	(kg/day)	(l/s)
741 Apartments	2000.7	150	60	10%	330.1	120.0	3.8
3,142m^2 Retail, Commercial and Community	125.7	50	30	10%	6.9	3.8	0.08
1,444m^2 Amenity	57.8	50	30	10%	3.2	1.7	0.04
Total					340	126	3.9

TABLE 9-1 CALCULATION OF WASTEWATER FLOW

It is proposed to collect wastewater from the development above ground level in a network of gravity drainage pipes suspended at high level within the basement carpark. Runoff from the covered basement carpark will be collected and passed through a Class 2 Hydrocarbon Separator prior to being pumped to the gravity wastewater collection system at ground level.

It is proposed to discharge wastewater by gravity to the existing combined sewerage network adjacent to the site, which drains to Irish Water's Mayor Street Pumping Station.

The proposed wastewater drainage system is designed in accordance with I.S. EN12056: 2000 '*Gravity Drainage Systems inside Buildings*', I.S. EN752: 2017 "*Drain & Sewer Systems outside Buildings*" and Irish Water's '*Code of Practice for Wastewater Infrastructure*' (IW-CDS-5030-03 Revision 1).

9.4 Baseline Scenario

9.4.1 Regional Hydrology

The site lies within the Eastern River Basin District (ERBD). The ERBD covers a large area (c. 6,300km^2) extending from parts of Co. Cavan in the north to south Wicklow and from parts of Co. Westmeath to the Irish Sea. The main river catchments in the RBD are the Boyne, the Nanny/Delvin, the Liffey and the Avoca/Vartry.

The district is further divided into Hydrometric Areas (HA) and the site lies within HA09 which is the catchment draining to Dublin Bay. Hydrometric Area 09 is the most densely populated in Ireland and contains a relatively large area of urbanised land (c. 21%) with agricultural land comprising over 60% of the catchment. Given the urban nature of the catchment, the water bodies within it are subject to prolonged and sustained pressure from pollution via point and diffuse sources. The water bodies have also been subject to high degrees of modification and canalisation as a result of development through the years.

The site is located on land historically reclaimed from the Liffey Estuary and can be considered to be within the Liffey Catchment. The Liffey rises in the Wicklow Mountains near the Sally Gap and the upper catchment consists of high mountains areas of Co. Wicklow. The river flows for c.125km through Co. Wicklow, Co. Kildare and Co. Dublin before entering the Irish Sea at Dublin Bay. The catchment areas are c.1,250km^2. The Liffey is impounded by dams at Poulaphouca, Golden Falls and Leixlip; the impoundments are associated with hydroelectric generation and water extraction. These installations regulate the river flow.

The Liffey Estuary stretches from Islandbridge (c. 4.5km upstream of the subject site) to the end of the Bull Wall. For the purposes of WFD assessment and classification, the estuary was split into the upper and lower water bodies. The Liffey Estuary is dominated in terms of land use by Dublin City and in the lower reaches by Dublin Port and the associated industrial areas. The former industrial docklands area has undergone major redevelopment in recent years and now has a service sector development along its perimeter. Whilst the flow in the estuary itself is to some extent regulated by the controlled release of water from the upstream reservoirs, the mixing processes in the estuary are typified by a classic “salt wedge”.

The Liffey Estuary is transitional water (tidal) up to Islandbridge and has been classified as a eutrophic, nutrient sensitive water. The WFD report for the waterbody classifies the overall status as Moderate with an objective to restore good status by 2027. The catchment is at risk of not achieving the conservations objective. The main risk factor has been identified as Combined Sewer Overflows (CSOs). These are known to occur from many points within the Dublin City catchment including from the combined sewerage receiving discharge from the subject site (further information in Chapter 7).

The River Liffey Estuary has not been designated as a European Site under the Habitat’s Directive. However, it is hydrologically linked to a number of designated sites namely:

Special Areas of Conservation:

1. North Dublin Bay SAC (000206), 4.2km to the east;

2. South Dublin Bay SAC (000210), 2.8km to the southeast;

Special Protection Areas:

3. North Bull Island SPA (004006), 4.2km to the northeast;

4. South Dublin Bay and River Tolka Estuary SPA (004024), 1.2km to the east at the closest point, 3.8km downstream of the site via the River Liffey;

The Royal Canal is located approximately 250m east of the subject site but is not hydrologically linked to the subject site.

9.4.2 Local Hydrology

No watercourses or surface water features of any type are present within the site boundary. The closest such feature is the Liffey Estuary at North Wall Quay, located approximately 380m to the south of the subject site at the closest point. Historic development in the area has resulted in all surface water runoff from the site being discharged to the combined sewerage infrastructure, which ultimately drains to the Ringsend Wastewater Treatment Works.

The site of the proposed development comprises approximately 2.9 hectares. Of this total, approximately 0.4 hectares comprises existing railway sidings in ballast. The remaining 2.5 hectares of the site is primarily in hardstand. Only 0.02 hectares is planted shrub; this area is a steep embankment with generally higher runoff characteristics than flat soft stand. The primary land use of the site is surface car parking, with bituminous road surface (“tarmac”) predominating. Buildings with hard roofs make up approximately 0.3 hectares of the site.

Runoff from the existing site is collected via gullies and downpipes through a network of below ground pipes. Trapped gullies provide limited grit removal, and runoff from car parking areas passes through hydrocarbon separators. There is no interception or other form of runoff volume reduction. There is no flow control and attenuation of runoff from the site. As there is no flow control, runoff from the site will vary with the intensity of rainfall; representative discharge rates have been calculated and are presented in **Table 9.2**.

Storm Return Period and Duration	Pre-development Discharge (l/s)
5-year 120 minute	86
30-year 120 minute	139
100-year 120 minute	186

TABLE 9-2 PRE-DEVELOPMENT SURFACE WATER DISCHARGE

All surface water runoff from the site is directed to existing combined sewerage infrastructure draining to Irish Water's Mayor Street Pumping Station. Combined Sewer Overflows (CSOs) on the receiving sewerage network discharge the Liffey Estuary at North Wall Quay. The Mayor Street Pumping Station discharges to existing gravity sewerage in Amiens Street that ultimately drains to Ringsend Wastewater Treatment Works.

9.4.3 Wastewater Drainage

In the vicinity of the subject site, there is an extensive network of combined sewers (collecting both wastewater and surface water) in the ownership of Irish Water that is operated and maintained in conjunction with Dublin City Council. Drainage Record Plans provided by Dublin City Council indicate that there are no foul sewers (collecting only foul sewage) in the vicinity of the subject site. The existing combined sewers provide services to domestic, commercial and industrial customers in the immediate vicinity of the site and in the wider area.

The primary land use of the subject site is surface car parking. Existing office space provides limited accommodation, with existing wastewater flow estimated as 12.6m^3/day with an equivalent DWF of 0.15l/s and a total Biological Oxygen Demand (BOD) of 5.8kg/day. With a peaking factor of 4.5 for non-domestic flow, the resulting peak flow is estimated to be 0.66l/s.

All wastewater generated on the site is directed to existing combined sewerage infrastructure draining to Irish Water's Mayor Street Pumping Station. Combined Sewer Overflows (CSOs) on the receiving sewerage network discharge the Liffey Estuary at North Wall Quay. The Mayor Street Pumping Station discharges to existing gravity sewerage in Amiens Street that ultimately drains to Ringsend Wastewater Treatment Works. Effluent from the treatment works is discharged to the Irish Sea at Dublin Bay.

Ringsend Wastewater Treatment Plant serves Dublin City and the City environs in the neighbouring counties. Its contributing residential population is in the order of 1.1 million. Together with the non-domestic contribution, the existing treatment works is currently operating at its full capacity of 1.65 million population equivalent (PE).

In November 2012, Dublin City Council received planning permission to improve the plant to 2.1M PE firm capacity, equivalent to 2.4M PE ultimate design capacity. This decision was challenged by way of judicial review and in November 2013, the decision to approve the scheme was confirmed by the High Court. Irish Water has inherited the treatment plant and plan to upgrade the existing plant to meet a capacity of up to 2.1M PE; this is currently being implemented.

The upgrade and expansion of the treatment works will be implemented in three phases. Phase 1 has already been completed and comprises advanced works to improve certain aspects of the existing works, including additional odour treatment and improved sludge handling capacity. Phase 2 will expand capacity to 2.1M PE and is programmed to become available for wastewater treatment by the end of 2018. Phase 3 comprises an upgrade to nutrient removal at the existing works and is planned to commence at the end of 2018 and is expected to take two years to complete, with an anticipated completion timescale of the end of 2020.

In April 2019, An Bord Pleanála granted permission (ref: ABP-301798-18) to Irish Water for works at Ringsend WWTP, amending the proposals for works permitted in 2012.

The Greater Dublin Drainage Project, currently being prepared by Irish Water to go for planning approval, is a regional wastewater project to serve the Greater Dublin Area, with a planned treatment plant in north County Dublin. The project includes an orbital sewer and two pumping stations which will divert drainage from the north of Dublin City to the new treatment plant thus freeing up additional treatment capacity at the Ringsend treatment works which is currently treating drainage from this area. Subject to being granted planning approval, it is anticipated that this project will be operational in 2026.

9.5 Do Nothing Scenario

If the proposed development were not undertaken, it is expected that there would be no change on the subject site and therefore no impact on hydrology arising from the subject site.

In the absence of this proposed development, wastewater flow from the site would continue to discharge to the receiving sewerage network. The expected increase in wastewater flow arising from the proposed development would not be discharged to the existing sewerage network. However, surface water runoff from the site would continue to flow un-attenuated into the receiving combined sewerage infrastructure. Un-attenuated flow contributes to the frequency of CSO discharges of combined sewage to the Liffey Estuary in times of high rainfall.

9.6 Impact Assessment

9.6.1 Construction Phase

9.6.1.1 Local Hydrology

Due to the absence of natural watercourses and surface water sewers in the vicinity of the site, it is expected that surface water runoff during construction would be discharged to Irish Water's combined sewerage network, subject to the conditions of a discharge licence from Irish Water. While the combined sewerage network normally conveys flow to the Ringsend Wastewater Treatment Works, Combined Sewer Overflows (CSOs) on the network present a residual risk that untreated surface water runoff from the construction site would enter the Liffey Estuary.

Surface water runoff during construction activities may contain increased silt levels or become polluted from construction activities. Waterborne silt can arise from dewatering excavations, exposed ground, stockpiles and site roads. Construction materials such as concrete and cement are alkaline and corrosive and can cause pollution in watercourses. The development will require the removal of topsoil and earthworks. Such works could potentially cause deoxygenation of water in the receiving watercourses, the gills of fish to become obstructed with waterborne silt and aquatic plants and invertebrates to be smothered by settled silt, limiting exposure to sunlight and oxygen. Heavy siltation or grit in the surface water runoff would lead to maintenance issues for the receiving gravity sewerage network and at Mayor Street Pumping Station. In the absence of mitigation measures, these potential impacts are considered to be adverse, significant and temporary. Mitigation measures (as described in Section 9.6 below) are available to control and manage these risks.

9.6.1.2 Wastewater Drainage

During construction it is envisaged that the contractor will put in place temporary drainage facilities to manage water within excavations. Water entering areas of excavation may be collected and discharged to the sewerage system following treatment (such as silt traps and interceptors) and at a flow rate subject to the conditions of a discharge licence from Irish Water. During the construction phase, welfare facilities for construction personnel will be located on site. Wastewater effluent from these facilities will be discharged to the sewerage system at a location and at a flow rate subject to the conditions of a discharge licence from Irish Water. Discharge from the excavated areas could potentially lead to siltation, surcharge and flooding within the sewerage system. Effluent from the welfare facilities could potentially lead to pollution of watercourses and flooding within the sewerage system. In the absence of mitigation measures, these potential impacts are considered to be adverse, significant and temporary. Compliance with the conditions of the discharge licence will effectively mitigate potential risks to the sewerage system.

9.6.2 Operational Phase

9.6.2.1 Local Hydrology

As the existing site is currently predominantly in hardstand, the proposed development will result in no significant increase in surface water runoff volume or runoff rates. The primary land use of the existing site is surface car-parking, with a resultant risk of surface water runoff containing elevated hydrocarbons. The proposed change from the existing scenario to the proposed development provides an inherent improvement for surface water.

The proposed Sustainable Urban Drainage System (SUDS) for the development incorporates flow control and attenuation of discharge from the site to the receiving sewerage network. This will result in a significant decrease in surface water discharge from the site, as illustrated in Table 9.3 below. The decrease in surface water discharge from the site will reduce the risk of flooding in the receiving sewerage network and will reduce the risk of CSO discharges to the Liffey Estuary.

Storm Return Period and Duration	Pre-development Discharge (l/s)	Post-development Discharge (attenuated) (l/s)	Percentage Change in Surface Water Discharge (%)
5-year 120 minute	86	5.8	-93
30-year 120 minute	139	5.8	-96
100-year 120 minute	186	5.8	-97

TABLE 9-3 COMPARISON OF PRE- AND POST-DEVELOPMENT SURFACE WATER DISCHARGE

The proposed drainage system for the development incorporates interception in the form of green roofs and bio-retention areas that facilitate losses through evapo-transpiration, thereby reducing the volume of surface water runoff.

The impacts on surface water discharge from the site are considered to be positive, significant and permanent.

9.6.2.2 Wastewater Drainage

The proposed development will increase the quantity of wastewater discharged to receiving wastewater sewerage network, Mayor Street Pumping Station and Ringsend Wastewater Treatment Works. However, as described earlier in illustrated in **Table 9.3**, the proposed development will result in a significant reduction in surface water discharge to the existing combined sewerage infrastructure. The combined surface water and wastewater discharges are presented in **Table 9.4**.

Storm Return Period and Duration	Pre-development Discharge			Post-development Discharge (attenuated)			Percentage Change in Total Discharge
	(l/s)			(l/s)			(%)
	SW	WW	Total	SW	WW	Total	Total
5-year 120 minute	86	0.66	86.66	5.8	12.0	17.8	-79
30-year 120 minute	139	0.66	139.66	5.8	12.0	17.8	-87
100-year 120 minute	186	0.66	186.66	5.8	12.0	17.8	-90

TABLE 9-4 COMPARISON OF PRE- AND POST-DEVELOPMENT SURFACE WATER AND WASTEWATER DISCHARGE

The receiving wastewater infrastructure is combined (surface water and wastewater flows) and includes Combined Sewer Overflows (CSOs) that discharge to the Liffey Estuary during extreme rainfall events. Therefore, it is the efficacy of the receiving wastewater infrastructure during extreme rainfall events that is critical for the assessment of environmental impacts. While the wastewater-only dry weather flow from the site is expected to increase as a result of the proposed development, the figures presented in Table 9.5 illustrate that, during extreme rainfall events, the loading on the existing wastewater infrastructure arising from the subject site will reduce as a result of the proposed development.

Irish Water has identified works required to increase the capacity at Mayor Street Pumping Station that will facilitate the development. Ringsend Wastewater Treatment Works has been upgraded to accommodate development of zoned lands.

There is the possibility that new wastewater sewers would leak, allowing wastewater to leak out of the sewers, potentially causing contamination of groundwater and surface waters in the area. In the absence of mitigation measures, these potential impacts are considered to be adverse, significant and permanent. However, all pipes will be tested prior to allowing wastewater effluent to discharge to them, in accordance with the requirements of Irish Water.

9.7 Mitigation

9.7.1 Incorporated Design Mitigation

9.7.1.1 Local Hydrology

Surface water runoff from the proposed development will be managed in accordance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS), with surface water attenuation and retention included as part of the main surface water drainage system.

The surface water management proposals would reduce the overall impact of the subject site on the existing environment by adopting a SuDS approach by combining elements such as green roofs, blue roofs, bio-retention areas, pervious paving, attenuation storage and flow control within the proposed development.

9.7.1.2 Wastewater Drainage

The proposed wastewater drainage system is designed in accordance with I.S. EN12056: 2000 '*Gravity Drainage Systems inside Buildings*', I.S. EN752: 2017 "*Drain & Sewer Systems outside Buildings*" and Irish Water's 'Code of Practice for Wastewater Infrastructure' (IW-CDS-5030-03 Revision 1). The proposed drainage system will therefore be designed with appropriate capacity for the development and ensure self-cleansing velocities are achieved to reduce the risk of blockages and odours.

9.7.2 Construction Phase Mitigation

9.7.2.1 Local Hydrology

The Contractor will be required to prepare and implement a Surface Water Management Plan that ensures avoidance and minimisation of effects. Surface water storage in excavations may be directed to on-site settlement ponds, where silt removal will be facilitated prior to discharge off site at a controlled rate. Periodic testing of the surface water discharge may also be undertaken.

If concrete mixing is carried out on site, the mixing plant will be sited in a designated area with an impervious surface.

To minimise any impact on the water environment from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas or chemical storage containers.

9.7.2.2 Wastewater Drainage

Any construction phase discharge to the wastewater sewerage infrastructure shall comply with the conditions of a Discharge Licence from Irish Water. In order to reduce the risk of defective or leaking sewers, all new sewers will be pressure tested and CCTV surveyed to ascertain any possible defects. Such defects, if they arise, would be repaired prior to the connection of any future development to the sewers.

9.7.3 Operational Phase Mitigation

9.7.3.1 Local Hydrology

Surface water runoff from the proposed development will be managed in accordance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS), with surface water attenuation and retention included as part of the main surface water drainage system.

The surface water management proposals will reduce the overall adverse effects of the subject site on the existing environment by adopting a SuDS approach by combining elements such as green roofs, blue roofs, bio-retention areas, pervious paving, attenuation storage and flow control.

The proposed drainage system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

9.7.3.2 Wastewater Drainage

The proposed wastewater drainage system is designed in accordance with I.S. EN12056: 2000 'Gravity Drainage Systems inside Buildings', I.S. EN752: 2017 "*Drain & Sewer Systems outside Buildings*" and Irish Water's '*Code of Practice for Wastewater Infrastructure*' (IW-CDS-5030-03 Revision 1). The proposed drainage system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

9.8 Monitoring

The requirement and recommendation for monitoring related to the hydrological environment is as follows:

- Qualitative and quantitative monitoring of any water to be discharged to the combined sewerage during the construction and operation phases. This might include flow monitoring and a regular sampling and analysis programme as required by the Regulating Authority under any Discharge Licence.
- Watching Brief and Discovery Strategy for any potentially contaminated material to ensure adequate classification and disposal (refer to Chapter 8, Land and Soils);
- Monitoring of retaining wall structures including inclinometers, tilt-meters and water movements either seepages or through control points during the construction programme. The specific monitoring requirements and frequency will be defined in the Contractor's CMP;
- Regular inspection of on-site fuel storage facilities to ensure environmental 'best-practices' are being employed during construction.

- Upon installation of new drains, pressure tests will be carried out to assess the potential for leaks to occur in the newly constructed drains.
- Following completion of the proposed drainage systems, a short-term flow and rainfall survey (involving in-pipe flow monitors and rain gauges on site) will be carried out to identify misconnections and allow for comparison with watermain meter readings to facilitate assessment and identification of any leakages.

9.9 Residual Impact Assessment

9.9.1 Local Hydrology

As the existing site is primarily in hardstand and the primary land use is surface car parking, the proposed development design provides inherent improvement in surface water runoff on the site due to the change in surface finishes and uses. Furthermore, the provision of a Sustainable Urban Drainage System (SUDS) for the proposed development will provide betterment of the existing scenario. Green roofs and bio-retention areas will facilitate a reduction in surface water runoff volumes discharged from the site. Collection of surface water runoff via green roofs, pervious paving and bio-retention areas provides improvement to water quality. Provision of attenuation storage and flow control will reduce surface water runoff rates discharged from the site.

As surface water runoff from the site is discharged to the receiving combined sewerage infrastructure which includes Combined Sewer Overflows (CSOs), the proposed development will result in a reduction in combined sewage discharges to the Liffey Estuary.

9.9.2 Wastewater Drainage

While the wastewater-only dry weather flow from the site will increase as a result of the proposed development, with a corresponding increase in BOD loading at the receiving wastewater treatment plant, during extreme rainfall events the loading on the existing wastewater infrastructure arising from the subject site will reduce as a result of the proposed development.

Irish Water has identified works required to increase the capacity at Mayor Street Pumping Station, which will facilitate the development. Ringsend Wastewater Treatment Works has been upgraded to accommodate development of zoned lands in the area.

The decrease in surface water discharge from the site will reduce the risk of flooding in the receiving sewerage network and will reduce the risk of CSO discharges to the Liffey Estuary.

9.10 Cumulative Impacts

9.10.1 Local Hydrology

The site is located in an area with a long history of urban development. Much of the surrounding area was developed without application of modern techniques of Sustainable Drainage Systems (SuDS). Any redevelopment in the area complying with current best-practice methods will likely lead to an improvement in surface water runoff conditions, similar to the subject proposed development.

9.10.2 Wastewater Drainage

The site is located in an area with a long history of urban development. Much of the surrounding area was developed with the use of combined surface water-wastewater drainage systems, leading to increased flows in the receiving combined sewerage network during rainfall events and associated environmental spills from Combined Sewerage Overflows (CSOs). While any redevelopment in the area resulting in an intensification of land use or increased density of occupation would likely lead to an increase in wastewater contributing to the receiving combined sewerage network, the application of modern techniques of Sustainable Drainage Systems (SuDS), similar to the subject proposed development, would tend to reduce the frequency of environmental spills. In addition, to use of separated drainage systems within any new development sites would facilitate the eventual separation of surface water and wastewater in the receiving sewerage network, thereby improving the performance of the sewerage network and wastewater treatment works.

9.11 Human Health

During the construction phase, there is potential for adverse impact on human health arising from construction activities and construction personnel, interruption of utility services to the general public and pollution of ground and surface water that might be in contact with the general public. During the operational phase, there is potential for adverse impact on human health arising from maintenance activities and maintenance personnel, reduction in utility services to the general public and pollution of ground and surface water that might be in contact with the general public. These risks are addressed in the preceding sections of this chapter. Risks to human health during the construction and operational phases have been managed in design by the application of the general principles of prevention hierarchy of risk elimination and reduction. In the construction phase, the works contractor will assess residual risks and implement appropriate construction methodologies. During the operational phase, inspection and maintenance of the material assets should be carried out by adequately equipped competent personnel. The potential for construction activities and operation of the proposed development to cause pollution and contamination.

9.12 Unplanned Events

The proposed infrastructure is designed in accordance with the relevant regulations, codes of practice and guidelines to provide sufficient capacity for the expected loading. However, in the design of the proposed development, the potential impact of these planned loads being exceeded was assessed. Where the designed capacity of piped drainage is exceeded, flow will travel over ground along roads; the street infrastructure has been designed to convey overland flow away from highly vulnerable receptors. In the event of unplanned interruptions to water supply, water will be available to future occupants of site from on-site water storage tanks. All proposed electricity, gas and telecommunications infrastructure will be provided below ground, where the risk of accidental damage is minimised.

9.13 References and Sources

- Greater Dublin Strategic Drainage Study (2005) – Fingal County Council, Dublin City Council, Dún Laoghaire-Rathdown County Council, South Dublin County Council, Wicklow County Council, Kildare County Council, Meath County Council
- The Greater Dublin Region Code of Practice for Drainage Works (2012) – Fingal County Council, Dublin City Council, Dún Laoghaire-Rathdown County Council, South Dublin County Council, Wicklow County Council, Kildare County Council, Meath County Council
- I.S. EN12056: 2000 Gravity Drainage Systems inside Buildings (2000) – National Standards Agency Ireland
- I.S. EN752: 2017 Drain & Sewer Systems outside Buildings (2017) – National Standards Agency Ireland
- Code of Practice for Water Infrastructure (2017) – Irish Water
- Code of Practice for Wastewater Infrastructure (2017) – Irish Water
- Wastewater Treatment Manuals (1999) – Environmental Protection Agency
- Pollution Prevention Guideline PPG3 Use and design of oil separators in surface water drainage systems (2006) – UK Environment Agency
- Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009) – National Roads Authority
- Control of Water Pollution from Construction Sites (2001) – Construction Industry Research and Information Association
- Environmental Handbook for Building and Civil Engineering Projects (2000) – Construction Industry Research and Information Association
- Environmental Protection Agency Envision Data Viewer: http://gis.epa.ie/Envision

CHAPTER 10
BIODIVERSITY

OCTOBER 2019

Table of Contents

Table of Figures

Table of Tables

10 Biodiversity

10.1 Introduction

This chapter assesses the potential effects of the proposed Connolly Quarter development on the biodiversity aspects of the receiving environment.

This biodiversity chapter has been prepared by Pádraic Fogarty of OPENFIELD Ecological Services. Pádraic Fogarty has worked for over 20 years in the environmental field and in 2007 was awarded an MSc from Sligo Institute of Technology for research into Ecological Impact Assessment (EcIA) in Ireland. OPENFIELD is a full member of the Institute of Environmental Management and Assessment (IEMA).

10.2 Proposed Development

Oxley Holdings Ltd. intend to apply to An Bord Pleanála for permission for a Strategic Housing Development at this site (c. 2.88 hectares) to the rear of Connolly Station, Sherriff Street Lower, Dublin 1, Eircode D01 V6V6. The site abuts Connolly Rail Station and has frontage onto Sherriff Street Lower, Oriel Street Upper and Seville Place.

The full development description is contained in EIAR Chapter 2 and briefly the development will consist of;

The development will consist of;

i. the demolition of 4 no. structures with a combined gross floor area of 3,028sq.m;

ii. the construction of 741 no. Build to Rent (BTR) residential units in 8 no. apartment blocks ranging in height from 4 storeys to 23 storeys with lower height buildings located adjacent to the northeast and east site boundaries, with a cumulative gross floor area of 68,535sq.m comprising;

   a. Block B1 (maximum building height 54.917m, total gross internal floor area 11,260sq.m, Apartment Mix: Studio: 25, 1-bed: 37, 2-bed: 51);
   b. Block B2 (maximum building height 54.917m, total gross internal floor area 10,831sq.m, Apartment Mix: Studio: 20, 1-bed: 35, 2-bed: 51,);
   c. Block B3 (maximum building height 51.767m, total gross internal floor area 9,766sq.m, Apartment Mix: Studio: 22, 1-bed: 60, 2-bed: 27, 3-Bed: 1);
   d. Block C1 (maximum building height 79.450m, total gross internal floor area 12,705sq.m, Apartment Mix: Studio: 84, 1-bed: 40, 2-bed: 41);
   e. Block C2 (maximum building height 39.615 m, total gross internal floor area 4,890 sq.m, Apartment Mix: Studio: 9, 1-bed: 33, 2-bed: 3, 3-Bed: 4);
   f. Block C3 (maximum building height 39.650 m, total gross internal floor area 6,775sq.m, Apartment Mix: Studio: 40, 1-bed: 18, 2-bed: 23);
   g. Block D1 (maximum building height 53.392 m, total gross internal floor area 8,418 sq.m, Apartment Mix: Studio: 10, 1-bed: 25, 2-bed: 44, 3-Bed: 1);
   h. Block D2 (maximum building height 30.950 m, total gross internal floor area 3,890 sq.m, Apartment Mix: Studio: 18, 1-bed: 8, 2-bed: 11);

iii. residential support amenities including 1 no. gym, a resident's lounge, work areas, meeting rooms, dining rooms, recreational areas with a combined GFA of 1,444 sq.m;

iv. change of use from club house to pedestrian passageway of the existing vault (137sq.m GFA) fronting Seville Place, a Protected Structure (RPS No. 130);
v. a basement of 7,253.4 sq.m with vehicular access from Oriel Street Upper incorporating residents' car parking (58 no. spaces), residents cycle parking (640 no. spaces) 7 no. plant rooms (combined 2,228sq.m), waste management facilities (393 sq.m)
vi. 766 no. covered cycle parking spaces for residents and visitors, concierge office (233 sq.m) and waste management facilities (126 sq.m);
vii. 'other uses' including 10 no. units providing retail, commercial, and community use with a combined GFA of 3,142 sq.m;
viii. A total of 18,562 sq.m of hard and soft landscaping comprising both public, communal and private open space located throughout the development;
ix. A service and emergency vehicle only access ramp from the Oriel Street Upper site entrance to serve CIE's transport needs at Connolly Station;
x. Enabling works of a non-material nature to safeguard the existing vaults (Protected Structures - RPS No. 130) that form part of the subject site fronting Sheriff Street Lower, Oriel Street Upper, and Seville Place during the construction phase;
xi. All associated ancillary development works including drainage, 6 no. electricity substations, pedestrian access; and

Works to the Masonry wall fronting Oriel Street and the Vaults fronting Seville Place (both a Protected Structure) consisting of the creation of a new vehicular and pedestrian entrance.

10.3 Methodology

Article 3 of the EIA Directive requires that "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:

- biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;" and
- Annex IV point 4 of the EIA Directive requires "A description of the factors specified in Article 3(1) likely to be significantly affected by the project: … biodiversity (for example fauna and flora).

The assessment was carried out in accordance with the following best practice methodology: 'Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland' by the Institute of Ecology and Environmental Management (IEEM, 2016) and 'Guidelines on the information to be contained in Environmental Impact Assessment Reports by the Environmental Protection Agency (EPA, 2017).

A site visit was carried out on the 15th of November 2018 in fair weather. The site was surveyed in accordance with the Heritage Council's Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2010). Habitats were identified in accordance with Fossitt's Guide to Habitats in Ireland (Fossitt, 2000).

The nomenclature for vascular plants is taken from *The New Flora of the British Isles* (Stace, 2010) and for mosses and liverworts *A Checklist and Census Catalogue of British and Irish Bryophytes* (Hill et al., 2009).

November lies outside the optimal survey period for general habitat surveys (Smith et al., 2010) but it was possible to classify all habitats on the site to Fossitt level 3. November lies outside the optimal season for surveying breeding birds and amphibians. However, given the urban context of the site, this was not a constraint to a full ecological assessment. It is within the optimal season for surveying large mammals.

The bat surveys were undertaken by a separate bat specialist. This EIAR contains a separate report on the potential effects to bats in Appendix 10.1. Thus, effects on bats from this project is not considered further in this EIAR section.

10.3.1 Consultation

Because of the very low ecological sensitivity of the subject lands, third party consultation was not sought.

10.4 Baseline Scenario

10.4.1 Zone of Influence

Best practice guidance suggests that an initial zone of influence be set at a radius of 2km for non-linear projects (IEA, 1995). However, some impacts are not limited to this distance and so sensitive receptors further from the project footprint may need to be considered as this assessment progresses. This is shown in **Figure 10.1**.

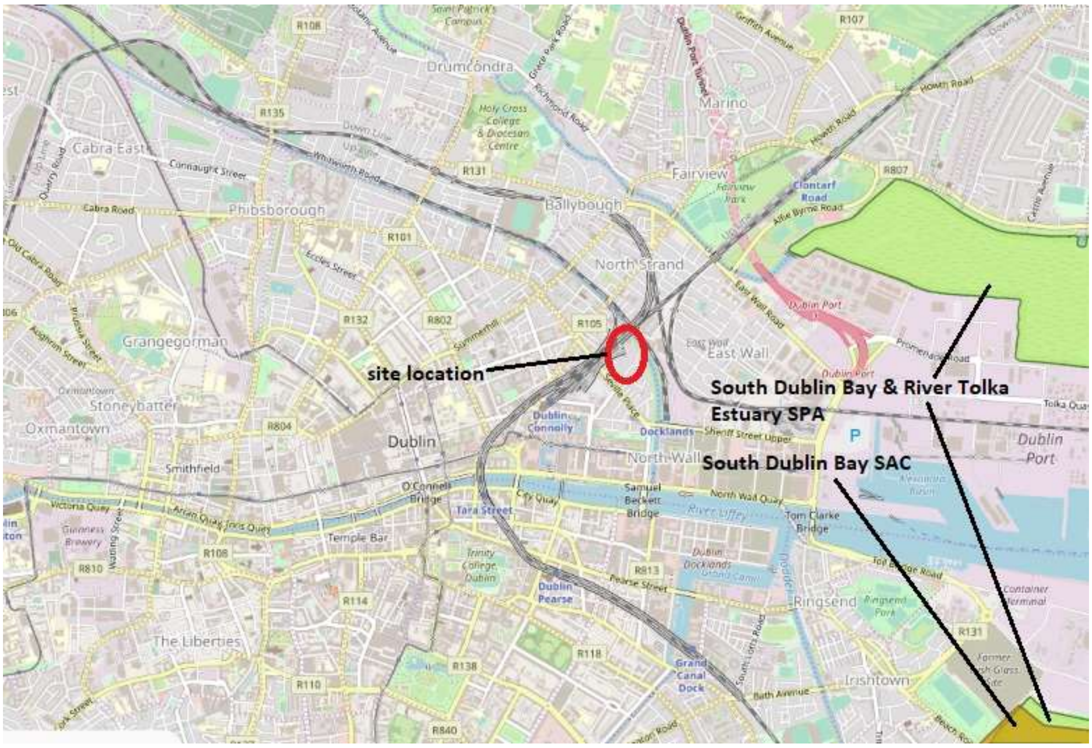


FIGURE 10-1 APPROXIMATE 2KM RADIUS OF PROPOSED SITE SHOWING AREA DESIGNATED FOR NATURE CONSERVATION

There are a number of designations for nature conservation in Ireland including National Park, National Nature Reserve, RAMSAR site, UNESCO Biosphere reserves, Special Protection Areas (SPA – Birds Directive), Special Areas of Conservation (SAC – Habitats Directive); and Natural Heritage Areas (NHA). The mechanism for these designations is through national or international legislation. Proposed NHAs (pNHA) are areas that have yet to gain full legislative protection. They are generally protected through the relevant County Development Plan. There is no system in Ireland for the designation of sites at a local, or county level. The following areas were found to be located within an approximate 2km radius of the application site:

10.4.1.1 Dublin Bay SAC (Site Code: 0210)

It has one qualifying interest (i.e. feature which qualifies the area as being of international importance) which is mudflats and sandflats not covered by seawater at low tide.

10.4.1.2 South Dublin Bay and Tolka Estuary SPA (Site Code: 4024)

This site is concentrated on the intertidal area of Sandymount Strand, to the south of the city, as well as the Tolka Estuary. The North Bull Island SPA (site code: 0206) is largely coincident with the North Dublin Bay SAC with the exception of the terrestrial portion of Bull Island. Table 2 lists the features of interest for these SPAs.

Bird counts form BirdWatch Ireland are taken from Dublin Bay as a whole and are not separated between the two SPAs in this area.

Dublin Bay is recognised as an internationally important site for water birds as it supports over 20,000 individuals. Table 10.1 shows the most recent count data available (Lewis et al., 2016).

Year	2010/11	2011/12	2012/13	2013/14	2014/15	Mean
Count	27,931	30,725	30,021	35,878	33,486	31,608

TABLE 10-1 – ANNUAL COUNT DATA FOR DUBLIN BAY FROM THE IRISH WETLAND BIRD SURVEY (IWEBS)

There were also internationally important populations of particular birds recorded in Dublin Bay (i.e. over 1% of the world population): Light-bellied brent geese *Branta bernicula hrota*; Black-tailed godwit *Limosa*; Knot *Calidris canutus* and Bar-tailed godwit *L. lapponica*.

Light-bellied Brent Goose (Branta bernicla hrota) [A046]
Oystercatcher (Haematopus ostralegus) [A130]
Ringed Plover (Charadrius hiaticula) [A137]
Grey Plover (Pluvialis squatarola) [A140]
Knot (Calidris canutus) [A143]
Sanderling (Calidris alba) [A144]
Dunlin (Calidris alpina) [A149]
Bar-tailed Godwit (Limosa lapponica) [A157]
Redshank (Tringa totanus) [A162]
Black-headed Gull (Croicocephalus ridibundus) [A179]
Roseate Tern (Sterna dougallii) [A192]
Common Tern (Sterna hirundo) [A193]

Arctic Tern (Sterna paradisaea) [A194]
Wetlands & Waterbirds [A999]

TABLE 10-2 – FEATURES OF INTEREST FOR THE SOUTH DUBLIN BAY AND TOLKA ESTUARY SPAS IN DUBLIN BAY (EU SPECIES CODE IN SQUARE PARENTHESIS)

10.4.1.3 South Dublin Bay pNHA (site code: 0210).

This area is coincident with the SAC, indeed the SAC designation may somewhat supplant this older national designation.

The NPWS web site (www.npws.ie) contains a mapping tool that indicates historic records of legally protected species within a selected Ordnance Survey (OS) 10km grid square. The subject site is located within the square O13 and six species of protected flowering plant are highlighted. These species are detailed in Table 10.3. It must be noted that this list cannot be seen as exhaustive as suitable habitat may be available for other important and protected species.

Species	**Habitat**[1]	**Current Status**[2]
Groenlandia densa		Current
Opposite-leaved Pondweed	Rivers, canals and estuarine mud	Record pre-1970
Galeopsis angustifolia Red Hemp-nettle	Calcareous gravels	
Hordeum secalinum Meadow Barley	Upper parts of brackish marshes, chiefly near the sea	
Puccinellia fasciculata Borrer's salt-marsh grass	Muddy inlets on the coast	Current
Hypericum hirsutum Hairy St. John's-wort	Woods and shady places	

TABLE 10-3 – KNOWN RECORDS FOR PROTECTED SPECIES WITHIN THE O13 10KM SQUARE

In summary it can be seen that of the six species only three records remain current. Opposite-leaved Pondweed was recorded as being 'common in the Grand Canal' in the Flora of County Dublin (Doogue et al., 1998). This source elaborates that the plant was "scattered along the Grand Canal at Dolphin's Barn from Portobello to Charlemont Bridge, and between Drimnagh and Kilmainham."

1 Parnell et al., 2012
2 Preston et al., 2002

Water quality in rivers, canals and estuaries is monitored on an on-going basis by the Environmental Protection Agency (EPA). They assess the pollution status of a stretch of water by analysing the invertebrates living in the substrate as different species show varying sensitivities to pollution. They arrive at a 'Q-Value' where Q1 = grossly polluted and Q5 = pristine quality (Toner et al., 2005). The subject lands are approximately 175m from the banks of the River Liffey. The river is tidally influenced throughout its length in Dublin city centre. The river banks at this location (Custom House Quay) are composed of artificial quay walls while water is assessed as 'eutrophic', indicating excessive levels of pollution. The biological quality of the canals is not assessed by the EPA although the estuarine waters of the Liffey where it meets the canals is assessed as 'unpolluted'. These data are taken from the ENVision mapping tool on www.epa.ie.

10.4.2 Plans or Policies Relating to Natural Heritage

Convention on Biological Diversity (CBD): The protection of biodiversity is enshrined in the CBD to which Ireland is a signatory. As part of its commitment to this international treaty Ireland, as part of a wider European Union initiative, was committed to the halt in loss of biodiversity by the year 2010. This target was not met but in 2010 in Nagoya, Japan, governments from around the world set about redoubling their efforts and issued a strategy for 2020 called 'Living in Harmony with Nature'. In 2011 the Irish Government incorporated the goals set out in this strategy, along with its commitments to conservation biodiversity under national and EU law, in the second national biodiversity action plan (Dept. of Arts, Heritage and the Gaeltacht, 2011).

Dublin City Biodiversity Action Plan 2015 – 2020: This plan was adopted in 2015 and identifies four themes: Strengthen the knowledge base for the conservation and management of biodiversity, and protect species and habitats of conservation value within Dublin City, Strengthen the effectiveness of regional collaboration for biodiversity conservation in the greater Dublin region, Enhance opportunities for biodiversity conservation through green infrastructure, and promote ecosystem services in appropriate locations throughout the City and Develop greater awareness and understanding of biodiversity, and identify opportunities for engagement with communities and interest groups.

Dublin City Development Plan 2016 – 2022: It consists of a number of themes, including: climate change; green infrastructure, open space, and recreation; and culture and heritage.

River Basin Management Plan 2018-2021: Under the Water Framework Directive (Directive 2000/60/EC) all Irish waters must achieve 'good ecological status' by 2015 or, with exemptions, by 2027 at the latest. The EPA website has assessed Dublin Bay as being of 'moderate' status.

10.4.3 Site Survey

Aerial photography from the OSI and historic mapping shows that this area has long been a part of the built environment of Dublin City. The site itself has been home to Connelly railway station and car park for many decades. The immediate vicinity is largely composed of buildings and artificial surfaces and minimal presence of vegetation.

10.4.3.1 Flora

The subject site is entirely composed of **buildings and artificial surfaces – BL3** which comprises car parking areas and buildings associated with the train station. As such there is minimal presence of vegetation. It is a habitat of negligible biodiversity value. There are a number of stands of Butterfly-bush *Buddleja davidii* (a non-native plant) along with small numbers of Grey Willow *Salix cinerea*. Ruderal plants are found in cracks and corners and includes frequent Canadian Fleabane *Conyza canadensis*.

No plants listed as alien invasive under Schedule 3 of SI No. 477 of 2011 are growing on the site.

10.4.3.2 Fauna

The site survey included incidental sightings or proxy signs (prints, scats, etc.) of faunal activity, while the presence of certain species can be concluded where there is suitable habitat within the known range of that species. **Table 10.4** details those mammals that are protected under national or international legislation in Ireland. Cells are greyed out where suitable habitat is not present or species are outside the range of the study area.

Table 10.4 – Protected mammals in Ireland and their known status within the O13 10km grid square. Those that are greyed out indicate either that there are no records of the species from the National Biodiversity Data Centre. Since the site is not coastal the two Seal species are greyed out.

Species	Level of Protection	Habitat[3]
Otter *Lutra*	Annex II & IV Habitats Directive; Wildlife (Amendment) Act, 2000	Rivers and wetlands
Lesser horseshoe bat *Rhinolophus hipposideros*		Disused, undisturbed old buildings, caves and mines
Grey seal *Halichoerus grypus*	Annex II & V Habitats Directive; Wildlife (Amendment) Act, 2000	Coastal habitats
Common seal *Phocaena*		
Whiskered bat *Myotis mystacinus*	Annex IV Habitats Directive; Wildlife (Amendment) Act, 2000	Gardens, parks and riparian habitats
Natterer's bat *Myotis nattereri*		Woodland
Leisler's bat *Nyctalus leisleri*		Open areas roosting in attics
Brown long-eared bat *Plecotus auritus*		Woodland
Common pipistrelle *Pipistrellus*		Farmland, woodland and urban areas
Soprano pipistrelle *Pipistrellus pygmaeus*		Rivers, lakes & riparian woodland
Daubenton's bat *Myotis daubentoniid*		Woodlands and bridges associated with open water
Nathusius' pipistrelle *Pipistrellus nathusii*		Parkland, mixed and pine forests, riparian habitats
Irish hare *Lepus timidus hibernicus*	Annex V Habitats Directive; Wildlife (Amendment) Act, 2000	Wide range of habitats
Pine Marten *Martes*		Broad-leaved and coniferous forest

[3] Harris & Yalden, 2008

Species	Level of Protection	Habitat[3]
Hedgehog *Erinaceus europaeus*	Wildlife (Amendment) Act, 2000	Woodlands and hedgerows
Pygmy shrew *Sorex minutus*		Woodlands, heathland, and wetlands
Red squirrel *Sciurus vulgaris*		Woodlands
Irish stoat *Mustela erminea hibernica*		Wide range of habitats
Badger *Meles*		Farmland, woodland and urban areas
Red deer *Cervus elaphus*		Woodland and open moorland
Fallow deer *Dama*		Mixed woodland but feeding in open habitat
Sika deer *Cervus nippon*		Coniferous woodland and adjacent heaths

TABLE 10-4 - KNOWN RECORDS OF PROTECTED SPECIES

Although a number of mammals are known to be present in Dublin city, most notably Fox *Vulpes,* there are no habitats on the site which are suitable for the majority of these species. The buildings were assessed for the suitability to host bat roosts. The lack of semi-natural vegetation in the immediate vicinity of the site is considered to be a significant limiting factor in this location while obvious roof cavities etc. are absent. A bat survey was carried out by Bat Eco Services on August 29th 2018 and on July 23rd, 25th and 26th 2019. These dates are well within the optimal survey period. This found no evidence of roosting bats and a 'low level' of activity generally. No foraging activity was noted while two species were recorded commuting: Common Pipistrelle and Leisler's Bat.

No birds were recorded during the site survey and habitats are not suitable for nesting countryside birds. Although November is outside the bird breeding season, the railway buildings are likely to be home to nesting Feral Pigeon *Columba livia.* The flat roof of the office building to the south is suitable for breeding sea gulls, and a number of species are known to nest in the city centre, notably Herring Gull *Larus argentatus* and Lesser Black-backed Gull *L. fuscus*. Herring gull is listed as of high conservation concern due to a long-term decline (1980-2013) in the national population of between 25% - 49%. The latest atlas of breeding birds states "reductions in feeding opportunities at feeding sites and from fishing industry discards, changes in intertidal ecology affecting food supplies, continuing effects of botulism plus increased rates of mammalian predation are implicated in the declines" (Balmer et al., 2013). Lesser Black-backed gulls are listed as of medium conservation concern (Colhoun & Cummins, 2013). An unpublished survey by BirdWatch Ireland in 2015 recorded 65 roof-nesting sites for gulls, the majority of these in the Dublin area and belonging to Herring Gulls (82% of the total). A map produced for this study showed that Herring Gull nests are widely distributed throughout Dublin city.

There are no suitable habitats on the site for amphibians or fish.

Most habitats, even highly altered ones, are likely to harbour a wide diversity of invertebrates. In Ireland only one insect is protected by law, the Marsh Fritillary butterfly *Euphydryas aurinia,* and this is not to be found on built up sites. Other protected invertebrates are confined to freshwater and wetland habitats and so are not present on this site.

10.4.4 Overall Evaluation of the Context, Character, Significance and Sensitivity of the Proposed Development Site

In summary it has been seen that the application site is within a built-up area of Dublin City Centre. There are no examples of habitats listed on Annex I of the Habitats Directive or records of rare or protected plants. There are no species listed as alien invasive as per SI 477 of 2011 or as 'most unwanted' by Invasive Species Ireland.

The buildings may be home to breeding birds.

Significance criteria are available from guidance published by the National Roads Authority (NRA, 2009). These are reproduced in **Table 10.5**. From this an evaluation of the various habitats and ecological features on the site has been made and this is shown in **Table 10.6**.

Site Rating	Qualifying criteria
A - International importance	SAC, SPA or site qualifying as such. Sites containing 'best examples' of Annex I priority habitats (Habitats Directive). Resident or regularly occurring populations of species listed under Annex II (Habitats Directive); Annex I (Birds Directive); the Bonn or Berne Conventions. RAMSAR site; UNESCO biosphere reserve; Designated Salmonid water
B - National importance	NHA. Statutory Nature Reserves. Refuge for Flora and Fauna. National Park. Resident or regularly occurring populations of species listed in the Wildlife Act or Red Data List 'Viable' examples of habitats listed in Annex I of the Habitats Directive
C - County importance	Area of Special Amenity, Tree Protection Orders, high amenity (designated under a County Development Plan) Resident or regularly occurring populations (important at a county level, defined as >1% of the county population) of European, Wildlife Act or Red Data Book species Sites containing semi-natural habitat types with high biodiversity in a county context, and a high degree of naturalness, or populations of species that are uncommon in the county
D - Local importance, higher value	Sites containing semi-natural habitat types with high biodiversity in a county context, and a high degree of naturalness, or populations of species that are uncommon in the locality Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
E - Local importance, lower value	Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; Sites or features containing non-native species that are of some importance in maintaining habitat links.

TABLE 10-5 SITE EVALUATION SCHEME TAKEN FROM NRA GUIDANCE 2009

Buildings and artificial surfaces – BL3	Negligible ecological value

TABLE 10-6 SITE EVALUATION SCHEME TAKEN FROM NRA GUIDANCE 2009

10.5 Characteristics Of The Proposed Development

The proposal is for a mixed-use development as detailed in section 10.2 and in EIAR Chapter 2 Development Description.

The development will result in the loss of no semi-natural habitat.

There will be new connections to foul and surface water drainage sewers, water supply, gas supply, electrical supply, and telecommunications connections that will be installed as buried connections in the streets near the site.

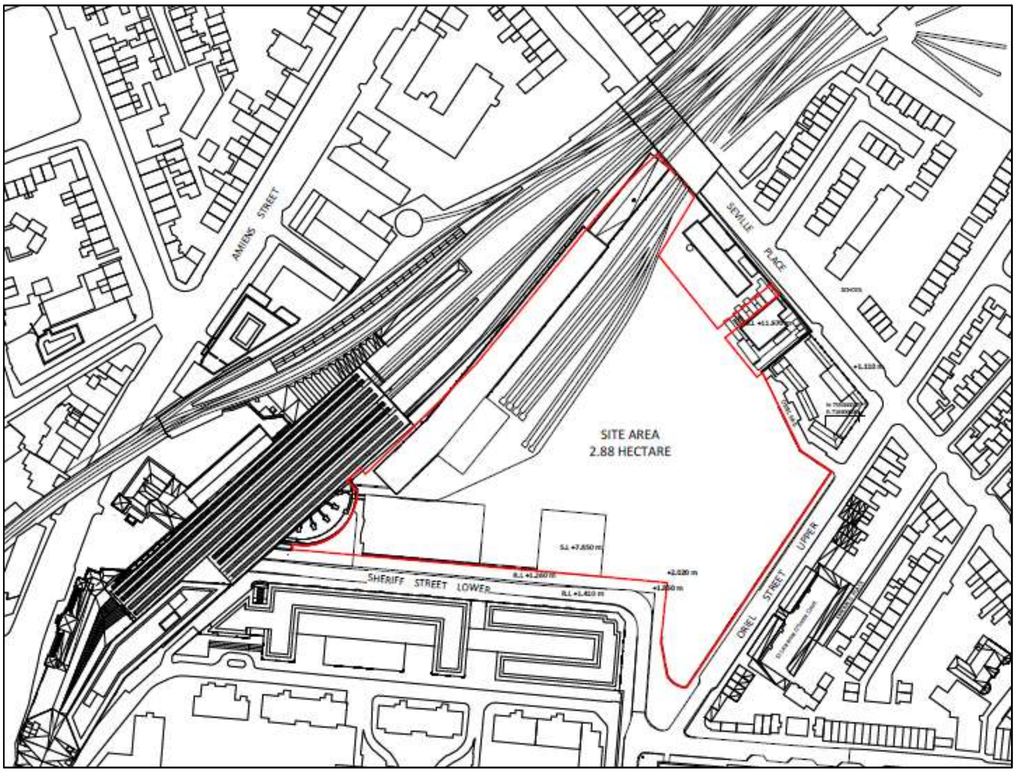


FIGURE 10-2 – DEVELOPMENT LOCATION

10.6 Potential Impact Of The Proposed Development

This section provides a description of the potential impacts that the proposed development may have on biodiversity in the absence of mitigation. Table 3.3 of the EPA guidance note sets out the criteria for determining the significance of impacts. This assessment is based on the valuation of the ecological feature in question and the quality, extent, and duration of the predicted impact. In this way it is possible to assign an impact significance in a transparent and objective way. Table 10.8 summaries the nature of the predicted impacts.

10.6.1 Construction Phase

The following potential impacts are likely to occur during the construction phase in the absence of mitigation:

1. The removal of habitats including the loss of (potential) nesting sites for pigeon and gulls. Herring Gull has suffered significant decline nationally and so is of high conservation concern. It is normally a coastal bird but has taken to nesting on buildings in urban areas in recent times. Its decline in Ireland is associated with a number of factors however the availability of nesting space or suitable habitat is not among these. While population trends in Dublin city are not available, recent data from BirdWatch Ireland indicate that nesting locations are widespread in the city. Although this potential nesting site will be lost, available nesting sites are widely available across the city and so the overall effect to the Herring Gull population must be considered imperceptible. Greater Black-backed Gull and Lesser Black-backed Gull are of medium conservation concern while Feral Pigeon is of low concern.

2. The direct mortality of species during demolition.

The demolition of buildings could impact nesting birds. This impact is most acute during the bird breeding season which can be assumed to last from March to August inclusive. The buildings have been confirmed to be suitable for nesting birds and mitigation will be required during the construction phase as all birds' nests and eggs are protected.

Although no bat roosts were recorded, a minor negative impact may occur to occur to bats arising from the removal of potential roost structures, specifically the renovation of stone arches.

3. Pollution of water courses through the ingress of silt, oils and other toxic substances. The distance of the site from Dublin Bay means that there is a buffer between potential pollution sources and this sensitive receptor. However, sediment is not a pollutant in coastal areas in the way it is in rivers (and where sediment can spoil fish spawning habitat). Estuaries and intertidal habitats, on the other hand, depend upon large quantities of sediment for the function and structure. No negative effects to habitats or species are expected from this phase.

10.6.2 Operational Phase

The following potential impacts are likely to occur during the operation phase in the absence of mitigation:

4. Pollution of water from foul wastewater arising from the development. Wastewater will be sent to the municipal treatment plant at Ringsend. Upgrade works are needed as the plant is not currently meeting its requirements under the Urban Wastewater Treatment Directive. Pollution effects are most acute in freshwater systems where the capacity for dilution is low and the consequent risk of eutrophication is high. The Ringsend WWTP discharges into Dublin Bay which is currently classified as 'unpolluted' by the EPA despite long-running compliance

issues at the plant. There is currently no evidence that non-compliance issues at the WWTP are having negative effects to features of high ecological value (e.g. wading birds or intertidal habitats). In February 2018 Irish Water announced proposals to upgrade the Ringsend plant and apply for planning permission for a new plant in north County Dublin. This will see improved treatment standards and will increase network capacity by 50%, with a target completion date of 2023.

5. Pollution of water from surface water run-off. The Greater Dublin Strategic Drainage Study (2005) identified issues of urban expansion leading to an increased risk of flooding in the city and a deterioration of water quality. This arises where soil and natural vegetation, which is permeable to rainwater and slows its flow, is replaced with impermeable hard surfaces. The site is currently entirely covered by hard standing and the proposed residential extension cannot adversely affect the quantity or quality of surface water run-off. The introduction of SUDS methods, green roofs, brown roofs will positively mitigate the run-off characteristics from this site.

6. Impacts to bats from artificial lighting and human disturbance were assessed in the bat report as ‘minor negative’.

7. Impacts to protected areas. No impacts are predicted to Natura 2000 areas (SACs or SPAs) in Dublin Bay, principally due to the separation distance between the site and these areas. A full assessment of potential effects to these areas is contained within a separate **Screening Report for Appropriate Assessment** included with the planning application documentation.

Impact		Direct/ Indirect	Cumulative	Duration[4]	Reversible?	Quality
Construction Phase						
1	Habitat loss	Direct	No	Permanent/ Temporary	No	Neutral
2	Species Mortality	Direct	No	Permanent	No	Negative
3	Pollution of water courses	Indirect	Yes	Temporary	Yes	Neutral
Operation Phase						
4	Wastewater	Indirect	Yes	Permanent	Yes	Negative
6	Bats	Direct	Yes	Permanent	Yes	Negative
7	Surface water run-off	Indirect	Yes	Permanent	Yes	Positive

TABLE 10-7 - NATURE OF PREDICTED IMPACTS IN THE ABSENCE OF MITIGATION

4 Momentary: seconds to minutes; Brief: > 1 day; Temporary: up to 1 year; Short-term: 1-7 years; Medium-term: 7-15 years; Long-term: 15-60 years; Permanent: >60 years (EPA, 2017)

Table 10.8 below assesses the scale and likelihood of the predicted impacts of the proposed development in the absence of mitigation.

Impact		Magnitude	As proportion of resource	Probability
Construction Phase				
1	Habitat loss	No loss of semi-natural habitat	-	Likely
2	Mortality to animals during construction	Possible disturbance to protected species	-	Likely
3	Pollution of water	No water bodies in close proximity	-	Unlikely given barriers to flow between the site and the river
Operation Phase				
4	Wastewater pollution	Not possible to quantify	N/A	Unlikely given existing and future treatment facilities at Ringsend
5	Surface water pollution	Not possible to quantify	N/A	Likely improvement given proposed attenuation measures
6	Bats	Very low levels of bat activity were recorded	Would affect the entire bat population	Unlikely

TABLE 10-8 – SCALE AND PROBABILITY OF PREDICTED IMPACTS IN THE ABSENCE OF MITIGATION

Table 10.7 and **Table 10.8** are combined to determine the level of significance of any given impact. This is shown in **Table 10.9**.

Construction phase		
	Impact	Significance
1	Loss of habitat	Imperceptible
2	Mortality to animals during construction	Significant
3	Pollution of water during construction phase	Imperceptible
4	Wastewater pollution	Imperceptible
5	Surface water pollution	Slight
6	Bats	Imperceptible

TABLE 10-9 - SIGNIFICANCE LEVEL OF LIKELY IMPACTS IN THE ABSENCE OF MITIGATION

Overall it can be seen that one potential significant impact is predicted to occur as a result of this project in the absence of mitigation.

10.6.3 Cumulative Impacts

A number of the identified impacts can also act cumulatively with other impacts from similar developments in this area of Dublin. These primarily arise through the additional loading to the Ringsend Wastewater Treatment Plant. It is considered that this effect is not significant due to the planned upgrading works that will bring it in line with the requirement of the Urban Wastewater Treatment Directive.

In this instance the incorporation of SUDS and other attenuation measures replacing a brown-field site without attenuation measures will contribute to the cumulative positive effective of reducing rainwater run off to the municipal treatment plant.

The Connolly Quarter Masterplan shows a design for the development of the entire site comprising the lands under agreement between CIE and Oxley Holdings Limited. Oxley Holdings Limited intended to submit an application under Section 34 to Dublin City Council for the development of office and hotel blocks. These are Blocks A, D3, and E detailed in the Masterplan. It is considered that the cumulative effects from the works required to implement the masterplan are neutral, permanent, and not significant.

There are no other effects which could act in a cumulative way to result in significant impacts to flora and fauna.

10.6.4 Do Nothing Impact

Should the proposed development not progress, the site will continue to have minimal ecological value and is likely to remain hard surfaced. This is unlikely to change in the absence of this project.

10.7 Mitigation and Monitoring

These measures include avoidance, reduction and constructive mitigation measures as set out in Section 3.8 of the EPA (2017) Draft Guidelines on Information to be contained in an EIAR. Under the EIA Directive, where significant negative effects are predicted to arise from a project then mitigation measures are required.

This report has identified one impact that was assessed as significant and therefore mitigation is required. This is to avoid impacts to breeding birds.

10.7.1 Recommendation: Mitigation by avoidance

If possible the demolition of existing buildings should be completed outside the bird breeding season. Potential mitigation measures are to install netting on potential nesting spaces before the end of February to prevent any nesting occurring. The existing buildings should be surveyed during the breeding season to determine their use by nesting birds during the year of construction. Depending upon the outcome of this survey, further mitigation may be required.

Recommendation: Mitigation by reduction

The following measures are taken from the bat survey report in relation to artificial lighting and landscaping:

"All luminaires used should lack UV/IR elements to reduce impact.

- LED luminaires should be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (<2700 Kelvins is recommended to reduce the blue light component of the LED spectrum).
- Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- The use of specialist bollard or low-level downward directional luminaires should be considered in bat sensitive areas to retain darkness above.
- Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.
- Only luminaires with an upward light ratio of 0% and with good optical control should be used.
- Luminaires should always be mounted on the horizontal, i.e. no upward tilt.
- Any external security lighting should be set on motion-sensors and short (1min) timers.
- As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

In relation to urban lighting, avoid lighting over reflective surfaces and, where possible, use timers to reduce lighting during hours of the night when it is not needed.

For pedestrian lighting, use low level lighting that is as directional as possible and below three lux at ground level with an aim to having it below 1 lux at ground level.

The landscaping is recommended to incorporate:

- Native hedgerow tree species
- Individual deciduous trees (in lines) that could potentially provide commuting corridors through the proposed development site
- Flower rich meadows, scrub and groups of trees
- Where possible, include water features connected to other green spaces
- Green roofs, communal wildlife friendly gardens and potentially living walls with climbing plants and creepers with a view of provide connected pockets of foraging habitat (linking in with other streetscape planting e.g. individual trees)
- Avoid the use of chemicals (weed killers, etc.) within the development zone.

10.8 Predicted Impacts Of The Proposed Development

This section allows for a qualitative description of the resultant specific direct, indirect, secondary, cumulative, short, medium and long-term permanent, temporary, positive and negative effects as well as impact interactions which the proposed development may have, assuming all mitigation measures are fully and successfully applied.

10.8.1 Operational Phase

With mitigation in place the residual impacts to biodiversity from the operational phase of this project will be a permanent neutral, and imperceptible.

10.8.2 Construction Phase

With mitigation in place the residual impacts to biodiversity from the construction phase of this project will be a short-term neutral and not significant.

10.9 Monitoring

Monitoring is required where the success of mitigation measures is uncertain or where residual impacts may in themselves be significant.

Monitoring will be required during the bird nesting season to ensure that the integrity of netting is maintained and that no birds are nesting at the time of works commencing.

10.10 Reinstatement

No reinstatement works are required for ecological features.

10.10 Interactions

This section provides a description of impact interactions together with potential indirect, secondary and cumulative impacts.

The key environmental interaction with Biodiversity is Water. A series of mitigation measures are proposed in Chapter 9 – Water of this EIAR document to ensure the quality (pollution and sedimentation) and quantity (surface run-off and flooding) is of an appropriate standard.

10.11 Difficulties Encountered in Compiling

This section provides an indication of any difficulties encounters by the environmental specialist in collecting and compiling the required information.

No difficulties were encountered in carrying out this assessment.

10.12 References

- Bullock C., Kretch C. & Candon E. 2008. *The Economic and Social Aspects of Biodiversity*. Stationary Office.
- Colhoun K. & Cummins S. 2013. *Birds of Conservation Concern in Ireland 2014 – 2019.* Irish Birds. Volume 9 Number 4 pg523-541.
- Cooney R. & Dickson B. 2005. *Biodiversity and the Precautionary Principle.* Earthscan.
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora
- Council Directive 97/11/EEC of 3rd March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment
- Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy – more commonly known as the Water Framework Directive
- Curtis T.G.F.& McGough H.N. 1988. *The Irish Red Data Book 1: Vascular Plants.* Stationary Office.
- Department of Arts, Heritage and the Gaeltacht. 2011. *Actions for Biodiversity 2011 – 2016. Ireland's National Biodiversity Plan.*
- DG Environment. 2010. *Natura 2000 European Commission Nature and Biodiversity Newsletter.* Number 28. June 2010. ISSN: 1026-6151.
- Doogue D., Nash D., Parnell J., Reynolds S., & Wyse Jackson P. 1998. *Flora of County Dublin.* The Dublin Naturalists' Field Club.
- EPA. 2002. *Guidelines on the information to be contained in Environmental Impact Statements.*
- EPA, 2003. *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)*
- Fitter R., Fitter A. & Farrer A. 1984. *Grasses, sedges, rushes and ferns of Britain and Northern Europe.* Collins.
- Fossitt J. 2000. *A Guide to Habitats in Ireland*. Heritage Council.
- Harris S. & Yalden D.W. 2008. *Mammals of the British Isles: Handbook, 4th Edition.* The Mammal Society.
- Heritage Council. 2002. *Draft Habitat Survey Guidelines*. The Heritage Council.
- Hill M.O., Blackstock T.H., Long D.G. and Rothero G.P 2008. *A Checklist and Census Catalogue of British and Irish Bryophytes.* British Bryological Society.
- Hundt L. 2012. *Bat Surveys: Good Practice Guidelines. 2nd Edition.* Bat Conservation Trust.
- IEEM. 2016. *Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland.* Institute of Ecology and Environmental Management.
- Institute of Environmental Assessment, 1995. *Guidelines for Baseline Ecological Assessment*'
- Johnson O. & More D., 2004. *Tree Guide*', Collins
- Mason C.F. 1996. *Biology of Freshwater Pollution.* Longman.

- Morris P. & Therivel R., 2001. *Methods of Environmental Impact Assessment,* Spon Press
- NRA. 2009. *Guidelines for Assessment of Ecological Impacts of National Road Schemes.* National Roads Authority.
- Parnell J. & Curtis T. 2012. *Webb's An Irish Flora.* Cork University Press.
- Preston C.D., Pearman D.A. & Dines T.D. 2002. *New Atlas of the British & Irish Flora*. Oxford University Press.
- Rich C. & Longcore T. Editors. 2006. *Ecological Consequences of Artificial Night Lighting.* Island Press.
- Sargent G. & Morris P. 2003. *How to Find & Identify Mammals.* The Mammal Society.
- Smith G. F., O'Donoghue P., O'Hora K. and Delaney E. 2010. *Best Practice Guidance for Habitat Survey and Mapping.* Heritage Council.
- Stace C. 2010. *New Flora of the British Isles.* Cambridge University Press
- Statutory Instrument No. 94 of 1999. Flora (Protection) Order
- Treweek J., 1999. *Ecological Impact Assessment*', Blackwell Science.
- United Nations. 1992. *Convention on Biological Diversity*

Appendix 10.1 Bat Report (see Volume III)

CHAPTER 11
NOISE & VIBRATION

OCTOBER 2019

Table of Contents

Table of Figures

Table of Tables

11. Noise and Vibration

11.1. Introduction

Irwin Carr Consulting has been instructed by Oxley Holdings Limited to undertake a noise impact assessment in relation to a proposed mixed-use development at Connolly Station, 1 Amiens Street, North Dock, Dublin.

The site is bounded by Oriel Street Upper and Seville Place to the east, Sheriff Street Lower to the south, with the railway lines running along the north and west.

This chapter of the Environmental Impact Assessment Report (EIAR) considers the existing baseline noise levels in the vicinity of the site, predicted construction (including demolition) and operational noise levels and the impact of the predicted change in noise levels. Noise and vibration mitigation measures are proposed as required.

The application area is dominated by railway and traffic noise from the surrounding transport network.

Irwin Carr Consulting is an indigenous company based in Ireland. The company has a proven track record in noise impact assessments throughout the UK and Ireland, with extensive knowledge of the issues in relation to noise impacting upon residential developments.

This chapter was prepared by Shane Carr. Shane is a Director in Irwin Carr Consulting with primary responsibilities for assessing environmental noise and air quality. He has more than 20 years' experience of working in acoustics, having previously worked in both the public and private sectors after obtaining a BSc (Hons) Degree in Environmental Health and a Post-Graduate Diploma in Acoustics. Shane has been responsible for undertaking and reviewing noise impact assessments on numerous large-scale commercial and residential developments throughout Ireland.

11.2. Methodology

At this point in time, Ireland does not have any statutory noise limit values. However, in the current Noise Action Plan for the Agglomeration of Dublin December 2018 – July 202, it is indicated that it is undesirable to have areas with a night time level greater than 55 dB and a daytime level greater than 70 dB. The Plan identifies areas with desirable low sound levels as those area with a with night time level less than 50 dB and\or a daytime level less than 55 dB.

These criteria is similar to the World Health Organisation (WHO) criteria which states:
"To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady, continuous noise."

The Code of practice for noise and vibration control on construction and open sites (BS 5228-1:2009) provides a number of methodologies for assessing the significance of construction noise at residential receptors.

11.3. Noise Assessment Criteria – Transportation

Dublin City County as part of the requirements of the EU Directive on the Management of Environmental Noise and under the Environmental Noise Regulations S.I. No. 140 of 2006, has revised and upgraded their traffic source "Noise Maps" for the 2012 base year. These maps are to be used to assess the number of people annoyed and sleep-disturbed respectively throughout Dublin.

The maps are Strategic Noise Maps, and should be used for strategic, high level planning and not for the assessment of local noise nuisances.

11.3.1. Construction Phase

Transport Infrastructure Ireland`s (TII) document Good Practice Guidance for the Treatment of Noise during the planning of National Road Schemes (TII, 2014) contains information on the permissible noise and vibration levels during the construction phase of a project.

Local authorities, where appropriate, should control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

TII considers that the noise levels in **Table 11.1** are typically deemed acceptable. It should be noted that these values are indicative only and it may be appropriate to apply more stringent limits in areas where pre-existing noise levels are low.

Days & Times	$L_{Aeq\ (1hr)}$ **dB**	$L_{pA(Max)slow}$ **dB**
Monday to Friday (07:00 – 19:00hrs)	70	80
Monday to Friday (19:00 – 22:00hrs)	60	65
Saturdays (08:00 – 16:30hrs)	65	75
Sundays and Bank Holidays (08:00 to 16:30hrs)	60	65

TABLE 11-1 MAXIMUM PERMISSIBLE NOISE LEVELS AT THE FAÇADE OF NEARBY DWELLINGS DURING CONSTRUCTION

It should be noted that the noise criteria quoted in **Table 11.1** above are specific to construction (including demolition) activities only (i.e. these levels are not cumulative with the existing noise environment from road traffic and other surrounding sources).

The TII Guidelines recommend that in order to ensure that there is no potential for vibration damage during construction, vibration from construction activities should not exceed the values as set out in the TII guidance and detailed in **Table 11.2**.

Allowable vibration velocity (peak particle velocity) at the closest part of any sensitive property to the source of vibration, at a frequency of;		
Less than 10Hz	10-50Hz	50 to 100Hz (and above)
8mm/s	12.5mm/s	20mm/s

TABLE 11-2 MAXIMUM ALLOWABLE VIBRATION LEVELS DURING CONSTRUCTION PHASE

11.3.2. Operational Phase

In the absence of a specific Irish standard for assessing the impact of transportation noise on residential developments, it is usual to rely upon UK guidance as international standards. ProPG: Planning & Noise (ProPG) guidance was recently published in its final format in May 2017 and supersedes the withdrawn Planning Policy Guidance Note 24 – Noise - PPG24. It provides guidance for local authorities on the use of their planning powers to minimise the adverse impact of noise.

The impact of transportation noise on proposed residential developments are typically assessed with reference to absolute noise levels. ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise – New Residential Development – May 2017 provides a methodology for assessing external noise impacts on proposed residential development from transportation dominant noise environments.

In particular, it aims to:

- Advocate full consideration of the acoustic environment from the earliest possible stage of the development process;
- Encourage the process of good acoustic design in and around new residential development;
- Outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- Improve understanding of how to determine the extent of potential noise impact and effect; and,
- Assist the delivery of sustainable development.

ProPG introduces an 'Initial Site Noise Risk Assessment' methodology (see **Figure 11.1**) which notes with higher external noise levels the greater the risk of noise becoming a determining factor in the likelihood of permission being granted.

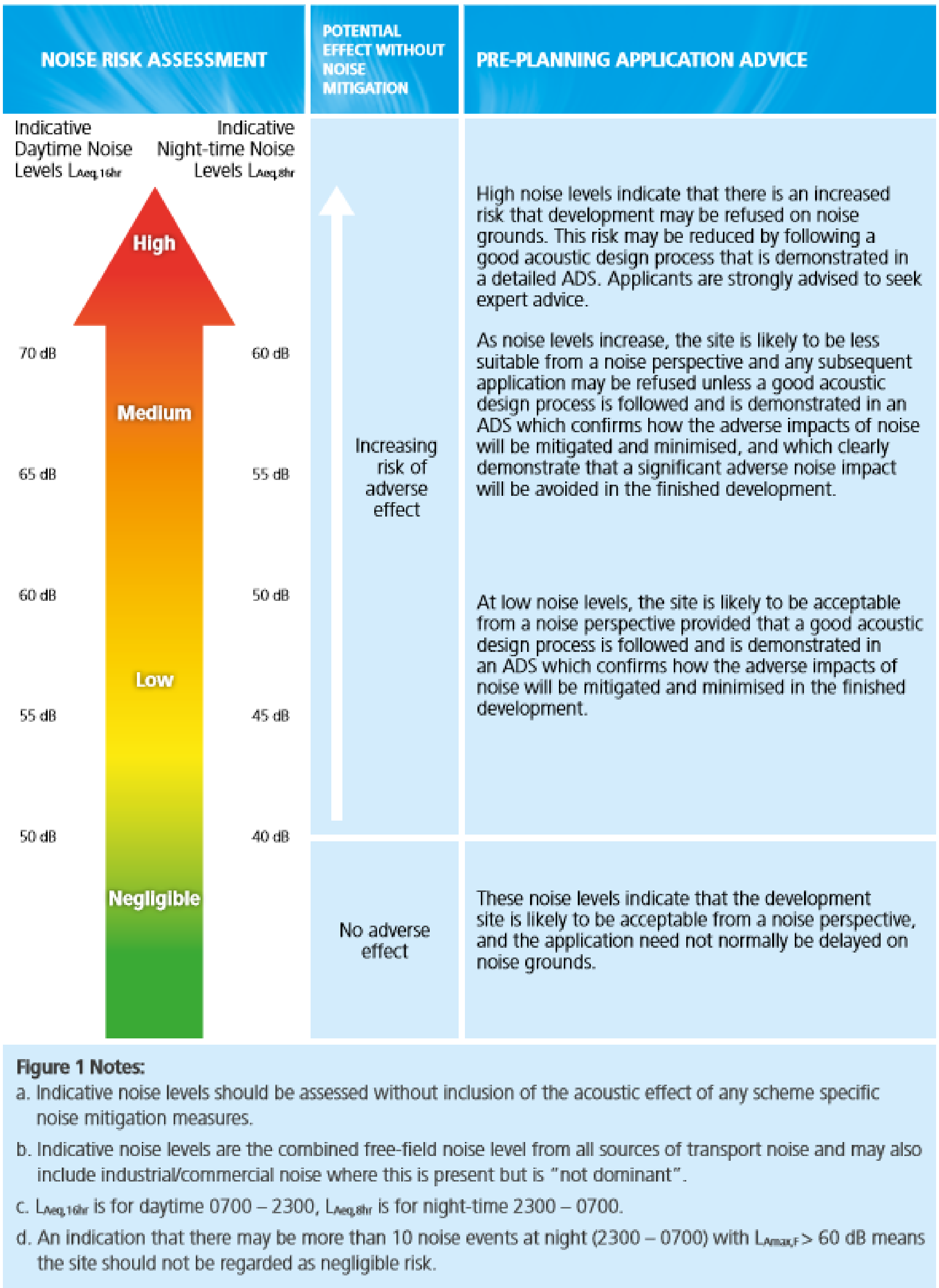


FIGURE 11-1: PROPG – INITIAL SITE NOISE RISK ASSESSMENT

ProPG advises that the noise risk assessment may be based on measurement or prediction (or a combination) as appropriate and should aim to describe noise levels during a typical worst case 24-hour day now or over the foreseeable future. The assessment should include the combined free-field noise level from all sources of transport noise that affect the site. In the case where industrial or commercial noise is present but not "dominant" (i.e. where the effect would be likely to be rated as lower than adverse if a BS4142:2014 assessment was to be carried out), its contribution may be included in the noise level used to establish the degree of risk.

Where industrial/commercial noise is considered to be "dominant" then the ProPG approach should not be used for the industrial or commercial noise and regard should be had to the guidance in BS4142:2014.

Page 10 of the ProPG states, "The judgement on whether or not to undertake a BS4142 assessment should be proportionate to the level of risk. In low risk cases a subjective judgement of dominance, based on audibility, would normally be sufficient."

In terms of this subject application, subjective observations on both leaving out and collecting the noise monitoring equipment (as well as a general understanding of the locality), was that the dominant noise source was traffic noise from the surrounding road network. No plant noise was audible at the noise monitoring location. Consequently, any contribution from existing industrial/commercial premises in proximity to the proposed development was included within the ProPG survey results.

11.4. Proposed Development

The site is located the rear of Connolly Station, Sherriff Street Lower, Dublin 1, Eircode D01 V6V6. The site abuts Connolly Rail Station and has frontage onto Sherriff Street Lower, Oriel Street Upper and Seville Place.

The site area is approximately 2.88 hectares.

Further west of Connelly Station is Talbot Street which leads directly to O'Connell Street. To the south is the Inner Dock and George Dock, located adjacent to the city's financial district, the Irish Financial Service Centre (IFSC). The River Liffey is located approximately 450m to the south.

To the east is a small area of inner-city housing bounded within the environs of the subject site by the Royal Canal and railway infrastructure servicing Connolly Station and Dublin Port.

A full description of the proposed development is presented in Chapter 2 and should be read in conjunction with this chapter.

The development will consist of;

I. the demolition of 4 no. structures with a combined gross floor area of 3,028sq.m;

II. the construction of 741 no. Build to Rent (BTR) residential units in 8 no. apartment blocks ranging in height from 4 storeys to 23 storeys with lower height buildings located adjacent to the northeast and east site boundaries, with a cumulative gross floor area of 68,535sq.m comprising;

   a) Block B1 (maximum building height 54.917m, total gross internal floor area 11,260sq.m, Apartment Mix: Studio: 25, 1-bed: 37, 2-bed: 51);

   b) Block B2 (maximum building height 54.917m, total gross internal floor area 10,831sq.m, Apartment Mix: Studio: 20, 1-bed: 35, 2-bed: 51,);

   c) Block B3 (maximum building height 51.767m, total gross internal floor area 9,766sq.m, Apartment Mix: Studio: 22, 1-bed: 60, 2-bed: 27, 3-Bed: 1);

   d) Block C1 (maximum building height 79,450m, total gross internal floor area 12,705sq.m, Apartment Mix: Studio: 84, 1-bed: 40, 2-bed: 41);

   e) Block C2 (maximum building height 39,615 m, total gross internal floor area 4,890 sq.m, Apartment Mix: Studio: 9, 1-bed: 33, 2-bed: 3, 3-Bed: 4);

   f) Block C3 (maximum building height 39,650 m, total gross internal floor area 6,775sq.m, Apartment Mix: Studio: 40, 1-bed: 18, 2-bed: 23);

   g) Block D1 (maximum building height 53,392 m, total gross internal floor area 8,418 sq.m, Apartment Mix: Studio: 10, 1-bed: 25, 2-bed: 44, 3-Bed: 1);

h) Block D2 (maximum building height 30,950 m, total gross internal floor area 3,890 sq.m, Apartment Mix: Studio: 18, 1-bed: 8, 2-bed: 11);

III. residential support amenities including 1 no. gym, a resident's lounge, work areas, meeting rooms, dining rooms, recreational areas with a combined GFA of 1,444 sq.m;

IV. change of use from club house to pedestrian passageway of the existing vault (137sq.m GFA) fronting Seville Place, a Protected Structure (RPS No. 130);

V. a basement of 7,253.4 sq.m with vehicular access from Oriel Street Upper incorporating residents' car parking (58 no. spaces), residents cycle parking (640 no. spaces) 7 no. plant rooms (combined 2,228sq.m), waste management facilities (393 sq.m)

VI. 766 no. covered cycle parking spaces for residents and visitors, concierge office (233 sq.m) and waste management facilities (126 sq.m);

VII. 'other uses' including 10 no. units providing retail, commercial, and community use with a combined GFA of 3,142 sq.m;

VIII. A total of 18,562 sq.m of hard and soft landscaping comprising both public, communal and private open space located throughout the development;

IX. A service and emergency vehicle only access ramp from the Oriel Street Upper site entrance to serve CIE's transport needs at Connolly Station;

X. Enabling works of a non-material nature to safeguard the existing vaults (Protected Structures - RPS No. 130) that form part of the subject site fronting Sherriff Street Lower, Oriel Street Upper, and Seville Place during the construction phase;

XI. All associated ancillary development works including drainage, 6 no. electricity substations, pedestrian access; and

XII. Works to the Masonry wall fronting Oriel Street and the Vaults fronting Seville Place (both a Protected Structure) consisting of the creation of a new vehicular and pedestrian entrance.

This chapter assesses how the proposed development will impact the existing noise sensitive locations in the vicinity of the site and also presents an assessment of the impact the surrounding road network will have on the residential elements of the proposal.

11.5. Existing Environment

11.5.1. Environmental Noise Survey

The selection of the monitoring location was influenced by the following factors;

- professional judgement, it is considered that the selected locations are representative of the worst-case noise level in the vicinity of the subject site, being located towards the railway lines as well as the to the other side of the site towards Oriel Street Upper;
- unattended monitoring requires a secure location to ensure that instrumentation cannot be tampered with as this may distort the readings with anomalous results;
- the application area is a working train station and car park, and the selected location is the point where security is present; and,
- the selected location is remote from sources of extraneous noise (such as from children playing, gardening equipment, etc.) and it is thus less likely that measurements would be contaminated.

Noise levels were measured at locations within the proposed development site as described in **Table 11.3** and presented in **Figure 11.2**. The survey was undertaken between the 26 to 31 October 2018.

Noise Monitoring Location	Irish Transverse Mercator
NML 1 - Northern Side	716830, 735106
NML2 - Southern Side	716861, 734915

TABLE 11-3 NOISE MONITORING LOCATIONS

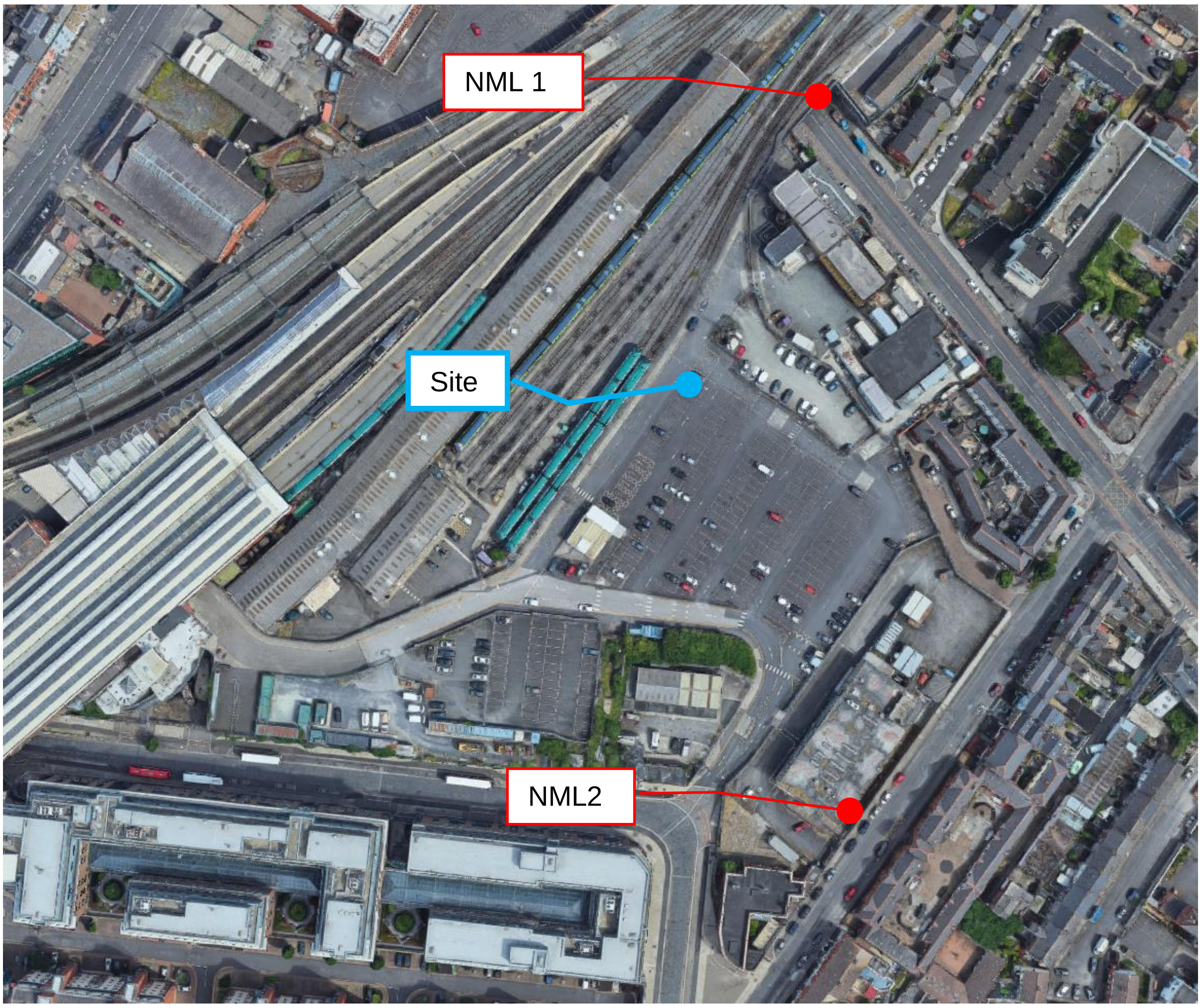


FIGURE 11-2 NOISE MONITORING LOCATIONS

The survey was set up by Shane Carr using the following equipment:

- 01dB DUO Precision Sound Level Meter (fitted with external all-weather kit)
- 01 dB CAL21 Acoustic Calibrator
- Davis Vantage Vue Weather Station

Instrumentation was calibrated before and after the survey period, with the calibration certificate provided in **Appendix 11.3**. Weather during the surveys was predominantly dry and calm with wind speeds less than 5 m/s. Any periods of rainfall or wind speeds in excess of 5m/s were excluded from the data pool.

The acoustic parameters measured included;

- L_{Aeq} – A-weighted equivalent continuous steady sound level during the sample period, effectively representing an average value; and
- L_{A90} – 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

11.6. Baseline Conditions – Survey Results

Figure 11.3 presents the results of the noise measurements over the survey period.

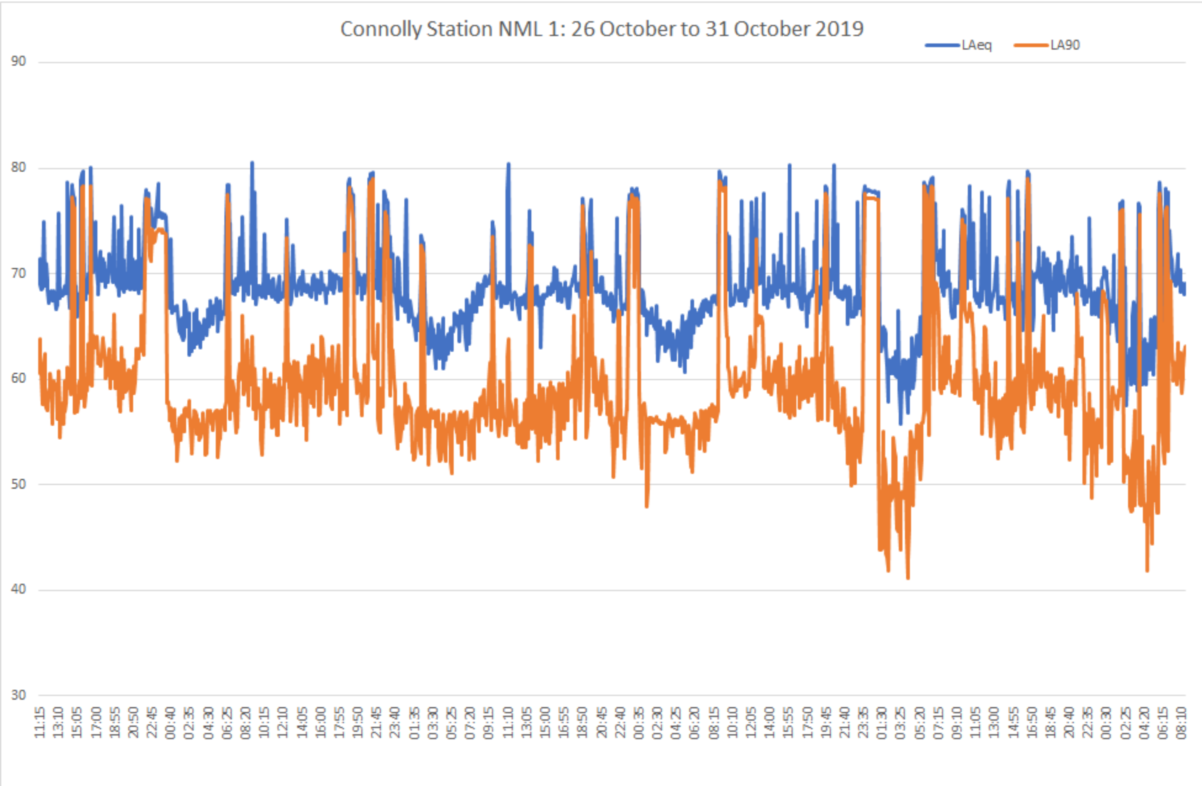


FIGURE 11-3: ACOUSTIC SURVEY TIME HISTORY – NML1

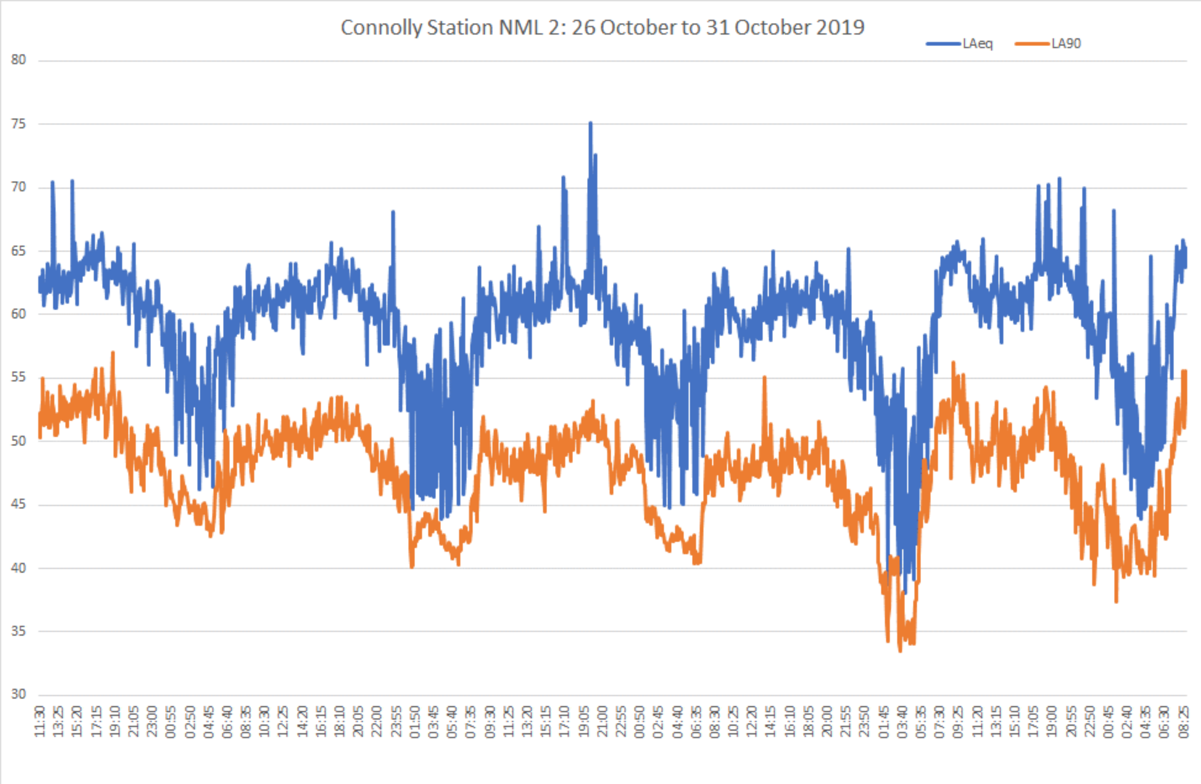


FIGURE 11-4: ACOUSTIC SURVEY TIME HISTORY – NML2

For the purposes of the noise impact assessment the measured daytime and night-time ambient sound levels are presented in **Table 11.4**.

Date	Noise Level dB – NML 1		Noise Level dB – NML 2	
	$L_{Aeq,16hr}$ Day	$L_{Aeq,8hr}$ Night	$L_{Aeq,16hr}$ Day	$L_{Aeq,8hr}$ Night
Friday 26 October 2018	72.6*	67.6	63.4*	57.2
Saturday 27 October 2018	71.8	58.0	61.6	53.7
Sunday 28 October 2018	69.9	64.7	63.0	53.3
Monday 29 October 2018	71.5	68.6	60.6	51.8
Tuesday 30 October 2018	71.1	64.4	63.2	54.0
Wednesday 31 October 2018	69.9*	-	63.7*	-
*Denotes less than full 16hr measurement period due to equipment being set-up/collected on that day.				

TABLE 11-4 MEASURED DAYTIME AND NIGHT-TIME AMBIENT SOUND LEVELS

11.7. Do Nothing Scenario

If the proposed development were not to proceed, noise levels in the locality will remain unchanged as there will be no additional railway or traffic movements or construction noise as a consequence of the proposed development. In addition, there will not be any additional receptors introduced to the locality to be exposed to existing noise levels.

There will be a natural increase in traffic flows over time, but the predicted levels of increase will not cause a noticeable difference in the noise levels on the site.

The site is zoned for regeneration so would be likely to be developed in the future with either residential or enterprise led development. The impact of this development is likely to be similar to future development on the site.

11.8. Impact Assessment – Construction Phase and Demolition Phase

It should be noted that this assessment is for both the construction and demolition phase of the proposed development.

The impact of construction phase sound is assessed using the methodology described in TII Guidelines, comparing the level of the sound with the limits in **Table 11.1**.

For the purposes of the construction noise assessment, the noise emissions from the various construction phases/activities at the nearest noise sensitive receptors have been predicted using *SoundPLAN* acoustic modelling software.

The model was implemented in *SoundPLAN* version 8.1, which is produced by Braunstein & Berndt GmbH. The *SoundPLAN* implementation of ISO9613 has been tested in-house by *SoundPLAN* developers to ensure calculated results are within 0.2dB of the standard.

The model is integrated, allowing noise from all sources, with prediction methodologies to be undertaken simultaneously. The noise model takes into consideration the following parameters:

- Topographical effects
- Atmospheric absorption
- Ground absorption
- Screening effects
- Reflections
- Focusing effects
- Metrological conditions

The model predicts the propagation of noise for each octave-band and source-receiver pair and produces a noise level contour map from which the noise levels at receiver locations can be determined.

The construction equipment as contained within **Table 11.5** have been located centrally within the proposed site. For all construction phases, a worst-case assumption of 16 heavy goods vehicles (HGV's) per hour have been included within predictions.

Activity	Plant	L_{Aeq} at 10m
Site clearance/excavation/Demolition Earthworks	Lorries (drive by) Dozers HGV and tippers	70 dB 87 dB 84 dB
Foundations	Concrete Pour Place and vibrate Concrete Cycle Cement Mixers	up to 80 dB up to 86 dB 80 dB 74 dB
Metal Frame	Large crane operations Place and vibrate	86 dB 80 dB
Road works/landscaping	Surfacing/rolling	76 - 86 dB

TABLE 11.5: TYPICAL NOISE LEVELS FROM CONSTRUCTION WORKS (REF: BS 5228)

The majority of construction of the proposed site will take place between 0700 – 1900hrs from Monday to Friday and between 0900 – 1300 on Saturdays. No construction will take place on Sundays or Bank Holidays.

The nearest residential receptors to the proposed development site are located along the Eastern edge of site, as presented in **Table 11.5** and illustrated on **Figure 11.1**.

Location (nearest road)	Location (Irish Transverse Mercator)
ER1 – Oriel Hall	716879, 735016
ER2 – Oriel Street Upper	716885, 734929
ER3 – Sheriff Street Lower	716823, 734838

TABLE 11-5: THIRD PARTY - NOISE SENSITIVE RECEPTOR LOCATIONS

The *SoundPlan* predicted construction noise levels are presented in **Table 11.6**.

Sensitive Receptor Location	Predicted noise level dB L_{Aeq}			
	Earthworks	Foundations	Framework	Landscaping
ER1 – Oriel Hall	61.1	57.1	51.9	50.7
ER2 – Oriel Street Upper	53.2	53.7	55.5	49.7
ER3 – Sherriff Street Lower	57.3	50.4	56.0	49.9

TABLE 11-6: PREDICTED CONSTRUCTION NOISE LEVELS

The predicted levels are considered worse case and are expected to only occur for a short period of time as they assume that all equipment is working continuously at full power. It should be noted that construction noise limits are fixed limits and are irrespective of existing background levels.

Descriptor	**Assessment**	**Comment**
Quality of Effects	Neutral Effects	The predicted noise levels in **Table 11.6** show that the predicted worst-case scenario are lower than the limits provided in the TII guidelines as outlined in **Table 11.1**.
Significance of Effects	Slight Effects	The predicted noise levels are lower than the existing background daytime noise levels at all stages after the proposed earthworks.
Probability of Effects	Unlikely to Occur	The predicted noise level are shown to be in line with appropriate limits and the proposed hours of operation are during normal daytime hours, which are less sensitive to existing residential properties.
Duration and Frequency of Effects	Short-Term Effects	The demolition and construction on the site would be expected to last between 1 to 7 years

TABLE 11-7: DESCRIPTION OF EFFECTS – CONSTRUCTION PHASE

Duration of the construction works will be a short-term impact and the predicted levels show the noise levels will be neutral and will be below the guideline levels and will be slight.

This is a conservative assumption as in reality during the majority of the construction phase, noise levels will be significantly lower than the predicted levels. In the context of a working day, the L_{Aeq} over the averaging period is anticipated to be below the construction noise criteria levels for the vast majority of the construction phase.

11.9. Impact Assessment – Operational Phase

As noted in Section 11.3, ProPG advises that the noise risk assessment should aim to describe noise levels during a typical worst case 24-hour day now or over the foreseeable future. As the planning permission itself will reduce the number of parking spaces on the site as compared to the existing carpark use, but there will be the normal incremental increase in traffic movements year on year, the 2035 Annual Average Daily Traffic (AADT) traffic movement data provided by O'Connor Sutton Cronin & Associates – Multidisciplinary Consulting Engineers has been relied upon in predicting the noise impact at future residential locations within and adjacent to the proposed development.

Table 11.8 presents the indicative receptor locations introduced as a consequence of the proposed development.

Location (nearest road)	Location (Irish Grid Reference)
PR1 – Block B1 – Ground Floor	716777, 735016
PR2 – Block B1 – Second Floor	716777, 735016
PR3 – Block B2 – Ground Floor	716793, 735037
PR4 – Block B2 – Second Floor	716793, 735037
PR5 – Block B3 – Ground Floor	716811, 735061
PR6 – Block B3 – Second Floor	716811, 735061
PR7 – Block C1 – Ground Floor	716833, 735005
PR8 – Block C1 – Second Floor	716833, 735005
PR9 – Block C2 – Ground Floor	716859, 735014
PR10 – Block C2 – Second Floor	716859, 735014
PR11 – Block C3 – Ground Floor	716848, 735039
PR12 – Block C3 – Second Floor	716848, 735039
PR13 – Block D1 – Ground Floor	716843, 734993
PR14 – Block D1 – Second Floor	716843, 734993

TABLE 11-8 PROPOSED DEVELOPMENT –INDICATIVE NOISE SENSITIVE RECEPTOR LOCATIONS

Transportation movement noise levels were calculated for both daytime and night-time at the noise sensitive receptor locations as specified in **Table 11.8**.

Table 11.9 presents the predicted daytime and night-time noise levels as a consequence of transportation movements.

Receptor Location	Predicted noise level	
	Daytime (dB $L_{Aeq, 16hr}$)	Night-time (dB $L_{Aeq, 8hr}$)
PR1 – Block B1 – Ground Floor	62.4	55.7
PR2 – Block B1 – Second Floor	64.2	57.5
PR3 – Block B2 – Ground Floor	62.7	56.0
PR4 – Block B2 – Second Floor	64.8	58.1
PR5 – Block B3 – Ground Floor	62.7	56.0
PR6 – Block B3 – Second Floor	64.5	57.8
PR7 – Block C1 – Ground Floor	40.9	32.5
PR8 – Block C1 – Second Floor	42.2	33.8
PR9 – Block C2 – Ground Floor	42.6	34.2

Receptor Location	Predicted noise level	
	Daytime (dB $L_{Aeq,\ 16hr}$)	**Night-time (dB $L_{Aeq,\ 8hr}$)**
PR10 – Block C2 – Second Floor	48.1	39.7
PR11 – Block C3 – Ground Floor	54.0	47.3
PR12 – Block C3 – Second Floor	56.3	49.6
PR13 – Block D1 – Ground Floor	41.3	32.9
PR14 – Block D1 – Second Floor	43.5	35.1

TABLE 11-9: PREDICTED NOISE LEVELS AT PROPOSED INDICATIVE NOISE SENSITIVE RECEPTORS

The worst-case daytime is predicted to be 64.8 dB $L_{Aeq,16hr}$ while night-time is 58.1 dB $L_{Aeq,8hr}$. This diurnal pattern is typical of transportation noise, with greater daytime activity than night-time.

For the purposes of the assessment, worst case daytime noise levels would equate to the higher end of the ProPG Low-Range Category (see **Table 11.1**) which states, *"At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an Acoustic Design Statement (ADS) which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development."*

For the purposes of the assessment, worst case night-time noise levels would equate to the higher end of the ProPG Mid-Range Category which states, *"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."*

ProPG states that through a full noise impact assessment and a robust Acoustic Design Statement identifying how noise at the development may be mitigated, it is considered that the proposed development will be acceptable.

Full details of the proposed mitigation and acoustic design are presented in section 11.11 below.

11.10. Mitigation – Construction Phase

While the effect of construction noise is not considered to be significant, the following noise control measures, are recommended in order to minimise noise disturbance.

- To the extent practicable, complete works during standard construction hours. Where practical, organise for deliveries to be made during standard construction hours and carry out loading and unloading away from sensitive receivers.
- Using quieter construction methods where required and where considered reasonable and feasible. Avoid rock hammering; where possible by using other excavation methods such as jaw crushers and, if unavoidable, use the smallest practical excavator/backhoe and hammer. Use rubber wheeled in preference to steel tracked equipment. Make sure all diesel equipment is fitted with appropriate mufflers (e.g. residential grade). Where acceptable from an occupational health and safety perspective, using quieter alternatives

to reversing alarms (such as spotters, closed circuit television monitors and 'smart' reversing alarms).

- Switch off equipment when not in use (including during breaks and down times of more than 30 minutes).
- Where reasonable and feasible, locate haulage routes as far away as possible from residential receivers. Truck movements will be restricted to identified haulage routes.
- Where possible, avoid using noisy plant simultaneously or close together to avoid cumulative noise impacts.
- Orientate equipment and excavation work sites where possible to reduce noise emissions to sensitive receivers.
- Maintain equipment in efficient working order.
- Establish a noise complaint handling procedure and respond quickly to resolve any complaints in accordance with Dublin City Council established policy.

All of the measures outlined above will be integrated to the Construction and Environmental Management Plan (CEMP) to be agreed with the competent authority prior to the commencement of development.

11.11. Mitigation – Operational Phase

INTERNAL NOISE LEVELS IN THE PROPOSED DEVELOPMENT

Both ProPG and BS8233 Guidance on Sound Insulation and Noise Reduction for Buildings, 2014 recommend the following criteria inside dwellings:

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	—
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	—
Sleeping	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

TABLE 11-10: INDOOR NOISE CRITERIA

Based on a typical 15 dB reduction for an open window and the worst case external ambient sound levels measured on site, internal sound pressure levels for any future occupants of this development are expected to be in the region of 50 dB $L_{Aeq,16hr}$ during the day and 43 dB $L_{Aeq,8hr}$ at night, in excess of the internal noise criteria as stated in **Table 11.10**.

Typical double glazing 6/6/6mm provides 31dB Rw (BS EN 12354–3:2000 Building Acoustics. Estimation of acoustic performance in buildings form the performance of elements. Airborne sound insulation against outdoor noise), which provides in excess of the required acoustic performance to meet the BS8233 internal noise levels recommended criteria, day and night.

To ensure that windows do not have to be opened for prolonged periods, it is proposed to also incorporate an acoustic ventilation system into the proposed dwellings closest to the proposed link road and existing roads with an equivalent sound reduction index to the glazing of 31 dB Rw.

The specification of the ventilation will provide ventilation rates as presented in **Table 11.11** below and the system will comprise acoustic supply air grilles with supply and extract diffusers.

	Number of bedrooms in dwelling				
	1	**2**	**3**	**4**	**5**
Whole dwelling ventilation rate (l/s)	13	17	21	25	29
Notes: In addition, the minimum ventilation rate should not be less than 0.3 l/s per m^2 of internal floor area. (This includes all floors, e.g. for a two storey building add the ground and first floor areas). This is based on two occupants in the main bedroom and a single occupant in all other bedrooms. This should be used as the default value. If a greater level of occupancy is expected add 4 l/s per occupant.					

TABLE 11-11: WHOLE DWELLING VENTILATION RATES

The information in relation to background ventilation rates provided does not address the rapid ventilation provision, which will be addressed in the normal way with openable windows in all habitable rooms. The effect will allow people to open windows as desired, but it will not be required to permit background ventilation as this criterion will be addressed mechanically.

The summary of the mitigation measures incorporated into the site include:

- The site has been designed to maximise the distance from the roads to the habitable rooms.
- Mechanical ventilation in all habitable rooms overlooking the railway tracks.
- Windows with sound insulation more than 31dB Rw.
- Communal rooms and non-habitable dwellings are on the ground floors, which are less sensitive to noise.

EXTERNAL NOISE LEVELS IN THE PROPOSED DEVELOPMENT

BS8233:2014 states that,

"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 $L_{Aeq,16hr}$*".* The standard continues… *"These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited."*

It is commonly accepted that an acoustic barrier that completely blocks a direct line of sight with the noise source will provide approximately 10dB attenuation, whilst an acoustic barrier than only permits partial views of the noise source will provide approximately 5dB attenuation.

The layout of the scheme has incorporated significant design measures to maximise the amenity of the external areas:

- The side of the building facing onto railway lines will not have any external areas, allowing the façade of the building to act as a noise barrier.
- A communal external area will be at roof level, with the building between the external areas and the roads, which will provide in the region of 10dB noise reduction.

Descriptor	**Assessment**	**Comment**
Quality of Effects	Neutral Effects	There are no significant noise sources within the proposed site which will effect existing residential properties further away from the site. The noise sensitive receptors which have the greatest potential impact are those associated with the development. The predicted noise levels in **Table 11.9** show that the predicted worst-case scenario are in the low to medium range of the ProPG Guidance. When the good acoustic design as identified is taken into account, the effects will not be perceptible within the proposed units.
Significance of Effects	Slight Effects	The predicted noise levels for the operational phase are lower than the existing background daytime noise levels at all stages after the existing earthworks.
Probability of Effects	Unlikely effects	The site is primarily designed to minimise impact on the proposed residential development, and there will not be a significant impact on the existing properties in the wider area. The mitigation measures will be incorporated into the building design to ensure the ongoing noise effects are minimised.
Duration and Frequency of Effects	Permanent Effects	The proposed development will be expected to last over 60 years.

TABLE 11-12: DESCRIPTION OF EFFECTS – OPERATIONAL PHASE

The nearest residential locations are to the north, east and south of the site and the land use in the vicinity is primarily commercial, industrial, and residential.

Duration of the operational phase will be a neutral, permanent impact and the predicted levels demonstrate that the noise levels will be below the guideline levels and will be slight.

11.12. Cumulative Impact

There is a proposed Phase 2 development of the site which is currently in its masterplan stage. This will also be primarily a commercial development site in the south of the site fronting Sheriff Street Lower.

The nature of Phase 2 will give rise to additional noise sources which would have the potential to impact on proposed dwelling in Phase 1 or existing residential property in the vicinity of the site.

Once the Phase 2 site reaches the stage of full planning application it will be accompanied with a noise impact assessment which includes the impact to all identified sensitive locations, including the properties in this SHD application (Phase 1).

11.13. Monitoring

NOISE

Construction noise has the potential to be audible at the nearest receptors outside of the proposed development. The nearest dwellings will generally be most affected and therefore assessing compliance with noise limits at those 'controlling points' will also ensure compliance at other dwellings further away. The following location has been identified as the controlling point for construction noise.

Location (nearest road)	Location (Irish Grid Reference)
ER1 – Oriel Street Upper	316929, 234882

TABLE 11-13: CONSTRUCTION NOISE MONITORING LOCATION

Noise monitoring shall be conducted by the Site Manager or nominated sub-contractor by trained personnel.

A Noise Monitoring Terminal with the following specifications:

- Logging of two concurrent periods, e.g. 15-minute and hourly;
- Daily CIC automated calibrations;
- Text alert to the construction manager where the threshold are close to being exceeded;
- Text alert to the construction manager on low battery and low memory;
- Remote access to measured data, and;
- Data should be downloaded and reviewed on a monthly basis with the report held on file by the construction company for inspection as required.

VIBRATION

To minimise the effects from vibration on human receptors, Peak Particle Velocity (PPV) levels in excess of 5 mm/s in any axis, measured external to a building, is considered to represent a significant impact on the occupants of residential buildings (although higher levels may be tolerated in certain instances) in accordance with BS5228-2.

Location (nearest road)	Location (Irish Grid Reference)
ER1 – Oriel Hall	316943, 234994
ER2 – Oriel Street Upper	316929, 234882

TABLE 11-14: CONSTRUCTION VIBRATION MONITORING LOCATIONS

Vibration monitoring stations will continually log vibration levels using the Peak Particle Velocity parameter (ppv, mm/s) in the X, Y and Z directions, in accordance with BS ISO 4866: 2010: Mechanical vibration and shock – Vibration of fixed structures – Guidelines for the measurement of vibrations and evaluation of their effects on structures.

The mounting of the vibration monitoring transducer to the vibrating structure will need to comply with BS ISO 5348: 1998: Mechanical vibration and shock – Mechanical mounting of accelerometers. In summary, the following ideal mounting conditions apply:

- The transducer and its mountings should be as rigid as possible;
- The mounting surfaces should be as clean and flat as possible;
- Simple symmetric mountings are best,
- The mass of the mounting should be small in comparison to that of the structure under test
- The monitoring equipment should be set to monitor vibration in 5-minute periods suitable for purpose.
- Text alerts will be sent to the construction manager as thresholds are approached
- Text alert will be sent to the construction manager on low battery and low memory;
- Remote access to measured data, and;
- Data should be downloaded and reviewed on a monthly basis with the report held on file by the construction company for inspection as required.

11.14. Residual Impacts

A noise impact assessment has been undertaken for the proposed mixed-use development, Connolly Station, Dublin.

Construction noise impacts were assessed against BS5228:2014 noise limits and noted to be compliant at all existing residential properties. There will therefore be no residual construction impacts from the proposed development.

The impact of existing and proposed transportation noise sources on the proposed residential development has been assessed. The ProPG Noise Risk Impact has been found to be 'Low-Range' during the day and 'Mid-Range' night, indicating an Acoustic Design Statement is required at the reserved matters stage.

Further to appropriate mitigation measures being incorporated into the proposed development, it was found that operational noise from the proposed development is likely to have a low impact during both the daytime and night-time periods.

Given the above, it can be concluded that residual effects from the construction and operation of the proposed development would not be deemed significant.

11.15. Human Health and Major Accidents

The noise impact will not generate any significant impact on human health. The short-term construction phase is shown to be in line with construction limits standards and the site is designed to minimise the impact of noise on the proposed residential units on the site, with mitigation incorporated as required.

Noise from this site will not be an issue if there is a major accident.

Similarly, the vibration impacts will not generate any significant impact on human health and there will not be an issue if there is a major accident.

11.16. References and Sources

- BS5228-1:2009 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise
- BS5228-2:2009 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration
- ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise – New Residential Development – May 2017
- BS6472-1:2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting
- BS7385-1:1990 Evaluation and measurement for vibration in buildings. Guide for measurement of vibrations and evaluation of their effects on buildings

Appendix 11-1 - Noise Measurement Locations

Appendix 11-2 - *SoundPlan* Noise Output

Appendix 11-3 - Calibration Certificate

CHAPTER 12

AIR QUALITY & CLIMATE

OCTOBER 2019

Table of Contents

Table of Figures

Table of Tables

Table of Appendices

12 Air Quality & Climate

12.1 Introduction

Irwin Carr Consulting has been instructed by Ballymore to undertake an air quality and climate impact assessment in relation to a proposed mixed-use development at Connolly Station, 1 Amiens Street, North Dock, Dublin.

The site is bounded by Oriel Street Upper and Seville Place to the east, Sheriff Street Lower to the south, with the railway lines running along the north and west.

This chapter of the Environmental Impact Assessment Report (EIAR) considers the potential short-term impacts associated with dust from the construction (including demolition phase. Predicted impacts associated with traffic related pollutants namely, nitrogen oxides (NOx), carbon monoxide (CO), and particulate matter (PM10) are presented as are climate change impacts. Mitigation measures are described as required.

Irwin Carr Consulting is an indigenous company based in Ireland. The company has a proven track record in air quality impact assessments throughout Ireland, with extensive knowledge of the issues in relation to air quality impacting upon residential developments.

This chapter was prepared by Shane Carr. Shane is a Director in Irwin Carr Consulting with primary responsibilities for assessing environmental noise and air quality. He has more than 20 years' experience of working in the field of air quality, having previously worked in both the public and private sectors after obtaining a BSc (Hons) Degree in Environmental Health. Shane has been responsible for undertaking and reviewing air quality impact assessments on numerous large-scale residential developments throughout Ireland.

12.1.1 Air Quality Standards

The European Union (EU) has introduced several measures to address the issue of air quality management, since the initial Framework Directive on ambient air quality assessment and management (Council Directive 96/62/EC). The aim is to protect human health and ecosystems from negative impacts. The current guidelines are the Clean Air for Europe (CAFÉ) Directive (2008/50/EC) which replaced the previous Air Framework Directive (1996/30/EC) and its daughter directives. The air quality standards currently applicable in Ireland are the EU ambient standards, which are presented in Table 12.1 below. These limits were transposed into Irish law by the S.I. No.180 of 2011, Air Quality Standards (AQS) Regulations 2011.

Pollutant	**Directive / Regulation**	**Limit Type**	**Value**
Nitrogen Dioxide	2008/50/EC and SI180 of 2011	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 $\mu g/m^3$ NO_2
		Annual limit for protection of human health	40 $\mu g/m^3$ NO_2
		Annual limit for protection of vegetation	30 $\mu g/m^3$ NO + NO_2

Sulphur dioxide	2008/50/EC and SI180 of 2011	Hourly limit for protection of human health - not to be exceeded more than 24 times/year	350 µg/m³
		Daily limit for protection of human health - not to be exceeded more than 3 times/year	125 µg/m³
		Annual Mean	60 µg/m³
Particulate Matter (as PM10)	2008/50/EC and SI180 of 2011	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m³ PM_{10}
		Annual limit for protection of human health	30 µg/m³ PM_{10}
PM2.5	2008/50/EC and SI180 of 2011	Annual limit for protection of human health	25 µg/m³ $PM_{2.5}$
Benzene	2008/50/EC and SI180 of 2011	Annual limit for protection of human health	5 µg/m³
Carbon Monoxide	2008/50/EC and SI180 of 2011	8-hour limit (on a rolling basis) for protection of human health	10 mg/m³

TABLE 12-1: IRISH AIR QUALITY STANDARDS

The standards for air pollution set out in Table 12.1 above are concentrations over a given time period that are considered to be acceptable in the light of what is scientifically known about the effects of each pollutant on health and on the environment. They can also be used as a benchmark to determine if air pollution is getting better or worse.

An exceedance of a standard is a period of time (which is defined in each standard) where the concentration is higher than that set down by the standard. In order to make useful comparisons between pollutants, for which the standard may be expressed in terms of different averaging times, the number of days on which an exceedance has been recorded is often reported.

An objective is the target date on which exceedances of a standard must not exceed a specified number.

12.1.2 Dust

There are no national or EU limits for dust deposition. However, the TA Luft Technical Instructions on Air Quality (TA Luft, 2002) provide a guideline for the rate of dust deposition of 350 mg/m2/day averaged over one year.

12.1.3 Climate

The Climate Action and Low Carbon Development Act 2015 sets out the national objective of transitioning to a low carbon, climate resilient and environmentally sustainable economy in the period up to 2050. The Act provides for the preparation of a yearly National Mitigation Plan which will specify policies to reduce greenhouse gas emissions for each sector, including transport.

12.2 Methodology

Based on the proposed development, there are three main elements of this assessment:

- The impact of the construction phase on the surrounding area;
- The impact the surrounding road network will have on the proposed and existing residential dwellings from both the existing and proposed increase in traffic flows; and
- The impact of the proposed development on climate.

12.2.1 Construction Phase Assessment

It should be noted that the assessment of construction phase impacts also includes proposed site preparation works, including demolition works.

The Institute of Air Quality Management (IAQM) – 'Guidance on the Assessment of dust from demolition and construction' Version 1.1 2014, provides a structured approach to assessing potential dust impacts from construction activities.

There are two types of receptors that may be impacted by dust generated during construction activities;

i. A 'human receptor', refers to any location where a person or property may experience the adverse effects of airborne dust or dust soiling or exposure to PM10; and,
ii. An 'ecological receptor' refers to any sensitive habitat affected by dust soiling. This includes the direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (e.g. on foraging habitats).

The assessment methodology considers three separate dust impacts, with account being taken of the sensitivity of the area that may experience these effects;

i. annoyance due to dust soiling;
ii. the risk of health effects due to an increase in exposure to PM10; and,
iii. harm to ecological receptors.

The IAQM Guidance provides a 4-step approach to the assessment of dust impacts;

- **Step 1** requires screening of the proposed development in terms of the distance of sensitive receptors (human and ecological) from the proposed works. No further assessment is required where receptors are not identified within a defined distance from the works.
- **Step 2** requires an assessment of dust impacts, this is done separately for each of the four identified activities (demolition, earthworks, construction and trackout) and take account of the scale and nature of the works which determines the potential dust emission magnitude (2A) and the sensitivity of the area (2B). These are then combined to provide the risk of dust impacts (2C).
  Risks are described in terms of there being a low, medium or high risk of dust impacts for each of the four separate potential activities. Where there are low, medium or high risks of an impact, then site-specific mitigation will be required, proportionate to the level of risk.

Based on the threshold criteria and professional judgement one or more of the groups of activities may be assigned a 'negligible' risk. Such cases could arise, for example, because the scale is very small and there are no receptors near to the activity.

- **Step 3** requires a determination of the site-specific mitigation for each of the four potential activities in Step 2.
- **Step 4** examines the residual effects following the application of mitigation.

12.2.2 Operational Phase Assessment

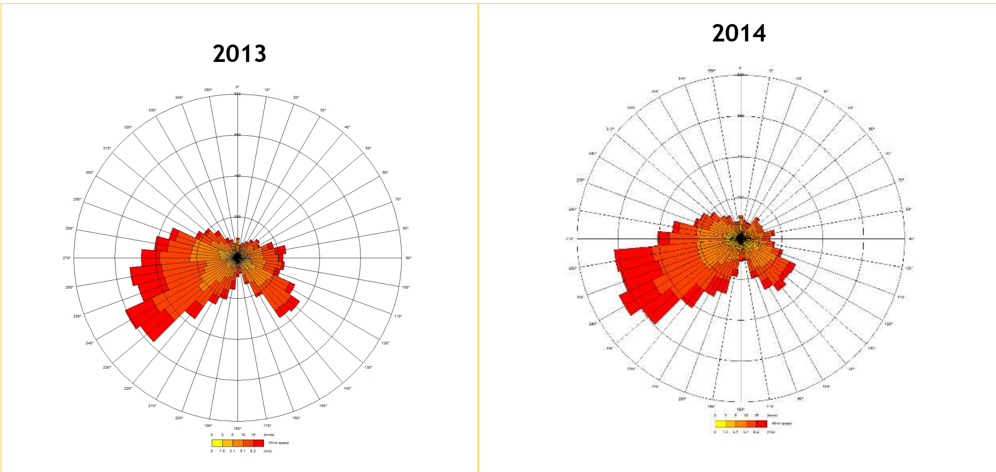
While there is no specific Irish guidance in relation to the methodology for carrying out Air Quality Assessments which require detailed modelling, guidance is provided by the Transport Infrastructure Ireland (TII), *Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes* (TII, 2011), but for the detailed assessment and limit levels the TII guidance references the UK guidance as an appropriate methodology to be followed.

In our assessment we have relied upon the methodology provided by the TII for the source of background data, appropriate modelling software and followed the UK Highways Agency and the Department for Environment, Food, and Rural Affairs (DEFRA) guidance as an appropriate reference methodology for assessing the impact of new road developments associated with this proposed mixed-use development.

ADMS Roads Modelling Software

ADMS-Roads 4 (Model version: 4.0.1.0) pollution model is a comprehensive tool for investigating potential air quality impacts from road networks, for instance changes in traffic flow, new lanes or new roads.

Five years of hourly sequential meteorological data (Dublin Airport, 2013- 2017) was used for the AERMOD dispersion modelling assessment. This allowed for the determination of the predicted overall average impact of emissions from the facility. The windrose data for each individual year is presented in Figure 12.1 below.



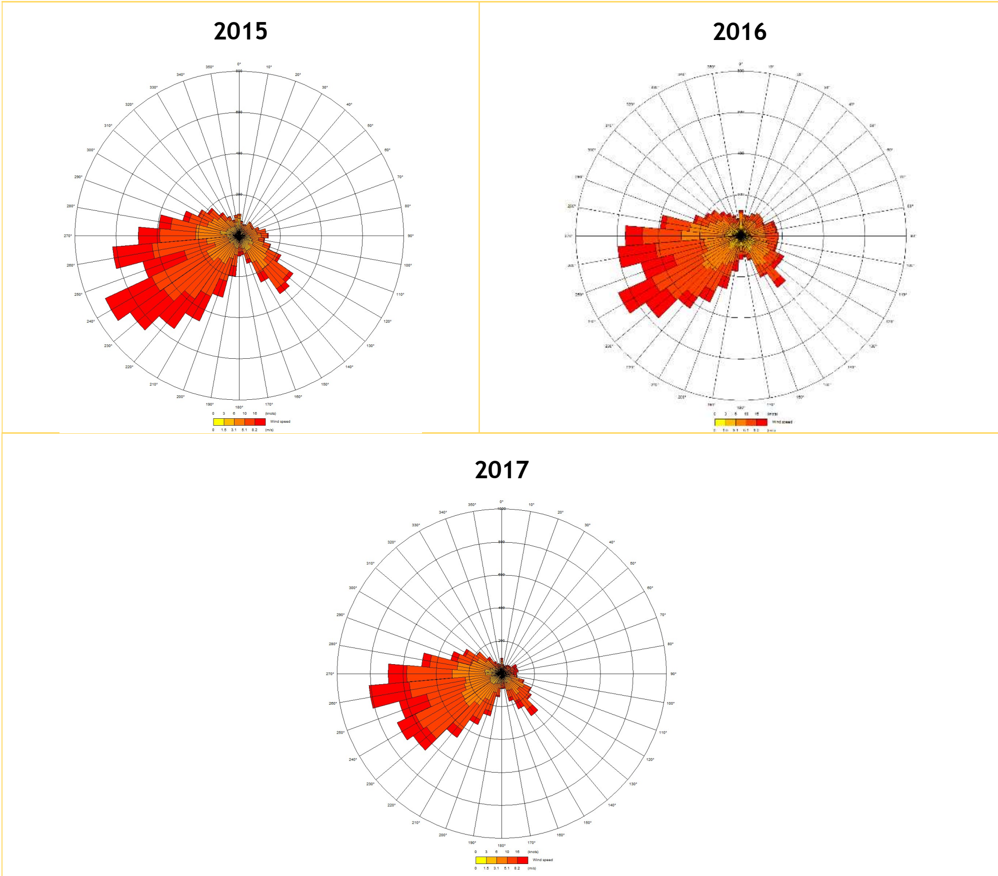


FIGURE 12-1 ANNUAL WINDROSE DATA

The ADMS Roads pollution model predicts pollutant concentrations at receptor locations near to roads. It can be used to predict annual mean concentrations of nitrogen oxides (NOx) and particulate matter (PM_{10} and $PM_{2.5}$). The ADMS Roads pollution model requires input data on annual average daily traffic flow (AADT), annual average speeds, the proportion of different vehicle types, the type of road, and the grid coordinates of receptors. ADMS Roads pollution model is widely utilised across central government, local government and environmental consultancies.

Recent evidence shows that the proportion of primary NO_2 in vehicle exhaust has increased. This means that the relationship between NO_x and NO_2 at the roadside has to be accounted for in the model outputs. Consequently, Department of Environment Food and Rural Affairs (DEFRA) in the UK has published a NO_x to NO_2 calculator (v4.1 June 2014) to permit such a conversion. The calculator applies to all road types and can also be used to estimate roadside NO_x from roadside NO_2 measurements.

The UK Highways Agency has indicated that the prediction models may significantly under-predict concentrations of nitrogen dioxide alongside urban city-centre roads classified as “street canyons”. In this context, a street canyon may be defined as a relatively narrow street with buildings on both sides, where the height of the buildings is generally greater than the width of the road. To avoid missing potential exceedances of the objective in such locations, corrective guidance has been provided to account for street canyon effects. It has been decided that on review of the streetscapes in proximity to the proposed development that a street canyon effect is unlikely to occur as neighbouring buildings are not greater in height that the width of the road.

Department for Environment, Food & Rural Affairs (DEFRA) in the UK has stated that if the annual mean objectives are not exceeded, it may be confidently assumed that the short-term (1-hour) objectives will also be met. However, if this approach is used, then care must be taken to include relevant locations where the hourly objectives might apply. If the annual mean nitrogen dioxide concentration is greater than 60 μg m^3, then there is a risk that the 1-hour objective may also be exceeded.

The ADMS Roads assessment is based upon traffic flows provided by Transport Professionals – O'Connor Sutton Cronin & Associates Multidisciplinary Consulting Engineers, including annual average daily traffic (AADT) and percentage HGVs. Irwin Carr Consulting has relied upon 2035 AADT flows (assumed 15 years of opening of the proposed Phase 1 mixed-use development), without and with the mixed-use development in operation. The AADT flows used in the ADMS Roads assessment are presented in **Table 12.2**.

Road Name	Annual Average Daily Traffic Flows
North Strand Road	Existing AADT = 11,610 2022 AADT without development = 12,279 2022 AADT with development = 12,482 2037 AADT without development = 14,216 2037 AADT with development = 14,419
Seville Place West	Existing AADT = 11,896 2022 AADT without development = 12,570 2022 AADT with development = 13,392 2037 AADT without development = 14,489 2037 AADT with development = 15,310
Amien's Street North	Existing AADT = 20,496 2022 AADT without development = 21,695 2022 AADT with development =21,695 2037 AADT without development = 25,215 2037 AADT with development =25,215
Portland Row	Existing AADT = 8,716 2022 AADT without development = 9,209 2022 AADT with development = 9,366 2037 AADT without development =10,611 2037 AADT with development = 10,767
Oriel Street Lower	Existing AADT = 244 2022 AADT without development = 257

	2022 AADT with development = 262 2037 AADT without development = 298 2037 AADT with development = 303
Seville Place East	Existing AADT = 10,820 2022 AADT without development = 11,437 2022 AADT with development = 12,331 2037 AADT without development = 13,208 2037 AADT with development = 14,100
Oriel Street Upper	Existing AADT = 4,186 2022 AADT without development = 4,423 2022 AADT with development = 7,141 2037 AADT without development = 5,096 2037 AADT with development = 7,815
Sherriff Street Upper	Existing AADT = 2,786 2022 AADT without development = 2,950 2022 AADT with development = 2,977 2037 AADT without development = 3,431 2037 AADT with development = 3,459
Guild Street	Existing AADT = 11,664 2022 AADT without development = 12,322 2022 AADT with development = 13,026 2037 AADT without development = 14,190 2037 AADT with development = 14,894
Amien's Street South	Existing AADT = 9,720 2022 AADT without development = 10,289 2022 AADT with development =10,289 2037 AADT without development = 11,957 2035 AADT with development = 11,957
Talbot Street	Existing AADT = 2,928 2022 AADT without development = 3,116 2022 AADT with development = 3,116 2037 AADT without development = 3,705 2037 AADT with development = 3,705

Existing Car Park Entrance	Existing AADT = 494 2022 AADT without development = 522 2022 AADT with development = 0 2037 AADT without development = 600 2037 AADT with development = 0
Sherriff Street Lower	Existing AADT = 1,625 2022 AADT without development = 1,726 2022 AADT with development = 1,794 2037 AADT without development = 2,040 2037 AADT with development = 2,118
Commons Street	Existing AADT = 570 2022 AADT without development = 602 2022 AADT with development = 1,794 2037 AADT without development = 691 2037 AADT with development = 2,118
North Wall Quay East	Existing AADT = 3,367 2022 AADT without development = 3,585 2022 AADT with development = 3,610 2037 AADT without development = 4,285 2037 AADT with development = 4,310
Samuel Beckett Bridge	Existing AADT = 6,444 2022 AADT without development = 6,805 2022 AADT with development = 6,867 2037 AADT without development = 7,817 2037 AADT with development = 7,880
North Wall Quay West	Existing AADT = 6,293 2022 AADT without development = 6,690 2022 AADT with development = 6,477 2037 AADT without development = 7,932 2037 AADT with development = 7,719

TABLE 12-2 ANNUAL AVERAGE DAILY TRAFFIC (AADT) FLOWS USED IN THE ADMS ROADS ASSESSMENT

The use of background pollutant concentrations within the modelling process ensures that pollutant sources other than traffic are represented appropriately. Background sources of pollutants within the vicinity of the study site include industrial, domestic and rail emissions.

The rationale for describing the impact of the proposed development is derived from the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance "Land-Use Planning & Development Control: Planning for Air Quality", May 2015.

12.3 Proposed Development

The site is located the rear of Connolly Station, Sherriff Street Lower, Dublin 1, Eircode D01 V6V6. The site abuts Connolly Rail Station and has frontage onto Sherriff Street Lower, Oriel Street Upper and Seville Place.

The site area is approximately 2.88 hectares.

Further west of Connelly Station is Talbot Street which leads directly to O'Connell Street. To the south is the Inner Dock and George Dock, located adjacent to the city's financial district, the Irish Financial Service Centre (IFSC). The River Liffey is located approximately 450m to the south.

To the east is a small area of inner-city housing bounded within the environs of the subject site by the Royal Canal and railway infrastructure servicing Connolly Station and Dublin Port.

A full description of the proposed development is presented in Chapter 2 and should be read in conjunction with this chapter.

The development will consist of;

I. the demolition of 4 no. structures with a combined gross floor area of 3,028sq.m;
II. the construction of 741 no. Build to Rent (BTR) residential units in 8 no. apartment blocks ranging in height from 4 storeys to 23 storeys with lower height buildings located adjacent to the northeast and east site boundaries, with a cumulative gross floor area of 68,535sq.m comprising;
    a. Block B1 (maximum building height 54.917m, total gross internal floor area 11,260sq.m, Apartment Mix: Studio: 25, 1-bed: 37, 2-bed: 51);
    b. Block B2 (maximum building height 54.917m, total gross internal floor area 10,831sq.m, Apartment Mix: Studio: 20, 1-bed: 35, 2-bed: 51,);
    c. Block B3 (maximum building height 51.767m, total gross internal floor area 9,766sq.m, Apartment Mix: Studio: 22, 1-bed: 60, 2-bed: 27, 3-Bed: 1);
    d. Block C1 (maximum building height 79.450m, total gross internal floor area 12,705sq.m, Apartment Mix: Studio: 84, 1-bed: 40, 2-bed: 41);
    e. Block C2 (maximum building height 39.615 m, total gross internal floor area 4,890 sq.m, Apartment Mix: Studio: 9, 1-bed: 33, 2-bed: 3, 3-Bed: 4);
    f. Block C3 (maximum building height 39.650 m, total gross internal floor area 6,775sq.m, Apartment Mix: Studio: 40, 1-bed: 18, 2-bed: 23);
    g. Block D1 (maximum building height 53.392 m, total gross internal floor area 8,418 sq.m, Apartment Mix: Studio: 10, 1-bed: 25, 2-bed: 44, 3-Bed: 1);
    h. Block D2 (maximum building height 30.950 m, total gross internal floor area 3,890 sq.m, Apartment Mix: Studio: 18, 1-bed: 8, 2-bed: 11);
III. residential support amenities including 1 no. gym, a resident's lounge, work areas, meeting rooms, dining rooms, recreational areas with a combined GFA of 1,444 sq.m;
IV. change of use from club house to pedestrian passageway of the existing vault (137sq.m GFA) fronting Seville Place, a Protected Structure (RPS No. 130);
V. a basement of 7,253.4 sq.m with vehicular access from Oriel Street Upper incorporating residents' car parking (58 no. spaces), residents cycle parking (640 no. spaces) 7 no. plant rooms (combined 2,228sq.m), waste management facilities (393 sq.m)

VI. 766 no. covered cycle parking spaces for residents and visitors, concierge office (233 sq.m) and waste management facilities (126 sq.m);

VII. ‘other uses’ including 10 no. units providing retail, commercial, and community use with a combined GFA of 3,142 sq.m;

VIII. A total of 18,562 sq.m of hard and soft landscaping comprising both public, communal and private open space located throughout the development;

IX. A service and emergency vehicle only access ramp from the Oriel Street Upper site entrance to serve CIE’s transport needs at Connolly Station;

X. Enabling works of a non-material nature to safeguard the existing vaults (Protected Structures - RPS No. 130) that form part of the subject site fronting Sheriff Street Lower, Oriel Street Upper, and Seville Place during the construction phase;

XI. All associated ancillary development works including drainage, 6 no. electricity substations, pedestrian access; and

XII. Works to the Masonry wall fronting Oriel Street and the Vaults fronting Seville Place (both a Protected Structure) consisting of the creation of a new vehicular and pedestrian entrance.

12.4 Receiving Environment

The nearest human sensitive receptors considered as part of this air quality impact assessment are the indicative dwellings proposed as part of the mixed used development, as presented in **Table 12.3** and **Figure 12.2**. The highest predicted level are on the lower floors, so indicative heights representative of the ground, first and second floor were relied upon in the assessment.

Receptor Location (Nearest Road)	Height (m)	Location (Irish Transverse Mercator)	
R1-3- N	1.5, 3, 6	716836	735098
R4-6- E	1.5, 3, 6	716897	734974
R7-9 - S	1.5, 3, 6	716842	734887
R10-12 SW	1.5, 3, 6	716789	734927
R13-15 - W	1.5, 3, 6	716664	734937

TABLE 12-3 SENSITIVE RECEPTOR LOCATIONS

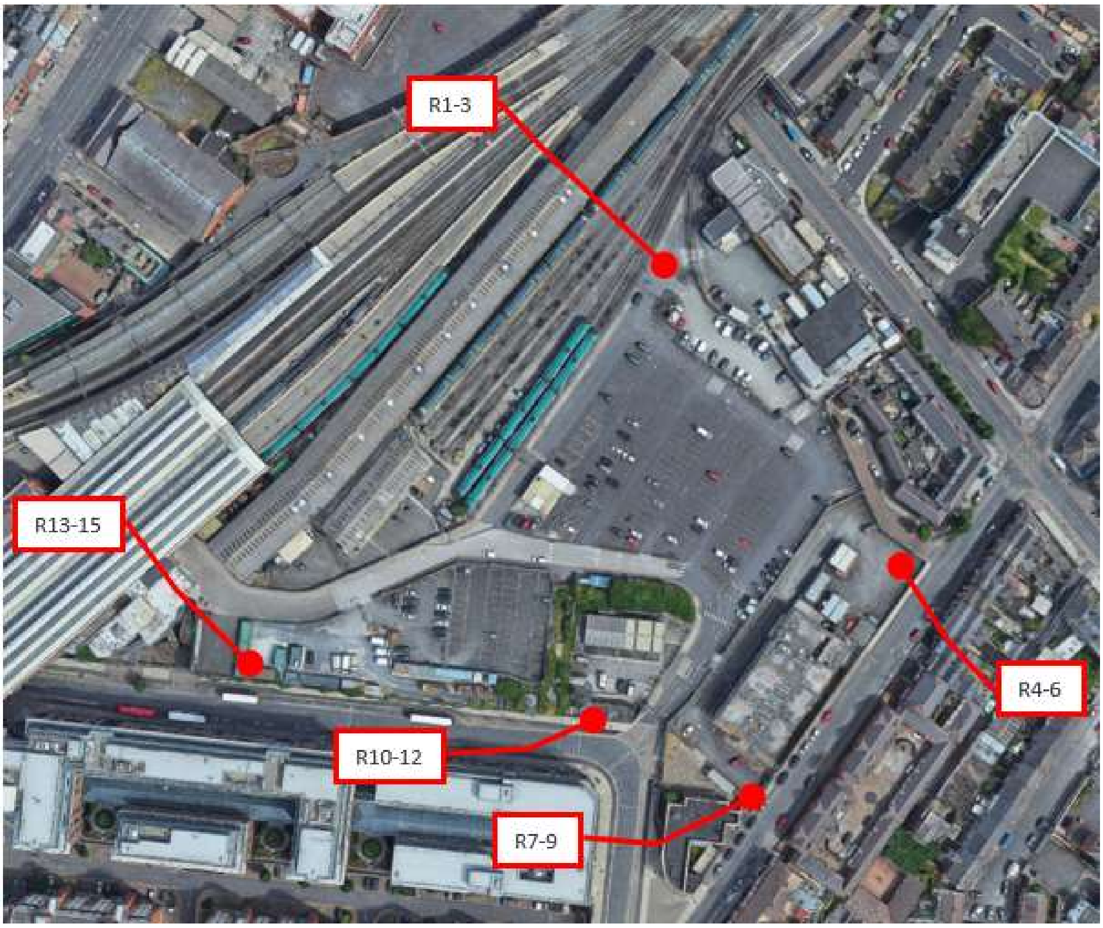


FIGURE 12-2 LOCATION OF IDENTIFIED SENSITIVE RECEPTORS

The Air Framework Directive deals with each EU member state in terms of "Zones" and "Agglomerations". These air quality zones have been declared for air quality management and assessment purposes. As part of the EU Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined for Ireland.

i. Zone A: Dublin Conurbation
ii. Zone B: Cork Conurbation
iii. Zone C: Other cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise
iv. Zone D: Rural Ireland, i.e. the remainder of the country excluding Zones A, B and C

The subject site is in Zone A, the Dublin Conurbation. Background sources of pollutants within the vicinity of the study site include industrial, domestic and rail emissions.

Environmental Protection Agency (EPA) mobile and fixed monitoring units monitor air quality at locations within Zone A. The typical baseline air quality data outlined below in **Table 12.4** is based on a review of the Air Quality Monitoring Report 2015 (EPA, 2016).

Pollutant	Zone A Monitoring Stations	EPA Baseline Monitoring Data Annual Mean 2015	Relevant Limit Value
PM_{10}	Winetavern Street	14 µg/m³	PM_{10} annual mean limit for the protection of human health = 40 µg/m³
	Rathmines	15 µg/m³	
	Phoenix Park	12 µg/m³	
	Blanchardstown	17 µg/m³	
	Dun Laoghaire	13 µg/m³	
	Ballyfermot	12 µg/m³	
	Davitt Road	13 µg/m³	
	St Anne's Park	15 µg/m³	
	Tallaght	14 µg/m³	
	Average	13.9 µg/m³	
SO_2	Winetavern Street	1 µg/m³	SO_2 annual mean limit for the protection of vegetation= 20 µg/m³
	Coleraine Street	0.1 µg/m³	
	Rathmines	2 µg/m³	
	Tallaght	3 µg/m³	
	Average	1.5 µg/m³	
NO_2	Winetavern Street	31 µg/m³	NO_2 annual mean limit for the protection of human health = 40 µg/m³
	Coleraine Street	25 µg/m³	
	Rathmines	18 µg/m³	
	Dun Laoghaire	16 µg/m³	
	Ballyfermot	16 µg/m³	
	Blanchardstown	25 µg/m³	
	St Anne's Park	14 µg/m³	
	Swords	13 µg/m³	
	Average	19.8 µg/m³	

Pollutant	Zone A Monitoring Stations	EPA Baseline Monitoring Data Annual Mean 2015	Relevant Limit Value
NO_x	Winetavern Street	49 µg/m^3	NO_x annual mean limit for the protection of human health = 30 µg/m^3
	Coleraine Street	44 µg/m^3	
	Rathmines	28 µg/m^3	
	Dun Laoghaire	27 µg/m^3	
	Ballyfermot	23 µg/m^3	
	Blanchardstown	55 µg/m^3	
	St Anne's Park	21 µg/m^3	
	Swords	22 µg/m^3	
	Average	33.6 µg/m^3	
Carbon Monoxide	Winetavern Street	0.0 mg/m^3	CO maximum daily 8 – hour mean value = 10 mg/m^3
	Coleraine Street	0.4 mg/m^3	
	Average	**0.2 mg/m^3**	

TABLE 12-4 TYPICAL AIR QUALITY MONITORING DATA REPRESENTATIVE OF EPA ZONE A MONITORING SITES

The closest monitoring station to the site is Coleraine Street, where continuous monitoring is undertaken for Sulphur Dioxide and Nitrogen Oxides (NO_X). As can be seen from the information presented in **Table 12.4** above, the annual mean concentrations for both parameters is well below the relevant limit value for the protection of human health and vegetation.

A review of other Zone A monitoring stations in Dublin demonstrates that for all pollutants excluding NO_X, the average annual mean is well below the individual limit value.

The annual average mean for NO_X is in excess of the relevant limit value and is associated with inter alia transportation emissions.

The background concentrations utilised within the ADMS modelling represents an average of the above values (unless measurements have been specifically undertaken in the Coleraine Street area i.e. (PM_{10} and SO_2) as these better represent the setting in proximity to the proposed development.

According to the EPA (2018) Ireland is not projected to meet 2020 emissions reduction targets and is not on the right trajectory to meet longer term EU and national emission reduction commitments. The Sustainable Energy Authority of Ireland (SEAI) reported that transport accounted for the largest share of energy-related CO_2 emissions, with a share of 37% in 2016, up from 33% in 2005. The residential sector accounted for the second largest share in that year, at 25%. The State thus faces significant challenges in meeting emission reduction targets for 2020 and beyond. Greater effort is required to position Ireland on a pathway towards a low carbon and climate resilient State, in line with the national objective of the Climate Action and Low Carbon Development Act, 2015.

12.5 Impact Assessment – Construction Phase

12.5.1 Climate

Construction traffic would be expected to be the dominant source of greenhouse gas emissions as a result of the development. Vehicles will give rise to CO_2 and NO_2 emissions during construction of the proposed development.

Based on the small number of construction vehicles and equipment to be used during construction and the short duration of the construction period, the potential impact on climate from the proposed development is deemed to be negligible.

The impact of climate due to the construction phase of the Proposed Project will not be significant.

12.5.2 Dust

Emissions of dust to air can occur during the preparation of the land (e.g. demolition, land clearing, and earth moving), and during construction. Emissions can vary substantially from day to day, depending on the level of activity, the specific operations being undertaken, and the weather conditions. The scale of these impacts depends on the dust suppression and other mitigation measures applied

The impacts depend on the mitigation measures adopted. Therefore, the emphasis in the guidance is on classifying the risk of dust impacts from a site, which will then allow mitigation measures commensurate with that risk to be identified. It is anticipated that with the implementation of effective site-specific mitigation measures the environmental effect will not be significant in most cases. Nonetheless a robust assessment of the dust impact risk is necessary in order to determine the level of site-specific mitigation that should be applied.

The potential air quality and climate impacts that may arise during demolition and construction activities are:

- dust deposition, resulting in the soiling of surfaces;
- visible dust plumes, which are evidence of dust emissions;
- elevated PM_{10} concentrations, as a result of dust generating activities on site; and
- an increase in concentrations of airborne particles and nitrogen dioxide due to exhaust emissions from diesel powered vehicles and equipment used on site (non-road mobile machinery) and vehicles accessing the site.

The most common impacts are dust soiling and increased ambient PM_{10} concentrations due to dust arising from activities on the site. Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed.

The risk of dust emissions from a demolition/construction site causing loss of amenity is related to:

- the activities being undertaken (demolition, number of vehicles and plant etc.);
- the duration of these activities;
- the size of the site;
- the meteorological conditions (wind speed, direction and rainfall);
- the proximity of receptors to the activities;
- the adequacy of the mitigation measures applied to reduce or eliminate dust; and

- the sensitivity of the receptors to dust.

Adverse impacts can occur in any direction from a site. They are, however, more likely to occur downwind of the prevailing wind direction and/or close to the site. It should be noted that the 'prevailing' wind direction is usually the most frequent direction over a long period such as a year (in the case of Ireland South Westerly); whereas construction activity may occur over a period of weeks or months during which the most frequent wind direction might be quite different. The most frequent wind direction may also not be the direction from which the wind speeds are highest. The use of the prevailing wind direction in the assessment of risk is most useful, therefore, for construction projects of long duration such as this.

Dust impacts are more likely to occur during drier periods, as rainfall acts as a natural dust suppressant.

As described Section 12.2 above, the IAQM Guidance provides a 4-step approach to the assessment of dust impacts and this methodology is followed below.

Step 1 An assessment will normally be required where there is a human receptor within 350m of the boundary of the site; or 50m of the route used by construction vehicles on the public highway, up to 500m from the site entrance.

The nearest residential dwelling to the application area is adjacent to the site on the east, in Oriel Hall, and thus further assessment is required.

Step 2 The criteria for assessing the risk of dust impact is provided in **Table 12.5**, with the potential magnitude of dust presented in **Table 12.6**.

Stage of Works	**Scale**	**Comment**
Demolition	Large	Total building volume >50,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level
	Medium	Total building volume 20,000 m^3 – 50,000 m^3, potentially dusty construction material, demolition activities 10-20 m above ground level
	Small	Total building volume <20,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months
Earthworks	Large	Total site area >10,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes
	Medium	Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m - 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes
	Small	Total site area <2,500 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks during wetter months.

Construction	Large	Total building volume >100,000 m^3, on site concrete batching, sandblasting
	Medium	Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on site concrete batching
	Small	Total building volume <25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).
Trackout	Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m
	Medium	10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m
	Small	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m

TABLE 12-5 CRITERIA FOR ASSESSMENT OF RISK FROM DUST

Based on the proposed development description in chapter 2 which include the proposed demolition of all existing buildings on the site, the magnitude of dust emissions during the construction phase is set out in the **Table 12.6** below.

Activity	Dust Emission Magnitude
Demolition	Low
Earthworks	Medium
Construction	Medium
Trackout	Medium

TABLE 12-6 DUST EMISSION MAGNITUDE FOR PROPOSED DEVELOPMENT SITE

It is determined that for all stages of the construction of the proposed development the potential dust magnitude is considered to be medium.

The **Table 12.7** below sets out the criteria for assessing people's sensitivity to dust in the vicinity of the site.

Sensitivity Level	Comment
High	Users can reasonably expect enjoyment of a high level of amenity; or The appearance, aesthetics or value of their property would be diminished by soiling; and The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Indicative examples include dwellings, museums, and other culturally important collections, medium and long-term car parks and car showrooms.
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or The appearance, aesthetics or value of their property could be diminished by soiling; or

	The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land, Indicative examples include parks and places of work.
Low	The enjoyment of amenity would not reasonably be expected, or Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Indicative examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short term car parks and roads.

TABLE 12-7 DUST SENSITIVITY

The closest existing sensitive human receptors are the residential dwellings located c.30m east and south of the application area, based on the criteria set out in the IAQM and reproduced in the **Table 12.8** below, the sensitivity of these receptors is determined to be low.

Receptor Sensitivity	Number of receptors	Distance from the 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

TABLE 12-8 SENSITIVITY OF PEOPLE TO DUST SOILING EFFECTS

The **Table 12.9** below sets out the sensitivities of people in the vicinity of the application area to the health effects of PM_{10}.

Sensitivity of Receptor	Comment
High	Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more a day). Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.
Medium	Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).

	Indicative examples include office and shop workers but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.
Low	Locations where human exposure is transient. Indicative examples include public footpaths, playing fields, parks and shopping streets.

TABLE 12-9 IDENTIFIES THE SENSITIVITY TO THE SITE OF PEOPLE IN RELATION TO THE POTENTIAL HEALTH EFFECTS

The recorded annual mean PM_{10} at the EPA in any Dublin Monitoring Station in 2015 was 17 µg m^3 significantly below the annual mean limit for the protection of health which is 40 µg m^3. Based on the distance from the source combined with the low background annual mean, the sensitivity of people to the health effects of PM_{10} is deemed to be low for all dust generating activities.

Receptor Sensitivity	Annual Mean PM_{10} concentration	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg m^{-3}	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28 - 32 µg m^{-3}	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24 – 28 µg m^{-3}	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg m^{-3}	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32 µg m^{-3}	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28 - 32 µg m^{-3}	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24 – 28 µg m^{-3}	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low

	<24 µg m^{-3}	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low	Low

TABLE 12-10 SENSITIVITY OF PEOPLE TO THE HEALTH EFFECTS OF PM10

Chapter 10, Biodiversity, identifies that there are no designated conservation sites (SACs, SPAs or pNHAs) within one kilometre of the proposed development site. The closest Natura 2000 site is South Dublin Bay and River Tolka Estuary SPA at approximately 1.2km and the nearest SAC is the South Dublin Bay SAC at approximately 2.8km.

The sensitivity of ecological receptors to dust generating activities is thus determined to be low as set out in the **Table 12.11** to **Table 12.13** below.

Sensitivities of receptors to ecological effects

Sensitivity of Receptor	Comment
High	Locations with an international or national designation and the designated features may be affected by dust soiling; or Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain Indicative examples included a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
Medium	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or Locations with a national designation where the features may be affected by dust deposition. Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features
Low	Locations with a local designation where the features may be affected by dust deposition Indicative example is a local Nature Reserve with dust sensitive features

TABLE 12-11 IDENTIFIES THE SENSITIVITY TO THE SITE ECOLOGICAL SITES

Receptor Sensitivity	Distance from the Source (m)

	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

TABLE 12-12 SENSITIVITIES OF RECEPTORS TO ECOLOGICAL EFFECTS

The Table below provides a summary of the conclusions from the dust assessment.

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Low	Low	Low	Low
Human Health	Low	Low	Low	Low
Ecological	Low	Low	Low	Low

TABLE 12-13 SENSITIVITY OF THE SURROUNDING AREA OF THE PROPOSED DEVELOPMENT

Step 2C of the IAQM Guidance requires that following the determination of the sensitivity of the surrounding area, the risk of impacts in the absence of mitigation measures be defined for each stage of the construction works phase. **Tables 12.14** to **Table 12.16** are reproduced from the Guidance.

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

TABLE 12-14 RISK OF DUST IMPACTS WITH NO MITIGATION - 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

TABLE 12-15 RISK OF DUST IMPACTS WITH NO MITIGATION - 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

TABLE 12-16 RISK OF DUST IMPACTS WITH NO MITIGATION - CONSTRUCTION

Applying the results of **Table 12.11** (Medium) and **Table 12.12** (Low), it is determined that in the absence of mitigation the risk to both human and ecological receptors during the construction phase is 'Low Risk'.

Potential Impact	Risk			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust Soiling	Low Risk	Low Risk	Low Risk	Low Risk
Human Health	Low Risk	Low Risk	Low Risk	Low Risk
Ecological	Low Risk	Low Risk	Low Risk	Low Risk

TABLE 12-17 SUMMARY DUST RISK TO DEFINE SITE SPECIFIC MITIGATION

12.6 Impact Assessment – Operational Phase

12.6.1 Climate

The site is located in the centre of Dublin City within close proximity of a wide number of public transport services and sustainable transport infrastructure including:

- The site is located directly adjacent to Connolly Station which provided direct access to a variety of rails services including:
  - Luas Red Line
  - DART
  - Commuter Rail
  - Intercity Rail
- The site is approximately 500m from the Busáras bus station providing access to a wide variety of commuter routes.
- There are approximately 19 No. Dublin Bus routes within a short walking distance from the site.
- Cycle tracks/lanes on adjacent roads infrastructure (North Wall Quay, Guild Street to the North Strand Road) to be further improved by the development and delivery of Greater Dublin Area Cycle Network Plan.
- Good quality pedestrian infrastructure on adjacent links and through the proposed development linking to key destinations locally within a short walking distance.

This anticipated modal shift will be beneficial in terms of greenhouse gas emissions associated with road traffic emissions within the study area i.e. less private car use and/or less use of fossil fuelled cars and more use of electric cars.

Energy efficient measures are incorporated into the scheme's design. The scheme is Part L compliant and an important element of Part L is the requirement for onsite or nearby renewable energy generation to contribute to the energy demand. This is reflected in the Building Lifecycle Report.

Improvements in energy efficiency coupled with the increased use of renewable energy technologies constitute important measures needed to facilitate a reduction in Ireland's energy dependency on, predominately imported, fossil fuels and associated greenhouse gas emissions over the period to 2020 and beyond.

12.6.2 Traffic Pollutants

The rationale for describing the impact of the proposed development is derived from the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance "Land-Use Planning & Development Control: Planning for Air Quality" May 2015.

There is a two-stage process to be followed in the assessment of air quality impacts:

i. A qualitative or quantitative description of the impacts on local air quality arising from the development; and
ii. A judgement on the overall significance of the effects of any impacts.

The suggested framework for describing the impacts is set out in Table 6.3 of the EPUK & IAQM guidance document and replicated in **Table 12.18** below. The term Air Quality Assessment Level (AQAL) has been adopted as it covers all pollutants, i.e. those with and without formal standards. AQAL is used to include air quality objectives or limit values where these exist. The Environment Agency uses a threshold criterion of 10% of the short term AQAL as a screening criterion for the maximum short-term impact. The EPUK & IAQM guidance adopts this as a basis for defining an impact that is sufficiently small in magnitude to be regarded as having an insignificant effect.

Long term average concentration at receptor in assessment year	**% Change in concentration relative to Air Quality Assessment Level (AQAL)**			
	<1	**2-5**	**6-10**	**>10**
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Explanation:
1. AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.
2. The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5% will be described as Negligible.
3. The Table is only designed to be used with annual mean concentrations.

4. Descriptors for individual receptors only; the overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.
5. When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.
6. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.
7. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

TABLE 12-18 IMPACT DESCRIPTORS FOR INDIVIDUAL RECEPTORS

The rationale for the assessment of significance is derived from the EPUK & IAQM Guidance as referenced in **Table 12.18** above.

Impacts on air quality, whether adverse or beneficial, will have an effect on human health that can be judged as 'significant' or 'not significant'. It is important to distinguish between the meaning of 'impact' and 'effect' as used in this EIAR Chapter assessment.

An 'impact' is the change in the concentration or deposition rate of an air pollutant, as experienced by a receptor. This may have an 'effect' on the health of a human receptor, depending on the severity of the impact and other factors that may need to be taken into account.

The impact descriptors set out in **Table 12.18** are not, in themselves, a clear and unambiguous guide to reaching a conclusion on significance. These impact descriptors are intended for application at a series of individual receptors. Whilst it may be that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances.

Any judgement on the overall significance of effect of a development will need to take into account such factors as:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

The presence of an AQMA that may be affected by a proposed development will increase the sensitivity of the application and any accompanying assessment. In this case, the proposed development site is not located within the Dublin Regional Air Quality Management Plan Air Quality Management Areas. The impacts descriptor acknowledges this and points to a conclusion of significant effect in cases where concentrations of a regulated pollutant are in excess of the objective value. Where the baseline concentrations are close to the objective value at a receptor, but not exceeding it, a case may be made for the development's predicted contribution being significant. It will always be difficult, however, to attribute the exceedance of an objective to any individual source.

Magnitude (scale of change) is determined by considering the predicted deviation from baseline conditions. Quantifiable assessment of magnitude has been undertaken. Impacts of the proposed development on air quality have been assessed with reference to the baseline conditions and environmental assessment criteria.

The predicted pollutant concentrations at existing residential dwellings (ER1-ER3) and proposed residential dwellings (R1-R5) in proximity to the proposed link road, with and without the proposed development in operation, are summarised in **Table 12.19** and **Table 12.21**. This is based on the assumptions that the Annual Average Daily Traffic Flow (24hour) in the assumed future year of 2035 are as outlined in **Table 12.2**.

It should be highlighted that the background concentrations relate to current day and given that emissions reduce in time due to improvements in the emissions profile of the national fleet of vehicles, reliance on the current day background concentrations would be deemed conservative in representing to 2035 traffic flow predictions. Appendix 12.1 includes a detailed breakdown of the results per individual meteorological year. Appendix 12.2 includes a graphical representation of the 2035 predicted air quality emission from the Connolly Quarter site, based on the 2017 meteorological year.

Receptor Name	**Assessed Year**	**Pollutant concentrations at receptors (excluding background concentrations)**		
		NO_x	NO_2	PM_{10}
		Annual mean µg m^{-3}	**Annual mean µg m^{-3}**	**Annual mean µg m^{-3}**
Without Development	2022			
R1-3- N		46.8	26.4	14.2
R4-6- E		46.6	26.3	14.2
R7-9 - S		46.6	26.3	14.2
R10-12 SW		45.7	25.9	14.1
R13-15 - W		46.0	26.0	14.1
With Development	2022			
R1-3- N		47.1	26.6	14.2
R4-6- E		47.6	26.8	14.3
R7-9 - S		47.9	27.0	14.3
R10-12 SW		46.0	26.0	14.1
R13-15 - W		46.1	26.1	14.2
Without Development	2037			
R1-3- N		46.5	26.2	14.2
R4-6- E		46.3	26.1	14.2

Receptor Name	Assessed Year	Pollutant concentrations at receptors (excluding background concentrations)		
		NO_x	NO_2	PM_{10}
		Annual mean µg m^{-3}	**Annual mean µg m^{-3}**	**Annual mean µg m^{-3}**
R7-9 - S		46.3	26.1	14.2
R10-12 SW		45.5	25.7	14.1
R13-15 - W		45.7	25.9	14.2
With Development	2037			
R1-3- N		46.7	26.3	14.3
R4-6- E		47.1	26.5	14.3
R7-9 - S		47.3	26.6	14.3
R10-12 SW		45.7	25.8	14.2
R13-15 - W		45.8	25.9	14.2
Limit Value			40 µg m^{-3}	40 µg m^{-3}

TABLE 12-19 AVERAGE POLLUTANT CONCENTRATIONS DUE TO TRAFFIC EMISSIONS – INCLUDING BACKGROUND

The predicted air quality pollutant concentration results have been compared with the relevant Air Quality Standards Regulations 2011. Using the information as described, based on the results of the ADMS Roads Assessment, it is predicted that the annual mean PM_{10} and NO_2 limit values will not be exceeded at existing dwellings in the vicinity of the site or at dwellings as proposed within this application for permission.

Based on the EPUK & IAQM Guidance, Tables 12.20 – 12.21 summarise the ADMS Roads assessment predictions and the description of impact on air quality at the receptor locations.

Receptor Name	Average Change in 2037	Relative Change (% of AQAL)	Percentage of predicted concentration relative to AQAL	Predicted Impact
R1-3- N	0.1	0.25	65.75	Negligible
R4-6- E	0.4	1	66.25	Negligible
R7-9 - S	0.5	1.25	66.5	Negligible
R10-12 SW	0.1	0.25	64.5	Negligible
R13-15 - W	0.0	0	64.75	Negligible

TABLE 12-20 DESCRIPTION OF IMPACT ON AIR QUALITY (NO_2) AS A RESULT OF PROPOSED DEVELOPMENT (µG M^{-3}) AT THE RECEPTOR LOCATIONS IN 2037.

Receptor Name	Average Change in 2037	Relative Change (% of AQAL)	Percentage of predicted concentration relative to AQAL	Predicted Impact
R1-3- N	0.1	0.25	35.75	Negligible
R4-6- E	0.1	0.25	35.75	Negligible
R7-9 - S	0.1	0.25	35.75	Negligible
R10-12 SW	0.1	0.25	35.5	Negligible
R13-15 - W	0.0	0	35.5	Negligible

TABLE 12-21 DESCRIPTION OF IMPACT ON AIR QUALITY (PM_{10}) AS A RESULT OF PROPOSED DEVELOPMENT (µG M^{-3}) AT THE RECEPTOR LOCATIONS IN 2037.

As outlined in Section 7 Assessing Significance of the EPUK & IAQM Guidance document a judgement of significance should be made by a competent professional. It is our professional judgement that there will be an insignificant impact on the air quality in the vicinity of the development as a result of the operational phase of the proposed development. Existing and proposed residents will not experience a significant air quality impact as deduced from the results of the ADMS Roads Assessment which compares air quality pollutant concentrations without and with the proposed mixed-use development.

12.7 Cumulative Impact

There is a proposed Phase 2 development of the site which is currently in its masterplan stage. This will also be primarily a commercial development site.

The nature of Phase 2 will should give rise to additional noise sources which would have the potential to impact on proposed dwelling in Phase 1 or existing residential property in the vicinity of the site.

12.8 Mitigation – Construction Phase - Step 3

The mitigation measures have been divided into general measures and measures applicable specifically to demolition, earthworks, construction and trackout, for consistency with the assessment methodology. The following **Table 12.22** details the site-specific mitigation required for the proposed development.

Measure	Comment
Communications	• Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. • Display the head or regional office contact information

Dust Management	• Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections. • Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. • Make the complaints log available to the local authority when asked. • Record any exceptional incidents that cause dust and/or air emissions, either on or off site, and the action taken to resolve the situation in the log book. • Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the site boundary, with cleaning to be provided if necessary. • Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked. • Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. • Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. • Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period. • Avoid site runoff of water or mud. • Keep site fencing, barriers and scaffolding clean using wet methods. • Cover, seed of fence stockpiles to prevent wind whipping. • Ensure all vehicles switch off engines when stationary – no idling vehicles. • Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction. • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. • Use enclosed conveyors and covered skips.

	• Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. • Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet methods. • Avoid bonfires and burning of waste materials.
Demolition	• Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). • Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
Construction	• Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling to prevent dust. • For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.
Trackout	• Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. • Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever the site size and layout permits. • Access gates to be located at least 10m from receptors where possible.

TABLE 12-22 DUST MITIGATION DURING CONSTRUCTION

12.9 Mitigation Assessment – Construction Phase - Step 4

Descriptor	Assessment	Comment
Quality of Effects	Neutral Effects	The predicted dust levels during construction have been shown to be low risk, once the identified mitigation measures have been incorporated into the site.
Significance of Effects	Not Significant	The dust levels may cause a noticeable change in the area, but there will not be significant consequences
Probability of Effects	Unlikely to Occur	The predicted dust levels are shown to be low risk and the proposed hours of operation are during normal daytime hours, which are less sensitive to existing residential properties.
Duration and Frequency of Effects	Short-Term Effects	The demolition and construction on the site would be expected to last between 1 to 7 years
Types of Effects	Do-nothing effects	The impacts of the construction are within appropriate limits for a short-term, they will not cause a significant ongoing impact in the vicinity of the site.

TABLE 12-23 DESCRIPTION OF EFFECTS – CONSTRUCTION PHASE

The nearest residential locations are across the Oriel Street Upper and the land use in the vicinity is primarily commercial or industrial.

Duration of the construction works will be a short-term impact (see **Table 12.23**) and the predicted levels impact from dust has been assessed to be low.

12.10 Mitigation – Operational Phase

Proposed residents will not experience a significant air quality impact as deduced from the results of the ADMS Roads Assessment which compares air quality pollutant concentrations with and without the proposed mixed-use development, hence no mitigation is deemed necessary.

Descriptor	Assessment	Comment
Quality of Effects	Neutral Effects	There are no significant air quality sources which will effect existing residential properties further away from the site. The additional traffic on the road will not cause a significant difference to the road network.
Significance of Effects	Not Significant	The changes to the air quality in the area will be slight and no proposed mitigation would be required, there will not be significant consequences

Descriptor	Assessment	Comment
Probability of Effects	Unlikely effects	The site is primarily designed to minimise impact on the proposed residential development, as there will not be a significant impact on the existing properties in the wider area.
Duration and Frequency of Effects	Permanent Effects	The proposed site will be expected to last over 60 years
Types of Effects	Do-nothing effects	The site is zoned for regeneration so would be likely to be developed in the future with either residential or enterprise led development. The impact of this development is likely to be similar to future development on the site

TABLE 12-24 DESCRIPTION OF EFFECTS – OPERATIONAL PHASE

12.11 Monitoring

Construction dust has the potential to impact at the nearest receptors outside of the proposed development. The nearest dwellings will generally be most affected and therefore assessing compliance with dust limits at those 'controlling points' will also ensure compliance at other dwellings further away. The following locations in Table 12.25 have been identified as the controlling points for construction dust.

Location (nearest road)	Location (Irish Transverse Mercator)
ER1 – Oriel Hall	716868, 735020
ER2 – Oriel Street Upper	716854, 734908

TABLE 12-25 CONSTRUCTION DUST MONITORING LOCATION

Dust monitoring shall be conducted by the Site Manager or nominated sub-contractor by trained personnel.

The provisional monitoring programme for each type of activity is:

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Record any exceptional incidents that cause dust and/or air emissions, either on or off site, and the action taken to resolve the situation in the log book.
- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the site boundary, with cleaning to be provided if necessary.
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Proposed residents will not experience a significant air quality impact as deduced from the results of the ADMS Roads Assessment which compares air quality pollutant concentrations without and with the proposed mixed use development, hence no monitoring is deemed necessary.

12.12 Difficulties Encountered in Compiling Information

No significant difficulties were encountered in compiling the relevant information and the current report is based on desktop review and non-disturbance on-site assessment only. No intrusive opening up, investigations or excavations have been carried out to the building fabric of the protected structures or to other features in the site.

12.13 Residual Impacts

An air quality impact assessment has been undertaken for the proposed mixed-use development, Connolly Station, Dublin.

The construction phase is relatively short-term in nature. Taking into consideration the original risk assessment of the proposed construction works and further to mitigation being enacted, it is concluded that no significant impacts will result as a consequence of the proposed development.

The operational phase of the site will be over 60 years, therefore is considered permanent. Existing and proposed residents will not experience a significant air quality impact as deduced from the results of the ADMS Roads Assessment which compares air quality pollutant concentrations without and with the proposed mixed-use development, hence no monitoring is deemed necessary.

Given the above, it can be concluded that residual effects from the construction and operation of the proposed development would not be deemed significant.

The assessment takes account of both the traffic predicted from the site development and the natural increase in the traffic flows in the area, as well as the improvements in traffic emissions expected.

Therefore, the cumulative assessment would reach similar conclusions, that the impact of the development would not be deemed significant when considered in additional to other expected increases in traffic levels.

The Connolly Quarter Masterplan shows a design for the development of the entire site comprising the lands under agreement between CIE and Oxley Holdings Limited. Oxley Holdings Limited intend to submit an application under Section 34 to Dublin City Council for the development of office and hotel blocks. These are Blocks A, D3, and E detailed in the Masterplan. It is considered that the cumulative effects from the works required to implement the masterplan are positive, permanent, and is not significant.

No other cumulative impacts upon the architectural or cultural heritage resource have been identified as part of the assessment.

12.14 References and Sources

- Institute of Air Quality Management (IAQM) guidance “Land-Use Planning & Development Control: Planning for Air Quality” May 2015.
- Institute of Air Quality Management – ‘Guidance on the Assessment of dust from demolition and construction’ Version 1.1 2014.
- Air Quality Standards Regulations 2011.

CHAPTER 13
CULTURAL HERITAGE: ARCHAEOLOGY

OCTOBER 2019

Table of Contents

Table of Figures

Table of Tables

13 Cultural Heritage - Archaeology

13.1 Introduction

Irish Archaeological Consultancy Limited has prepared this report on behalf of Oxley Holdings Limited to assess the impact, if any, on the archaeological and cultural heritage resource of a proposed mixed-use development on lands adjacent to Connolly Station, Dublin 1 (ITM 716810/734980).

This study determines, as far as reasonably possible from existing records, the nature of the cultural heritage and archaeological resource within the proposed development area using appropriate methods of study. Desk-based assessment is defined as a programme of study of the historic environment within a specified area or site that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic, and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the setting of heritage assets (CIfA 2014). In order to compile a complete baseline, a site inspection was carried out to complement the results of the desk-based assessment. This leads to the following:

- Determining the presence of known archaeological and cultural heritage sites that may be affected by the proposed development;
- Assessment of the likelihood of finding previously unrecorded archaeological remains during the construction programme;
- Suggested mitigation measures based upon the results of the above research.

13.1.1 Author Information

This chapter was produced by Grace Corbett BA, MA, MCIfA, MIAI, Senior Archaeological and Cultural Heritage Consultant with IAC Ltd. Grace is a Senior Archaeological Consultant with IAC Ltd. She holds an MA in Landscape Archaeology from the University of Sheffield and a BA in Archaeology and Classics from the University College Cork. She has over 15 years' experience working in the commercial archaeological sector, both in Ireland and the U.K. Grace has developed an excellent working knowledge of all aspects relating to Irish and British archaeology and heritage. She specialises in the production and delivery of archaeological and built heritage desk top assessments, EIAR, master plans and management plans across all sectors of development.

The chapter was technically reviewed by Faith Bailey BA, MA, MCIfA, MIAI, Associated Director of IAC Ltd. Faith is an Associate Director and Senior Archaeologist and Cultural Heritage Consultant with IAC Ltd. Faith has over 16 years' experience working in the commercial archaeological and cultural heritage sector. She has been responsible for the production and delivery of a large number of archaeological and built heritage desk top assessments, EIAR, master plans, LAP/SEA and management plans associated with all sectors of development in the Republic and Northern Ireland.

13.1.2 Proposed Development

The development will consist of;

i. the demolition of 4 no. structures with a combined gross floor area of 3,028sq.m;

a. the construction of 741 no. Build to Rent (BTR) residential units in 8 no. apartment blocks ranging in height from 4 storeys to 23 storeys with lower height buildings located adjacent to the northeast and east site boundaries, with a cumulative gross floor area of 68,535sq.m comprising;

b. Block B1 (maximum building height 54.917m, total gross internal floor area 11,260sq.m, Apartment Mix: Studio: 25, 1-bed: 37, 2-bed: 51);

c. Block B2 (maximum building height 54.917m, total gross internal floor area 10,831sq.m, Apartment Mix: Studio: 20, 1-bed: 35, 2-bed: 51,);

d. Block B3 (maximum building height 51.767m, total gross internal floor area 9,766sq.m, Apartment Mix: Studio: 22, 1-bed: 60, 2-bed: 27, 3-Bed: 1);

e. Block C1 (maximum building height 79,450m, total gross internal floor area 12,705sq.m, Apartment Mix: Studio: 84, 1-bed: 40, 2-bed: 41);

f. Block C2 (maximum building height 39,615 m, total gross internal floor area 4,890 sq.m, Apartment Mix: Studio: 9, 1-bed: 33, 2-bed: 3, 3-Bed: 4);

g. Block C3 (maximum building height 39,650 m, total gross internal floor area 6,775sq.m, Apartment Mix: Studio: 40, 1-bed: 18, 2-bed: 23);

h. Block D1 (maximum building height 53,392 m, total gross internal floor area 8,418 sq.m, Apartment Mix: Studio: 10, 1-bed: 25, 2-bed: 44, 3-Bed: 1);

i. Block D2 (maximum building height 30,950 m, total gross internal floor area 3,890 sq.m, Apartment Mix: Studio: 18, 1-bed: 8, 2-bed: 11);

ii. residential support amenities including 1 no. gyms, a resident's lounge, work areas, meeting rooms, dining rooms, recreational areas with a combined GFA of 1,444 sq.m;

iii. change of use from club house to pedestrian passageway of the existing vault (137sq.m GFA) fronting Seville Place, a Protected Structure (RPS No. 130);

iv. a basement of 7,253.4 sq.m with vehicular access from Oriel Street Upper incorporating residents' car parking (58 no. spaces), residents cycle parking (640 no. spaces) 7 no. plant rooms (combined 2,228sq.m), waste management facilities (393 sq.m)

v. 766 no. covered cycle parking spaces for residents and visitors, concierge office (233 sq.m) and waste management facilities (126 sq.m);

vi. 'other uses' including 10 no. units providing retail, commercial, and community use with a combined GFA of 3,142 sq.m;

vii. A total of 18,562 sq.m of hard and soft landscaping comprising both public, communal and private open space located throughout the development;

viii. A service and emergency vehicle only access ramp from the Oriel Street Upper site entrance to serve CIE's transport needs at Connolly Station;

ix. Enabling works of a non-material nature to safeguard the existing vaults (Protected Structures - RPS No. 130) that form part of the subject site fronting Sheriff Street Lower, Oriel Street Upper, and Seville Place during the construction phase;

x. All associated ancillary development works including drainage, 6 no. electricity substations, pedestrian access; and

xi. Works to the Masonry wall fronting Oriel Street and the Vaults fronting Seville Place (both a Protected Structure) consisting of the creation of a new vehicular and pedestrian entrance.

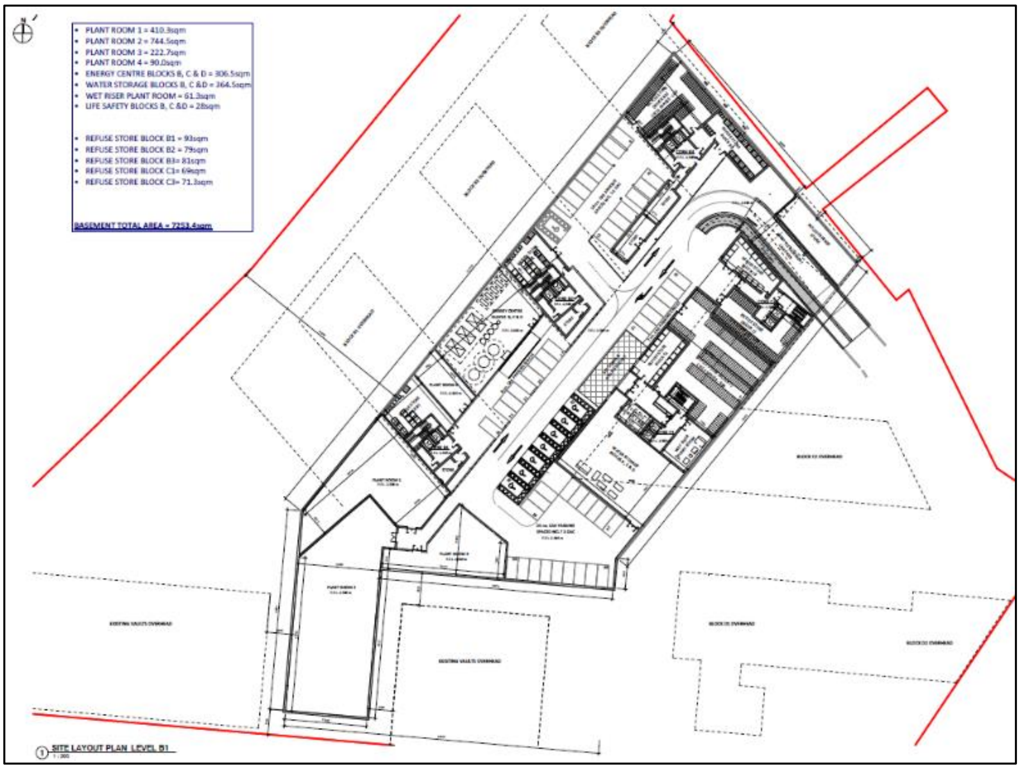


Figure 13-1 Proposed basement layout

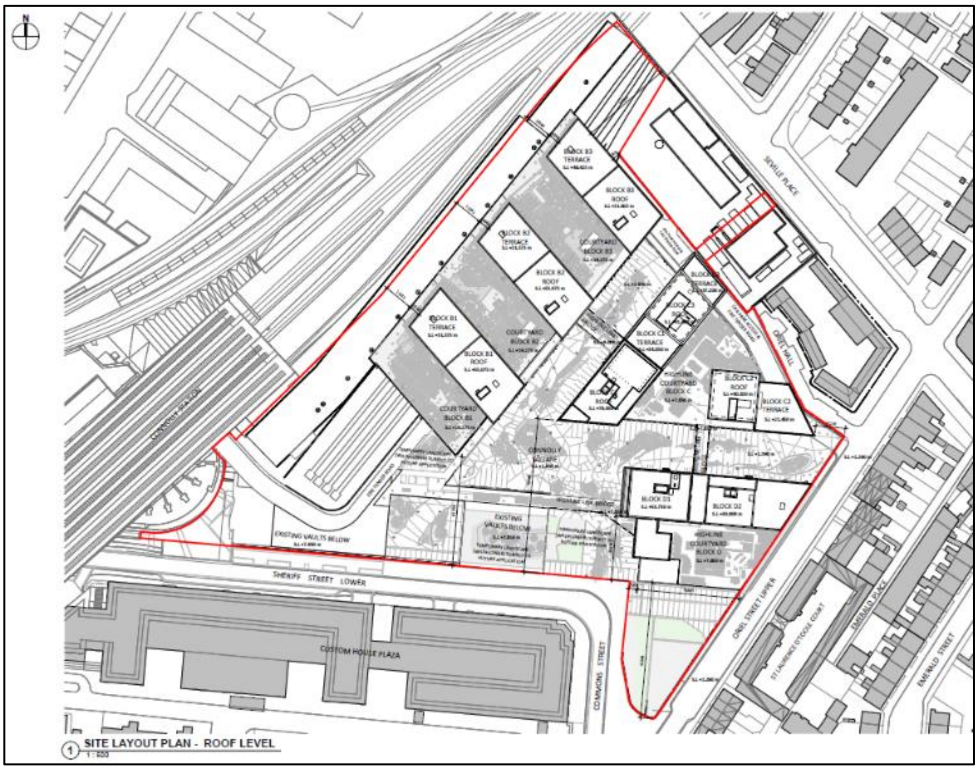


Figure 13-2 Proposed site layout

13.2 Methodology

13.2.1 Introduction

The study involved detailed interrogation of the archaeological and historical background of the development area. This included information from the Record of Monuments and Places of County Dublin, the City Development Plan, the topographical files of the National Museum of Ireland and cartographic and documentary records. Aerial photographs of the study area held by the Ordnance Survey of Ireland and Google Earth were also consulted. A field inspection was carried out on 19th October 2018 in an attempt to identify any known archaeological and cultural heritage sites and previously unrecorded features, structures and portable finds within the proposed development area.

An impact assessment and a mitigation strategy have been prepared. The impact assessment is undertaken to outline potential adverse impacts that the proposed development may have on the archaeological and cultural heritage resource, while the mitigation strategy is designed to avoid, reduce or offset such adverse impacts.

Research has been undertaken in two phases. The first phase comprised a paper survey of all available archaeological, historical, and cartographic sources. The second phase involved a field inspection of the proposed development area.

13.2.2 Legislative Context

The following legislation, standards and guidelines were consulted as part of the assessment.

- National Monuments Acts, 1930-2014;
- The Planning and Development (Strategic Infrastructure) Bill, 2006;
- Planning and Development Act, 2000, As amended;
- Planning and Development regulations, 2001, As Amended
- Heritage Act, 1995;
- Advice Notes for preparing Environmental Impact Statements (Draft Sept. 2015). Dublin, Government Publications Office;
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (DRAFT) (EPA 2017). Dublin: Government Publications Office;
- Guidelines on the Information to be Contained in Environmental Impact Statements, (EPA, 2002);
- Advice notes on Current Practice in the Preparation of Environmental Impact Statements, (EPA, 2003);
- Frameworks and Principles for the Protection of the Archaeological Heritage, 1999, (formerly) Department of Arts, Heritage, Gaeltacht and Islands;

13.2.3 Consultation

Following the initial research, several statutory and voluntary bodies were consulted to gain further insight into the cultural background of the background environment, receiving environment and study area (Figure 13.2), as follows:

- Department of Culture, Heritage and the Gaeltacht – the Heritage Service, National Monuments and Historic Properties Section: Record of Monuments and Places; Sites and Monuments Record; Monuments in State Care Database and Preservation Orders;
- National Museum of Ireland, Irish Antiquities Division: topographical files of Ireland;
- Dublin City Council: Planning Section; and
- Trinity College Dublin, Map Library: Historical and Ordnance Survey Maps.

13.2.4 Paper Survey

The following source documents were examined and a list of areas of archaeological and cultural heritage potential was compiled:

- Record of Monuments and Places for County Dublin;
- Sites and Monuments Record for County Dublin;
- Monuments in State Care Database;
- Preservation Orders;
- Register of Historic Monuments;
- Topographical files of the National Museum of Ireland;
- Cartographic and written sources relating to the study area;
- Dublin City Development Plan 2016-2022;
- Place name analysis;
- Aerial photographs; and
- Excavations Bulletin (1970-2018).

Record of Monuments and Places (RMP) is a list of archaeological sites known to the National Monuments Section, which are afforded legal protection under Section 12 of the 1994 National Monuments Act and are published as a record.

Sites and Monuments Record (SMR) holds documentary evidence and field inspections of all known archaeological sites and monuments. Some information is also held about archaeological sites and monuments whose precise location is not known, e.g. only a site type and townland are recorded. These are known to the National Monuments Section as 'un-located sites' and cannot be afforded legal protection due to lack of locational information. As a result, these are omitted from the Record of Monuments and Places. SMR sites are also listed on the recently launched website created by the DAHG – www.archaeology.ie.

National Monuments in State Care Database is a list of all the National Monuments in State guardianship or ownership. Each is assigned a National Monument number whether in guardianship or ownership and has a brief description of the remains of each Monument.

The Minister for the Department of Arts, Heritage and the Gaeltacht may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister for Culture, Heritage and the Gaeltacht, Josepha Madigan, TD.

Preservation Orders List contains information on Preservation Orders and/or Temporary Preservation Orders, which have been assigned to a site or sites. Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister for Culture, Heritage and the Gaeltacht, Josepha Madigan, TD.

Register of Historic Monuments was established under Section 5 of the 1987 National Monuments Act, which requires the Minister for Culture, Heritage and the Gaeltacht, Josepha Madigan, TD to establish and maintain such a record. Historic monuments and archaeological areas present on the register are afforded statutory protection under the 1987 Act. The register also includes sites under Preservation Orders and Temporary Preservation Orders. All registered monuments are included in the Record of Monuments and Places.

The topographical files of the National Museum of Ireland are the national archive of all known finds recorded by the National Museum. This archive relates primarily to artefacts but also includes references to monuments and unique records of previous excavations. The find spots of artefacts are important sources of information on the discovery of sites of archaeological significance.

Cartographic sources are important in tracing land use development within the development area as well as providing important topographical information on areas of archaeological potential and the development of buildings. Cartographic analysis of all relevant maps, which are listed following, has been made to identify any topographical anomalies or structures that no longer remain within the landscape.

- John Speed, Map of Dublin, 1610
- William Petty, Down Survey, Co. Dublin, 1655
- Bernard de Gomme, The City and Suburbs of Dublin, 1673
- Thomas Phillip, Map of Dublin, 1685
- Charles Brooking, Map of Dublin, 1728
- John Rocque, A plan of the city of Dublin and the environs, 1756
- Dublin City Corporation Map, 1761
- John Taylor, Map of the Environs of Dublin, 1816
- Thomas Larcom, Map of the County and City of Dublin, 1836
- Ordnance Survey maps of County Dublin, 1838, 1847,1876, 1889, and 1909

Documentary sources were consulted to gain background information on the archaeological and cultural heritage landscape of the proposed development area. A full list of references is given in Section 13.9.

Aerial photographic coverage is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its likely potential for archaeology. A number of sources were consulted including aerial photographs held by the Ordnance Survey and Google Earth.

Place Names are an important part in understanding both the archaeology and history of an area. Place names can be used for generations and in some cases have been found to have their root deep in the historical past.

Development Plans contain a catalogue of all the Protected Structures and archaeological sites within the county. The Dublin City Development Plan was consulted to obtain information on cultural heritage sites in and within the immediate vicinity of the proposed development.

Excavations Bulletin is a summary publication that has been produced every year since 1970. This summarises every archaeological excavation that has taken place in Ireland during that year up until 2010 and since 1987 has been edited by Isabel Bennett. This information is vital when examining the archaeological content of any area, which may not have been recorded under the SMR and RMP files. This information is also available online (www.excavations.ie) from 1970–2018.

13.2.5 Field Inspection

Field inspection is necessary to determine the extent and nature of archaeological remains and can also lead to the identification of previously unrecorded or suspected sites and portable finds through topographical observation and local information. A field inspection was carried out 19th October 2018, conditions were dry and overcast.

The field inspection entailed:

- Walking the proposed development area and its immediate environs.
- Noting and recording the terrain type and land usage.
- Noting and recording the presence of features of archaeological or cultural heritage significance.
- Verifying the extent and condition of recorded sites.
- Visually investigating any suspect landscape anomalies to determine the possibility of their being anthropogenic in origin.

13.2.6 Definitions

In order to assess, distil, and present the findings of this study, the following definitions apply:

- *'Cultural Heritage'* where used generically, is an over-arching term applied to describe any combination of archaeological, architectural and cultural heritage features, where:

- the term *'archaeological heritage'* is applied to objects, monuments, buildings or landscapes of an (assumed) age typically older than AD 1700 (and recorded as archaeological sites within the Record of Monuments and Places); and
- the term *'cultural heritage'*, where used specifically, is applied to other (often less tangible) aspects of the landscape such as historical events, folklore memories and cultural associations. This designation can also accompany an archaeological or architectural designation.

Table 13.1 shows the effects / impacts as defined by the EPA 2017 draft Guidelines. The full suite of the description of effects can be seen in Table 1.2 Impact Rating Terminology in chapter 1 of this EIAR.

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

TABLE 13-1- IMPACT RATING TERMINOLOGY

Impacts as defined by the EPA 2017 draft Guidelines (pg. 23).

13.3 Baseline Scenario

13.3.1 Description of the Receiving Environment

The proposed development area is located on lands adjacent to Connolly Station, Dublin 1 within the parish of Saint Thomas's in the Barony of Dublin. The site is bounded by Connolly Station to the west, Seville Place to the north, Oriel Street Upper to the east, and Sheriff Street Lower to the south. The site is an urban brownfield site which is currently used for ancillary facilities relating to the functions of Connolly Station, such as railway sidings, maintenance facilities for trains and administration facilities for various CIE departments. Most of the site consists of surface car parking (390 spaces approximately) for customers and staff of Irish Rail. This area is constructed on reclaimed ground, which is characteristic of the George's Dock and Spencer's Dock area located to the south and southeast of the development area. This land was reclaimed for industrial use from the 18th century onwards. The area is located c. 100m east of the zone of archaeological potential for Dublin City (DU018-020). This constraint provides an arbitrary indication of the zone of archaeological potential for Dublin city (**Figure 13.1**), which is subject to statutory protection under the National Monuments Act 1930-2004 (as amended).

13.3.2 Archaeological and Historical Background

13.3.2.1 Prehistoric Period (c.6000 BC – AD 400)

This is the earliest time for which there is clear evidence for prehistoric activity in Ireland. During this period people hunted, foraged and gathered food and appear to have had a mobile lifestyle. Evidence for settlement during this period is rare. However, due to the proximity of the River Liffey and former estuarine area (now reclaimed), there is potential for remains dating to this period to still be preserved beneath the level of the reclamation deposits. This has been illustrated by the discovery of Mesolithic fish traps during the development of the Spencer Dock area, c. 500m to the southeast of the proposed development area ((McQuade 2008, Licence Ref.: 03E0654).

The fish traps were found to be late Mesolithic in date and during the excavations the Mesolithic shore line was also identified 5m below the current ground level and 30m north of the current edge of the River Liffey. This area may represent the northern bank of the river or an estuarine island. The traps were set in estuarine silts and preserved under a later accumulation of silts which were sealed by reclamation deposits. The fish traps were constructed almost exclusively of hazel, and while fragmentary were in a relatively good state of preservation, with tool marks in evidence. Radiocarbon dates from five wood samples returned a date range of between 6100 - 5720BC, suggesting that these are presently the earliest fish traps recorded in Ireland and the UK. A further trap was found higher up in the silts, which returned a Neolithic date (McQuade 2008, 8-11).

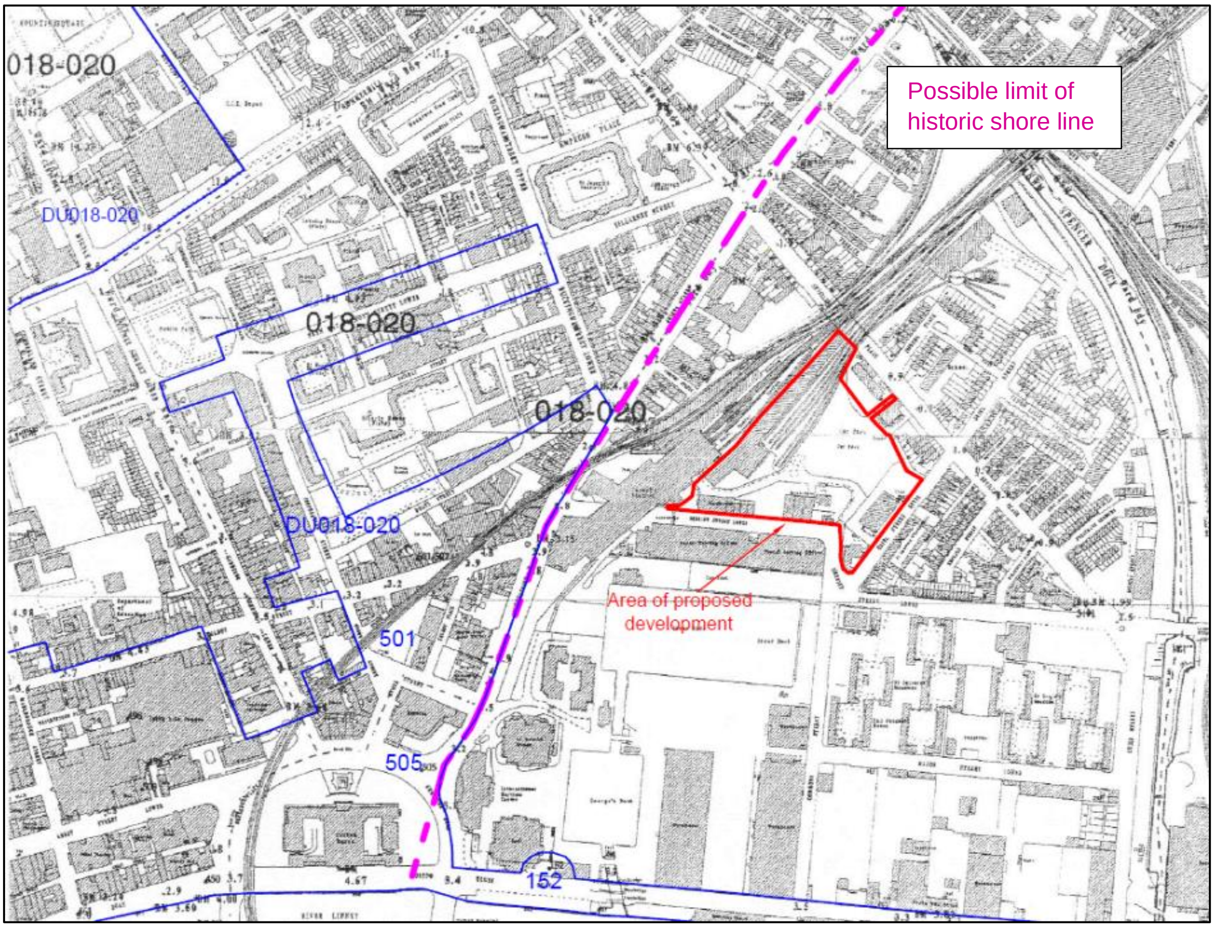


FIGURE 13-3 - EXTRACT FROM THE RMP MAP SHOWING THE PROPOSED DEVELOPMENT, RECORDED MONUMENTS AND DUBLIN CITY ZONE OF ARCHAEOLOGICAL POTENTIAL

During the Neolithic, communities became less mobile and their economy became based on the rearing of stock and cereal cultivation. This transition was accompanied with major social change. Agriculture demanded an altering of the physical landscape, forests were rapidly cleared and field boundaries constructed. There are no previously recorded archaeological sites dating to this period within the vicinity of the proposed development. However, the estuary and the river would have still remained as a major resource to be exploited during this period, proven by the Neolithic fish trap discovered at Spencer Dock, although habitation would have likely been confined to higher ground further to the north and northwest.

The Bronze Age period is associated with major technological innovations, in particular the production and use of metal. As with the transition from Mesolithic to Neolithic the transition into the early Bronze Age was accompanied by changes in society. Evidence for small scale settlement during this period is more common within the archaeological record, with Bronze Age fulacht fiadh or burnt mound sites the most typical. These particular sites are commonly found close to a water course as their main function was to provide boiling water within an excavated, often wood lined trough. It is not clear what the exact function of these sites was and varying interpretations have been offered that include cooking, dying, bathing and brewing. No Bronze Age sites or artefacts have been recorded within the vicinity of the proposed development site, although once again the proximity of the former estuary is likely to have attracted occupation at this time.

There is increasing evidence for Iron Age settlement and activity in recent years as a result of development-led excavations as well as projects such as LIARI (Late Iron Age and Roman Ireland). Yet, this period is distinguished from the rather rich remains of preceding Bronze Age and subsequent early medieval period by a relative paucity of evidence for material culture in Ireland. There is no known evidence of Iron Age activity in the vicinity of the proposed development.

13.3.2.2 Early Medieval Period (AD 400–1169)

The name Dublin (*Dubhlinn)*, meaning black pool, is generally taken to refer to the pool or pond that was located directly southeast of the site of the present Dublin Castle, located on the southern side of the River Liffey. However, this name has been suggested as referring to an early Christian monastic settlement south of the black pool and Clarke (1990, 58) believes that this interpretation of Dubhlinn would explain why the town has two names – *Dubhlinn* (for the enclosed ecclesiastical area) and *Baile Ath Cliath* – a secular settlement that was developed to guard over the 'ford of the hurdles'.

The early cartographic representations of Dublin city indicate the position of the estuary shoreline prior to the commencement of reclamation works. On the northern side of the river it is possible that Amiens Street (formerly the North Strand), which is located c. 100m to the west of the proposed development area, represents this former shoreline (De Courcy 1996, 270). De Courcy also argues that this is likely to have been the position of the shore line as far back as 850 AD (Ibid. xxvii). The proposed development area would therefore have been located within the tidal mud flats associated with the estuary and unlikely to have been a site suitable for permanent habitation during the early medieval period or the preceding prehistoric period.

The Vikings had established themselves in Dublin by the middle of the 9th century and by the 10th century Dublin had become a recognised urban centre. One of the first Viking landing points was marked by a standing stone or pillar stone ('The Long Stone'), which was erected according to Norse custom (De Courcy 1996, 235). The Long Stone stood just above the high-tide shoreline at the confluence of the Liffey and the Steine on the southern side of the River Liffey (DU018-020129; c. 925m southwest of the site). Today this is thought to be on the northern side of Trinity College.

The 9th and the 10th centuries were described as the age of Viking wars. During the 10th century the concept of a central authority began to take root in Ireland due to the emergence of rulers sufficiently powerful to declare themselves high kings of Ireland over all lesser kings and chieftains. One of the more prominent of these was Brian Boruma (Boru) who established himself in 976 as leader of the Dalcassians from his stronghold in Kincora and went on to declare himself king of Ireland in 1002. The Vikings had largely retained the kingship of Dublin throughout the century, despite many defeats by such Kings as Mael Sechnaill of Tara in 981, 989 and 995 and Brian Boruma in 999 and 1000. On Good Friday 1014 a battle was fought between Maelmordha, king of Leinster, and Brian Boruma, later known as the Battle of Clontarf, in which the Vikings supported Maelmordha. They promised him not only their support but as far as possible the support of their fellow countrymen elsewhere in Western Europe.

It seems unlikely that the Battle of Clontarf took place in the modern district of Clontarf. The Annals of the Four Masters say it was fought 'from *Tulcainn* to *Ath Cliath'* and while one may expect that isolated encounters of small groups occurred during the day over a wide area this description is the simplest and the most accurate definition of the battlefield. *Tulcainn* was the River Tolka and *Ath Cliath* located at the *Droichet Dubhgail,l* the bridge that crossed the Liffey at this time (possibly close to Augustine Street). We are told in the Annals of Loch Ce that Brian Boruma faced the allies on the slope of Crinan Hill, although the precise location of Crinan Hill is unknown today. One record of 1339 places it south of Ballybough Road, but by deduction from other records of 1192 and 1324 it is possible that it extended from Ballybough Road to Drumcondra Road. It has been suggested that the main action of the battle took place in the area bounded by O'Connell Street, Dorset Street, Drumcondra Road, the River Tolka, Ballybough Road and the North Strand (De Courcy 1996). This would place the proposed development area immediately adjacent to the battle site, although is unlikely to have strayed into the area of the station due to its position beyond the shore line at the time. There appears to be little doubt that some thousands were involved in each army. From what we know of warfare at the time this battle could be visualised as the meeting of two lines of closely packed forces with the best men, the champions and leaders in the front and the lesser folk scrambling and pushing behind (Hayes-McCoy 1989, 17).

The Irish Builder states "… there were other discoveries made some ten years previously of bones, swords and spears when excavations were being made for the foundations of houses in North Great George's Street, Summerhill, Gardiners Row, Mountjoy Square …From the frequent reoccurrence of such discoveries in the surrounding district during the laying out of streets etc …there is every reason to believe the Battle of Clontarf commenced somewhere between the site of Capel Street and the right bank of the Tolka." (Irish Builder 1897).

An extract from Dublin Magazine concurs with this stating "Vast quantities of bone were discovered behind New Gardens (Rotunda Gardens) in Britain Street. They were found 2-3ft beneath surface and were also present on Cavandish Row. They are thought to relate to the Battle of Clontarf as the area was consistent with the Battle of Clontarf and the bodies that were found had been covered in quick lime, which was typical of Danish practice." (Dublin Magazine 1763). If both accounts are taken to relate to remain associated with the battle, this would place the area in which the dead were buried between 600m and 900m to the west and northwest of the area of proposed development.

13.3.2.3 Medieval Period (AD 1169 –1600)

The beginning of the medieval period is characterised by political unrest that originated from the death of Brian Borumha in 1014. Diarmait MacMurchadha, deposed King of Leinster, sought the support of mercenaries from England, Wales and Flanders to assist him in his challenge for kingship. Norman involvement in Ireland began in 1169, when Richard de Clare and his followers landed in Wexford to support MacMurchadha. Two years later de Clare (colloquially known as Strongbow) inherited the Kingdom of Leinster and by the end of the 12th century the Normans had succeeded in conquering much of the country (Stout & Stout 1997, 53).

After the Anglo-Norman invasion of Ireland in 1169, the medieval town of Dublin enjoyed a period of prosperity and development, which continued until the beginning of the 14th century. The Anglo-Norman administration was responsible for reinforcing the town walls with defensive towers. Further improvements to the defences involved erecting a number of gates on the built-up streets outside the walls and supplementing the defensive gates already in place along the town wall itself.

Most of the extramural expansion of Hiberno-Norse Dublin had taken place to the south and east of the city, in the area between the Poddle and the Steine rivers. In the Anglo-Norman period, the establishment of 'Liberties' or areas of private jurisdiction outside the city walls promoted the growth of suburbs in a westerly direction, with housing extending along the main routes out of Dublin to the north, south, and west. A programme of land reclamation from the River Liffey at Wood Quay and Exchange St Lower was initiated towards the end of the twelfth century, as a part of the extramural development of medieval Dublin, although this did not extend far enough to the east to include the proposed development area, which would have still been within the confines of the River Liffey estuary.

The first recorded settlement north of the Liffey was in the medieval period after the evolution of the Viking city of *Dyflin* (Dublin). A parish church, St. Michan's, on the western side of Church Street was in use by c. 1179, though an earlier foundation date of 1095 or 1096 has been suggested (Bradley 1992, 51; De Courcy 1996, 288). St. Michan's parish was the only parish on the north side of the Liffey until 1697 and was likely established to provide a parish for Oxmantown (Bennett, 1994, 192). Oxmantown, which derives from The Ostmans' Town, is likely to represent a Norse suburb of Dublin, into which migration from the city of Dublin took place during the 12th century.

This period also saw the establishment and expansion of a number of ecclesiastical foundations often belonging to the religious orders. On the northern side of the River Liffey St. Mary's Abbey was a significant monastic establishment founded in 1139 as a daughter house of the Benedictine Order of Savigny. This then became Cistercian in 1147. It was, until its suppression in the 16th century, one of the largest and most important monasteries in Ireland. The site of the abbey buildings was close to the high-water shoreline of the Liffey, in an area now thought to be bounded by Arran Street, Little Mary Street, Capel Street and Mary's Abbey (ibid. 344). In 1224 the order handed over ownership of a church, which it had constructed close to the present Four Courts to the Dominican Order. This developed into another large monastic institution on the north bank of the river, known as St. Saviour's Priory. St. Mary's Abbey was dissolved in 1543 by Henry VIII but the ruins remained until the 17th century and during the 18th century the site was almost completely removed due to redevelopment (ibid. 345). Today the site of the abbey is located c. 1.45km west-southwest of the development area, although it is likely that the abbey precinct was much larger, according to Speed's map of Dublin, 1610, extending significantly to the east and northeast of the abbey buildings.

13.3.2.4 Post-medieval Period (AD 1600 –1900)

The proposed development area is located adjacent to Connolly Station and was formerly used as a service yard when the railway was developed during the 19th century. The station is positioned on the western edge of the Dublin docklands, which comprise c. 1300 acres of land on the north and south banks of the River Liffey. When the Custom House, located c.

400m southwest of the development area, opened in 1791, Ringsend was the only part of this area that was developed. The remainder consisted of low-lying wastelands, which had been divided into lots by the Ballast Office. The road from Ringsend to the city was regularly under water at high tide, but land was gradually drained or reclaimed, as was a large area of the foreshore in order to construct the North Wall and Alexandra Basin. Brookings map of 1728 shows the area in which the station is located defined by the North Wall Quay, but states that the area is still 'over flowd by ye Tide'. It is therefore likely that reclamation was just about to commence at this time. By the time of Roqcue's map of the city, 1756 (Figure 13.4), the area is shown as field plots served by a number of roads.

The population increased steadily throughout the 19th century, and the vacant land was gradually covered with houses and commercial properties. The Royal Canal and the Grand Canal, which linked Dublin with the River Shannon opened harbours in the area during the early 1800s. By the 1850s Docklands included Connolly station (Amiens Street Terminal) and Pearse Street (Westland Row). Hotels, warehouses, coal yards and cattle yards moved near the port and the railway lines, as did stables for the countless horses that transported goods from the port throughout the city.

Until 1800 most trade took place on the south side of the River Liffey, but with the opening of the new Custom House in 1791, port development shifted to the north bank of the river. The original Custom House Dock opened in 1796. In 1821 it was supplemented by George's Dock, located to the immediate south of the development area, which included large warehouses and storage vaults. In 1851, the Ballast Board commissioned William Dargan to construct a dry dock at the North Wall, which was leased to a shipbuilding firm that went bankrupt in 1870. Imports of wheat rose rapidly from 1840 onwards and several large flourmills opened in the Docklands as well as a Vinegar Works, Glass Works and Sugar Refinery.

In 1838 an act was passed enabling the building of a railway from Dublin to Drogheda. Connolly Station, which was to act as the terminus for the line, was built in 1846. The station was located high above the street level of Amiens Street and Sheriff Street. The station was renamed Connolly Station in 1966 in the memory of James Connolly, commander of the republican forces in Dublin during 1916. Early stations in Ireland strove to assume the mantle of permanent public buildings by adopting existing architectural fashions to reassure the travelling public and shareholders alike. The prevailing style for public buildings during the 1830s was Classical architecture, with main line terminals like Connolly reflecting that preference.

Although the main terminal buildings were often designed by an architect, the ancillary structures, some of which were located within the area of proposed development, were often designed by the company engineer. The 1864 Ordnance Survey map of the station show a number of buildings within the proposed development area, including a semi-circular engine house, an engine shed, luggage store, work shop and saw mill. Locomotive houses in Ireland were either polygonal or rectangular in plan. The polygonal (round) sheds were designed to save space, but as they were served by a single central turn table, this could lead to delays. These types of sheds were also more expensive to build. Rynne states that there are only three recorded instances in Ireland where a round house or shed was used, but surprisingly does not include Connolly Station (then Amiens Street Terminus) within his list. However, by the time of the 1889 map, the main station terminus has been extended and the semi-circular structure has been removed. A new rectangular engine house is marked to the north of the development area.

13.3.3 Previous Archaeology Investigations

A review of the Excavations Bulletin (1970–2018) has shown that no previous archaeological investigations have taken place within the proposed development area, however there have been 28 investigations within a 500m radius of the proposed development. Of these, 19 did not result in the discovery of any features of archaeological note. The remainder identified evidence for post-medieval reclamation and structures and prehistoric fish traps.

Test-trenching, c. 170m to the north, on the corner of Amiens Street and Seville Place discovered reclamation deposits dating to the 1720s (Licence Ref.: 02E1580). The line of Amiens Street follows the shoreline, delineating the high-water mark in the period before the reclamation of the area bounded by the North and East Walls in the early 1700s (Bennett 2002:0515).

The monitoring of test-pits in advance of the Liberty House Part Demolition and Redevelopment Scheme, c. 335m to the west, identified 19th-century basements (Licence Ref.: 11E0169). Originally constructed as single-family dwellings in the late Georgian period, most of these small houses became, in the mid-19th century, the core of the notorious red-light district known as the 'Monto' (Bennett 2011:206).

Monitoring for the construction of a railway station was carried out c. 355m to the east (Licence Ref.: 06E0682). This uncovered modern ceramics, post-medieval building material, metal, glass bottles, shell, the remains of a small post-medieval red-brick building, and part of the foundation wall for a bridge (Bennett 2006:639).

Monitoring of the extensive geotechnical site investigation drilling works for the DART underground between North Quays to East Wall, c. 430m to the northeast and c. 460m to the east, did not find conclusive evidence of archaeological deposits in this area (Licence Ref.: 08E0915). The area has been heavily truncated, levelled and filled with post-medieval and modern landfill deposits but no evidence of prehistoric foreshore archaeology akin to that identified nearby at Spencer Dock was encountered (Bennett 2009:AD5).

A test-excavation c. 440m to the west encountered a single sherd of medieval pottery and several examples of 17th and 18th-century pottery and the remains of several post-medieval structures (Licence Ref.: 03E0879; Bennett 2003:571). Further monitoring under the same licence did not encounter anything of archaeological significance (Bennett 2004:0582).

Archaeological investigations at Railway Street/Gloucester Place Lower/Sean McDermott Street, Dublin 1, c. 485m to the west, discovered the remains of post-medieval buildings (Licence Ref.: 03E0569; Bennett 2003:570).

The monitoring of the bulk reduction of the footprint of the National Conference Centre in 2006 encountered a series of post-medieval structures and earlier fish traps, c. 495m to the southeast (Licence Ref.: 06E0668; Bennett 2006:634). These were excavated in 2007 under the same licence. The remains of two stationary fishing structures or fish traps constructed of wood and several pieces of worked wood which had been washed in by the tide. They were dated to the late Mesolithic period and Middle Neolithic period (Bennett 2007:464).

The following licences did not encounter anything of archaeological significance; 05E0471 c. 85m west, 03E1921 c. 150m west, 04E0834 c. 160m northwest, 10E0101 c. 170m west, 05E0499 c. 215m north, 03E0683 c. 215m southwest, 05E0213 c. 230m west, 07E0167 c. 260m southwest, 03E0991 c. 290m northwest, 07E0965 c. 295m southwest, 12E402 c. 310m west, 03E0605 c. 315m west, 02E1102 c. 320m west, 03E0231 c. 340m west, 03E0819 c. 365m west, 01E0043 c. 445m west, 03E1060 c. 450m south, 01E0043 c. 475m west, 05E0088 c. 480m northwest (Bennett 2005:421, 2003:529, 2004:0507, 2010:254, 2005:420, 2003:0589, 2005:478, 2007:469; Lynch 2003a; Bennett 2007:508, 2012:647, 2003:588; Halliday 2002; Bennett 2003:0590; Lynch 2003b; Bennett 2001:392, 2003:509; Elder 2005; Bennett 2005:471).

13.3.4 Cartographic Sources

13.3.4.1 John Speed's Map of Dublin, 1610

John Speed's map of Dublin is among the first depictions of the walled town of Dublin. The proposed development area lies to the east of the city's walls in an undeveloped area.

13.3.4.2 William Petty's Down Survey, Co Dublin, 1655

Petty's Down survey represents the first systematic mapping of Ireland on a scale of 40 perches to one inch (the modern equivalent of 1:50,000). The fortifications of the city are depicted along with a few prominent buildings, though in no greater detail than Speed's map. The proposed development area still lies to the east of Dublin as it has not yet been reclaimed from the River Liffey.

13.3.4.3 Bernard de Gomme, The City and Suburbs of Dublin, 1673

Topographically this map shows little difference in the extent of the river estuary. However, the path of Amiens Street is clearly marked on this map as travelling north-northeast up the coast line. There is no evidence of reclamation within the proposed development area marked on this map.

13.3.4.4 Thomas Phillip's Map of Dublin, 1685

This map illustrates the gradual reclamation of the city centre from the River Liffey. However, the proposed development area is shown within the estuary of the River, with the approximate path of Amiens Street travelling part of the way along the coast at that point.

13.3.4.5 Charles Brooking's Map of Dublin, 1728

This map shows that by 1728, the North Wall Quay had been established. However, Brooking notes on the map that although the wall has been constructed, the area to the north of it, which contains the proposed development area, was still flooding at high tide. It is likely that reclamation work was about to begin at this point. Amiens Street is present but marked as The Strand. The drawing of the city centre, at the top of the map, marked as A Prospect of the City, shows this area under water, although the river is delineated by the North Wall Quay.

13.3.4.6 John Rocque's A plan of the City of Dublin and the Environs, 1756

By the time of this map, it appears that much of the reclamation within the proposed development area has been completed (Figure 13.4). The reclaimed land is shown as being divided into plots of land, which are marked with rough vegetation growth. Several linear roads cross the reclaimed area, including Sheriff Street, which borders the proposed development area to the south. Amiens Street is still marked as The Strand at this time and there are no buildings marked in or within the vicinity of the approximate location of the proposed development area.

13.3.4.7 Dublin City Corporation Map, 1761

This map shows a small portion of the proposed development area, however there are no buildings marked within the visible section or within the section to the south, which was later developed as George's Dock.

13.3.4.8 John Taylor's Map of the Environs of Dublin, 1816

This map shows clear detail relating to the proposed development (**Figure 13.4**). By this date George's Dock is marked as present, and the path of Sheriff Street has been realigned in order to provide more space for the docks. The Royal Canal is also present, as is Amiens Street and Seville Place. The reclaimed land to the northeast of the development area has yet to be developed and is marked as The Lots.

13.3.4.9 First Edition Ordnance Survey Map, 1838, scale 1,10,560

This map shows the first accurate and detailed representation of the proposed development area (**Figure 13.6**). The majority of the site is formed by empty plots, although the current street pattern is present, with Amiens Street marked as such for the first time. There are a number of buildings fronting onto Amiens Street, most of which appear to be small houses. The proposed route of the Dublin and Drogheda railway runs parallel to the north western boundary of the site. There are two larger structures located to the immediate west of the development area, one of which fronts onto a small lane named as Halpiny Row, some of which is located within the development area. The purpose of these buildings is not marked on the map, although the rear plots are named as Rope Walk. There are several structures marked to the northeast and east of the development area along Seville Place and there are two vinegar works c. 150m and c. 335m to the east. In comparison, development to the west of Amiens Street is very well established.

13.3.4.10 Ordnance Survey map (revision), 1847, scale 1:1,056

By the time of this map the railway has been constructed, although it is narrower than the layout of the tracks today. The terminus of the Station is also present, although the building is much smaller than the present structure. A semi-circular Engine House is marked adjacent to the tracks and northeast of the station and this is adjacent to a rectangular structure marked as a luggage store. The remaining area is marked as open ground, with two residential structures marked as fronting on to Seville Place and two small structures fronting onto Oriel Street Upper.

13.3.4.11 Second Edition Ordnance Survey Map, 1864, scale 1:10,560

By the time of this edition a large amount of development has taken place within the proposed development. The Engine House and Luggage store are still present. However, a work shop has been constructed to the east of the store and a saw mill is located to the north of the work shop. A smaller Engine shed is also marked to the northeast of the semi-circular structure.

Tracks are marked leaving the main track, which service the buildings. A small road way into the complex is marked from Sheriff Street, with the entrance at a similar location to the present entrance into the existing car park on site. Additionally, there has been a large amount of residential development to the northeast and southeast of the development area.

13.3.4.12 Ordnance Survey Map, 1889, scale 1:1,056

By the time of this edition the station had undergone extension and further development (**Figure 13.8**). The station terminus is shown to be significantly extended, with the platform area itself crossing above Sheriff Street by means of a wide bridge. A large number of tracks are marked within the development area, which form sidings and service a number of buildings on site. The semi-circular Engine House has been removed due to the extension of the station. This has been replaced by a large structure to the northwest of the development area. A section of the exterior wall of the round shed is still present but has been modified in order to create a railway siding. The luggage store building is still present, as is the adjacent workshop. The saw mill has been removed and replaced by a goods shed. A circular oil tank is marked at the southernmost point of the site. There are a number of other smaller ancillary sheds, the function of which is not marked. The slope of the site is illustrated by a large number of hachures along the access road. Hachures also indicate a slope down to the workshop, adjacent to the luggage store.

FIGURE 13-4 - EXTRACT FROM ROQUE'S MAP (1756) SHOWING THE APPROXIMATE LOCATION OF THE PROPOSED DEVELOPMENT

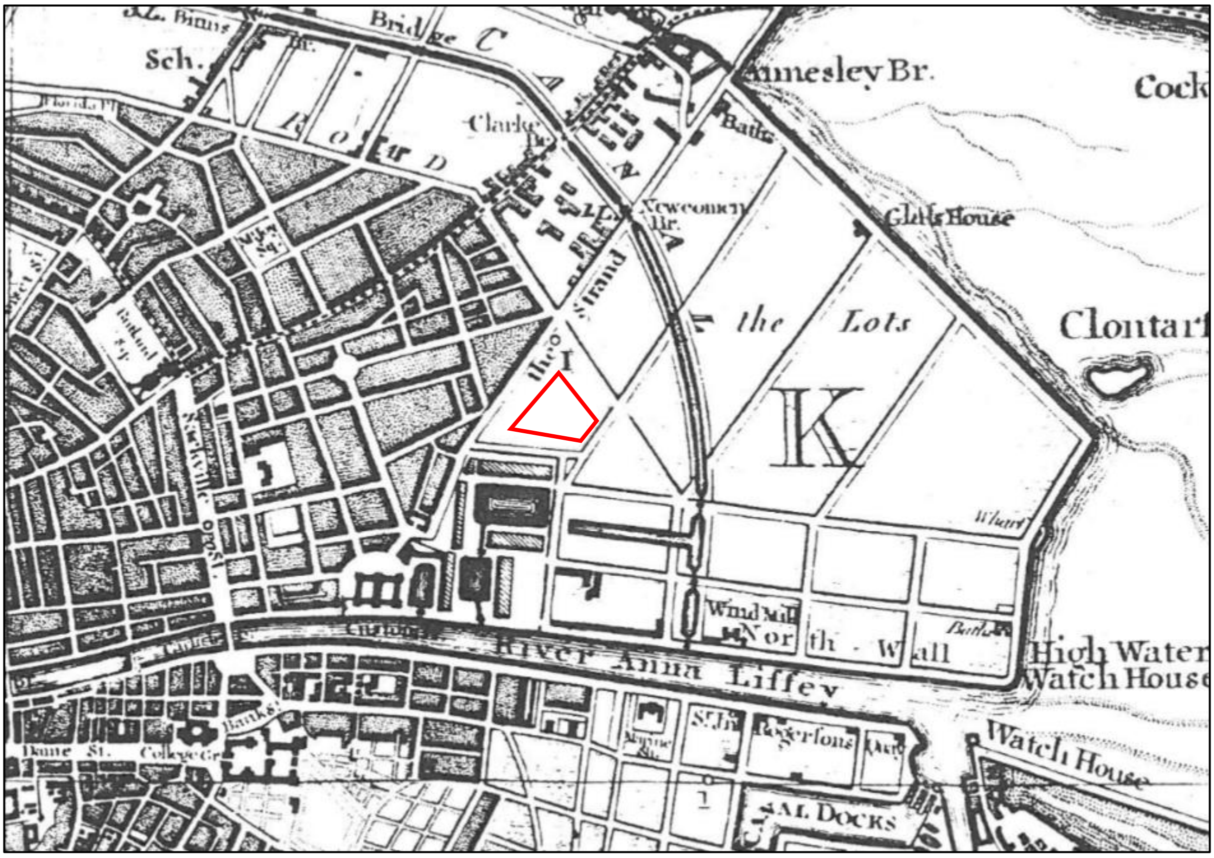


FIGURE 13-5 EXTRACT FROM TAYLOR'S MAP (1816) SHOWING THE APPROXIMATE LOCATION OF THE PROPOSED DEVELOPMENT

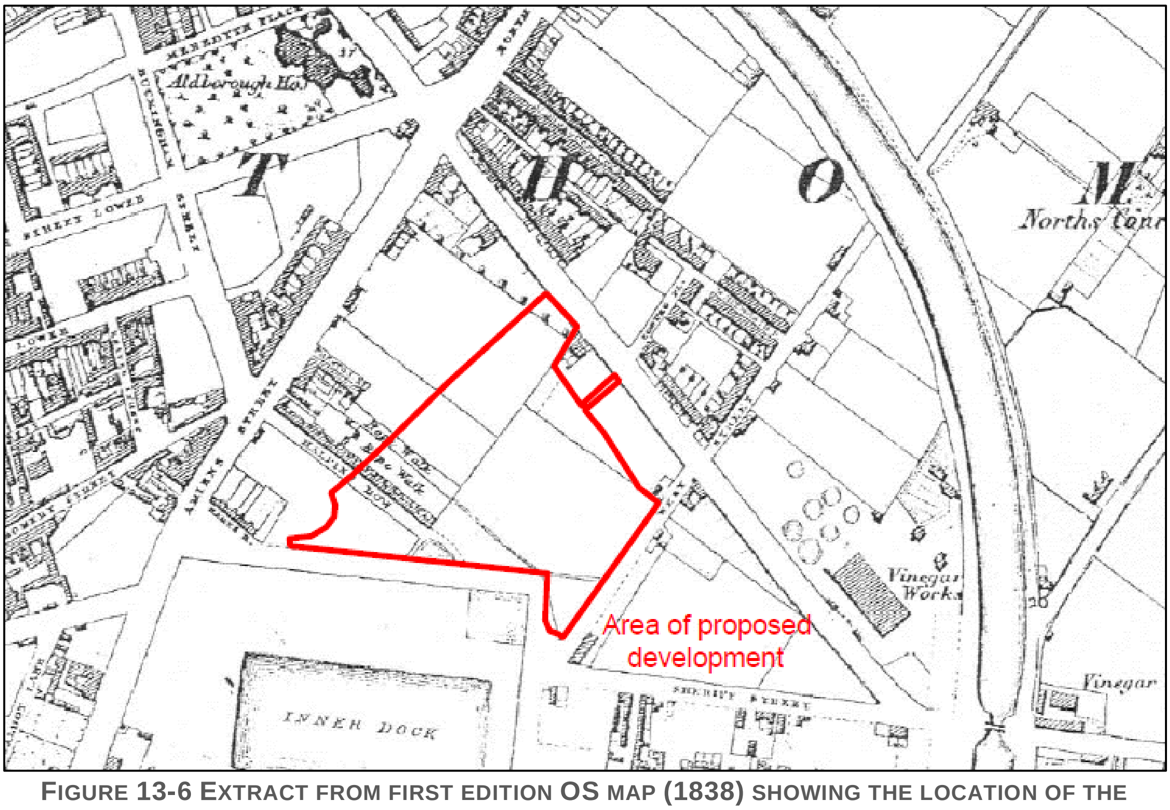


FIGURE 13-6 EXTRACT FROM FIRST EDITION OS MAP (1838) SHOWING THE LOCATION OF THE PROPOSED DEVELOPMENT

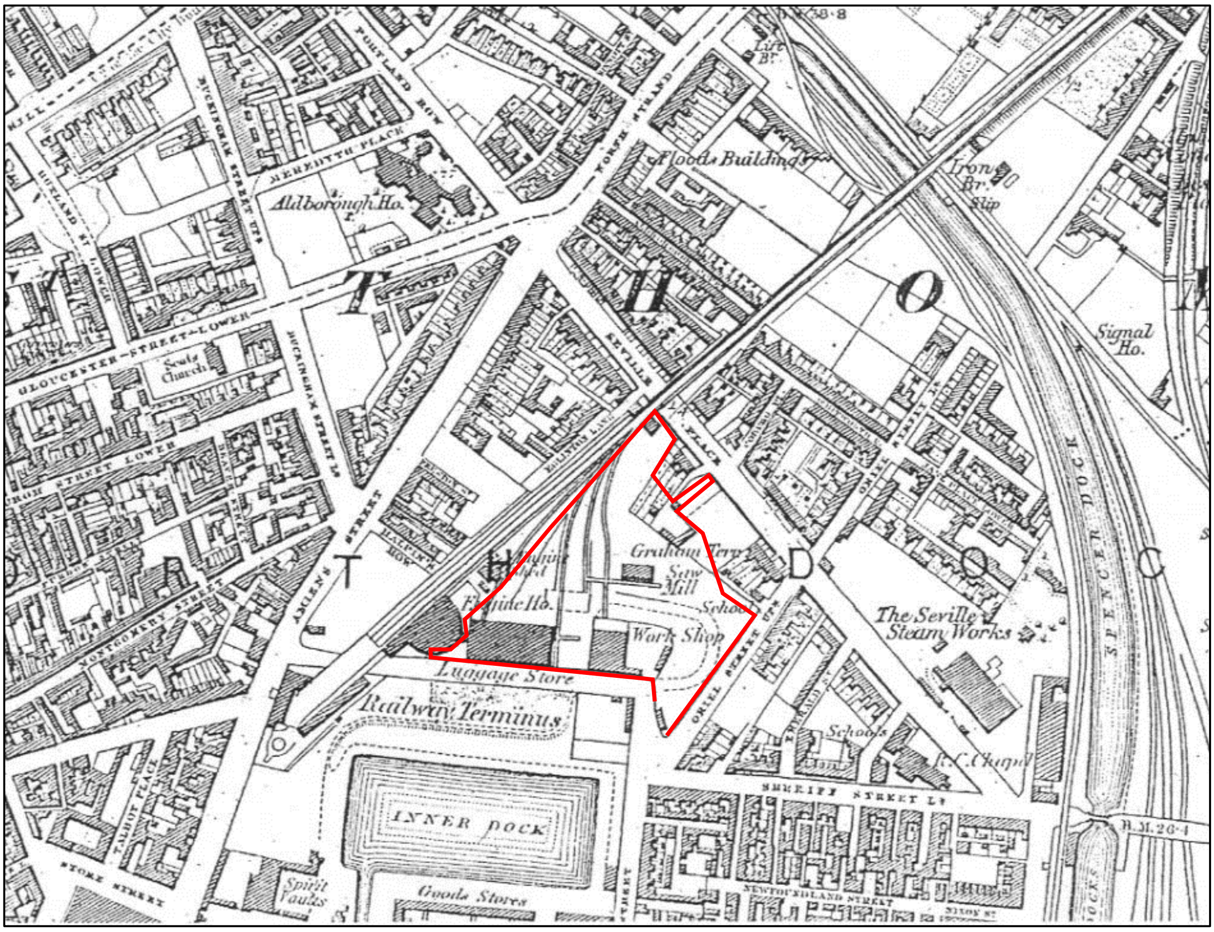


FIGURE 13-7 EXTRACT FROM OS MAP (1876) SHOWING THE LOCATION OF THE PROPOSED DEVELOPMENT

13.3.4.13 Ordnance Survey Map, 1909, scale 1:2,500

There are no major changes to note on this map that relate to the area of proposed development. All principle buildings remain present on site, although the functions are no longer marked. The small ancillary buildings marked in the middle of the site have been replaced with one rectangular structure. The oil tank has also been replaced by a structure.

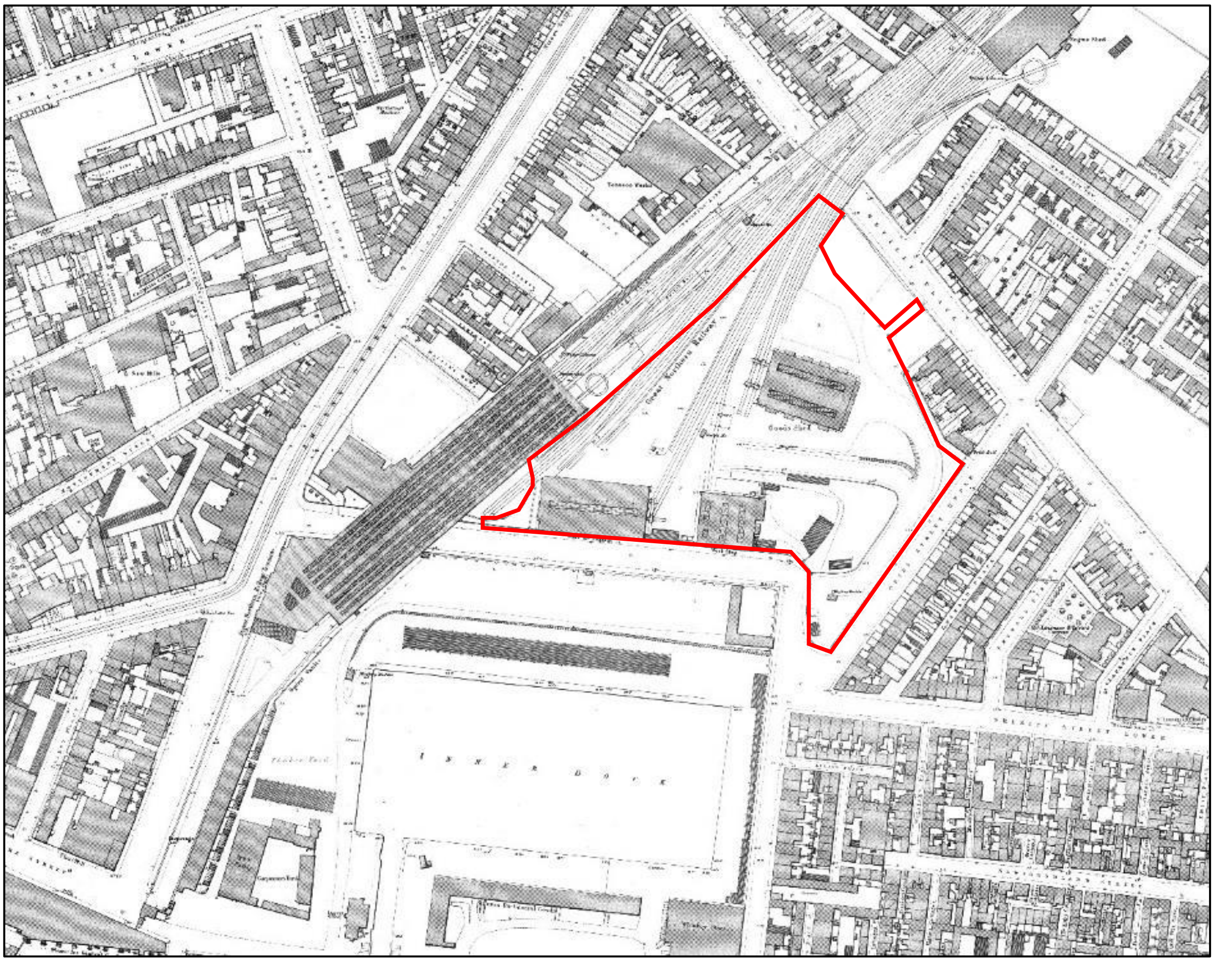


FIGURE 13-8 EXTRACT FROM OS MAP (1889) SHOWING THE LOCATION OF THE PROPOSED DEVELOPMENT

13.3.5 Record of Monuments and Places

The Dublin City Development Plan (2016–2022) recognises the statutory protection afforded to all RMP sites under the National Monuments Legislation (1930–2014). The development plan lists a number of aims and objectives in relation to archaeological heritage (**Appendix 13.1**).

It is a policy of the Dublin City Development Plan (2016–2022) to promote the in-situ preservation of archaeology as the preferred option where development would have an impact on buried artefacts. Where preservation in situ is not feasible, sites of archaeological interest shall be subject to archaeological investigations and recording according to best practice, in advance of redevelopment.

There are three recorded monuments, all of which are scheduled for inclusion on the RMP at the next revision, within a 500m radius of the proposed development (**Table 13.2**). The zone of archaeological potential for Dublin City (DU018-020) is located c. 100 metres to the west of the development area.

RMP No.	Location	Classification	Distance to the proposed development
DU018-020	Dublin City	Zone of Archaeological Potential for Dublin City	c.100m west
DU018-020501	Talbot St	Mill - unclassified	c. 295m west
DU018-020502	North of Custom House	Sea wall	c. 390m southwest
DU018-020152	Custom House Quay	Glasshouse	c. 415m south

TABLE 13.2 RECORDED ARCHAEOLOGICAL SITES

13.3.6 Topographical Files

Information on artefact finds from the study area in County Dublin has been recorded by the National Museum of Ireland since the late 18th century. Location information relating to these finds is important in establishing prehistoric and historic activity in the study area. A review of the topographical files has revealed that no stray finds have been recorded as being discovered in or within the vicinity of the proposed development area.

13.3.7 Current Site Use

The field inspection sought to assess the site, its previous and current land use, the topography and any additional information relevant to the report. During the course of the field investigation the proposed development site and its surrounding environs were inspected.

The proposed development area consists of Connolly Station car park which is located on a rise above the surrounding streets (**Plate 13.1**). The car park is tarmacked across the majority of the site, with a small area of rough ground located at the southern end of the site, adjacent to an existing building (**Plate 13.2**). This area is separated from the main car park by a tall metal fence. These enclosed areas are located over the surviving ground floor level of the nineteenth century buildings along Sheriff Street Lower. The topography of the site slopes from grade (street level) at Sheriff Street Lower to the concourse/railway platform level of Connolly Station, some 7m above Sheriff Street level. This level change is formed by filled ground, the site itself being reclaimed land. Within the body of the site are a number of modern buildings, which accommodate a range of operational functions associated with the railway network.

PLATE 13-1: THE SITE, FACING EAST

PLATE 13-2: SCRUB AREA AT THE SOUTH OF THE SITE, FACING SOUTH

Along Sheriff Street Lower the ground floor vaulted chambers of formerly two storey buildings, built in phases to service the expanding railway service and partially destroyed by fire in the 1970's, form the southern edge to the site. The northern boundary is formed by a 20th century stone wall which separates the site from residential housing and warehouses. At the junction of Sheriff Street Lower and Oriel Street Upper – forming and turning the southeast corner of the site - is the early 20th century two storey brick building, Oriel House. The large and linear Connolly Station railway terminal building form the western boundary.

A limestone boundary wall is located along the eastern boundary of the site (**Plate 13.3**). The wall is of coursed random (calp) limestone and rises to a full storey in height with some variation along its length. There are a small number of openings which have been blocked up in modern times.

Nothing of archaeological significance was noted during the site visit.

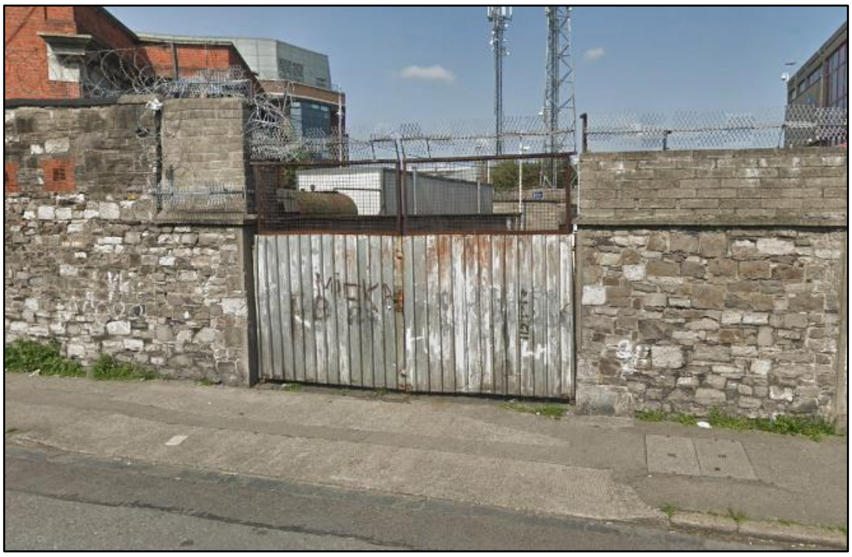


PLATE 13-3: BOUNDARY WALL ALONG ORIEL STREET WITH OPENING AND MODERN ADDITIONS, FACING NORTHWEST

13.3.8 Summary of Cultural Heritage potential

The proposed development area was originally located within the city ward of Custom House. However, as the urbanisation of the area continued, the boundaries were changed and became North Dock Ward. On the first edition OS map (1838) the surrounding city wards are named as St George's, Post Office to the east, and College to the south and the surrounding townlands are Ringsend to the southeast, Clonliff South, Lovescharity, Clonliffe East, and Ballybough to the north.

A historic wall is located along the eastern boundary of the site.

13.3.8.1 Placename Analysis

Townland and topographic names are an invaluable source of information on topography, land ownership and land use within the landscape. They also provide information on history; archaeological monuments and folklore of an area. A place name may refer to a long-forgotten site and may indicate the possibility that the remains of certain sites may still survive below the ground surface. The Ordnance Survey surveyors wrote down townland names in the 1830's and 1840's, when the entire country was mapped for the first time. Some of the townland names in the study area are of Irish origin and through time have been anglicised. The main reference used for the place name analysis is *Irish Local Names Explained* by P.W Joyce (1870). A description and possible explanation of each townland, parish, and barony name in the environs of the proposed development are provided in **Table 13.2** below.

Name	Derivation	Possible meaning
Clonliffe East	*Chluain Life Thoir*	Liffey meadow east
Ballybough	*an Bhaile Bhoicht*	The poor town
Ringsend	*na Rinne*	Refers to the point of land formerly between the Dodder and the sea
Clonliff South	*Chluain Life Theas*	Liffey meadow south
Lovescharity	-	-
North Dock Ward	-	-
Post Office Ward	-	-
College Ward	-	-
St George's Ward	-	-
Saint Thomas' Parish	-	-
Dublin	*Bhaile Átha Cliath*	Ford of the hurdles

TABLE 13.2 LIST OF AREAS, CITY WARDS, PARISHES AND BARONIES IN THE VICINITY OF THE PROPOSED DEVELOPMENT AREA

13.3.9 Cultural Heritage Features

The term 'cultural heritage' can be used as an over-arching term that can be applied to archaeological features. However, it also refers to more ephemeral aspects of the environment, which are often recorded in folk law or tradition or possibly date to a more recent period. An example of this is Connolly Station itself. The station was originally opened in 1844 and was renamed after James Connolly on the 50th anniversary of the 1916 Easter Rising. It was designed by the architect William Deane Butler, whose other works included the original entrance to Dublin Zoo, the Royal Music Hall in Dublin, the Roman Catholic Cathedral for Kilkenny, and the Sligo Asylum (Archiseek; Dictionary of Irish Architects).

A historic wall is located along the eastern boundary of the site.

13.3.10 Baseline Conclusions

The zone of archaeological potential for Dublin City (DU018-020) is located c. 100m to the west of the development area. There are three recorded monuments, all of which are scheduled for inclusion on the RMP at the next revision, within a 500m radius of the proposed development. The closest of these, a mill (DU018-020501), lies c. 295m to the west. There are no stray finds recorded in the topographical files within the study area for the proposed development.

There have been no previous archaeological investigations within the proposed development however there have been twenty-eight examples within the study area. Nineteen of these did not discover anything of archaeological note, the remainder mainly discovered evidence for post-medieval reclamation and structures. The most significant excavation recovered the oldest date for Mesolithic fish traps in Ireland and provided evidence of prehistoric activity in the area preserved underneath reclamation deposits.

An analysis of the cartographic sources revealed that in the mid-to-late 17th century the coastline was delineated by Amiens Street, then the Strand. By the early 18th century land was being reclaimed from the Liffey throughout the city centre and North Wall Quay was established. The proposed development area was still prone to flooding at this time as reclamation works were ongoing. By the middle of the century the area had been reclaimed and divided into plots with roadways, though there was no evidence of development in the area until the middle of the 19th century. The surrounding landscape, particularly to the south had undergone development at the beginning of the 19th century. After this the area became associated with Connolly Station, then Amiens Street Station, and facilitated several ancillary buildings for the station. An inspection of the aerial photography (www.osiemaps.ie) concluded that the proposed development has been in use as a carpark since 1995.

Originally the proposed development area was located within the estuary of the River Liffey before it was reclaimed. It became part of the city ward of Custom House, named after the administrative building, before being renamed as North Dock Ward. Connolly Station represents the most significant aspect of cultural heritage within the vicinity of the proposed development area owing to its architect and association with Irish history.

Nothing of archaeological significance was noted during the site visit, however a historic boundary wall along the eastern side of the site was noted.

13.4 Assessment of Impacts

13.4.1 Construction

It is possible that the excavation of a basement car park level associated within the proposed development may have a direct, permanent, profound or significant negative impact on prehistoric shore line/estuarine deposits located between 10m and 12m below the current ground level of the highest part of the development area. The proposed basement level will have a depth of approximately 3.0m metres below present ground level of Sheriff Street Lower.

It is possible that the excavation of modern infilling within the proposed development area, along with the excavation of basement areas will have a direct, permanent, profound or significant negative impact on the possible remains of post-medieval building foundations associated with the industrial function of the site. These include a workshop (c. 1860), saw mill (c. 1870) and goods shed (c. 1880).

The proposed development area is located within an area of reclaimed land, which once formed part of the Liffey estuary. The reclamation deposits are post-medieval and will require excavation as part of the construction of the proposed development. It is possible that some of these deposits may contain archaeological artefacts that were re-deposited during this period. As such, any construction excavation will result in the permanent loss of any archaeological artefacts located within these deposits resulting in a potential moderate negative impact upon the archaeological resource.

Although no previously unrecorded archaeological features were identified during the desktop study and field inspection, there may be a permanent direct negative impact on previously unrecorded features or deposits that have the potential to survive beneath the current ground level. This will be caused by ground disturbances associated with the construction of the proposed development. Depending on if there are any surviving features and what they may be the impacts are considered to be site specific, negative, permanent, and their effects could range from imperceptible to profound.

13.4.2 Operation

No negative impact is predicted on the archaeological resource as a result of the operation of the proposed development.

13.5 Mitigation Measures

13.5.1 Construction Phase

All excavation associated with the construction of the basements that will form part of the proposed development will be subject to archaeological monitoring. This will ensure the identification of any archaeological features that may be present, which may be associated with the former estuarine area. This will be carried out by a suitably qualified archaeologist. Full provision will be made available for the resolution of any archaeological deposits or features that may be identified, should that be deemed the most appropriate way to proceed.

Following the removal of modern infill within the area of proposed development (down to the post-medieval levels) all ground disturbances carried out in vicinity to the workshop (c. 1860), saw mill (c. 1870) and goods shed (c. 1880) will be subject to archaeological monitoring. This will ensure the identification of such features.

The excavation of the post-medieval reclamation deposits will be subject to archaeological monitoring. This will include inspection of the deposits in order to allow for the retrieval of any archaeological artefacts that might be present. Monitoring will be carried out by a suitably qualified archaeologist and based on a specified programme of finds retrieval.

If any features of archaeological potential are discovered during the course of the monitoring of construction works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the National Monuments Service of the DoCHG and Dublin City Archaeologist.

13.5.2 Operational Phase

No mitigation measures are required as there is no predicted impact on the archaeological resource during the operational phase of the proposed development.

13.6 Residual Impacts

Following the completion of the mitigation measures, all archaeological and cultural heritage remains at the site will have been preserved in-situ or by record. Therefore, there would be no residual impacts on the archaeological resource as result of the proposed development.

13.7 Difficulties Encountered in Compiling Information

No difficulties were encountered during the completion of this assessment.

13.8 Cumulative Impacts

The Connolly Quarter Masterplan shows a design for the development of the entire site comprising the lands under agreement between CIE and Oxley Holdings Limited. Oxley Holdings Limited intended to submit an application under Section 34 to Dublin City Council for the development of office and hotel blocks. These are Blocks A, D3, and E detailed in the Masterplan. It is considered that the effects from the works required to implement the masterplan are neutral, permanent, and not significant.

No other cumulative impacts upon the archaeological or cultural heritage resource have been identified as part of the assessment.

13.9 References

- Bennett, I. (ed.) 1987-2010 Excavations: Summary Accounts of Archaeological Excavations in Ireland. Bray. Wordwell.
- Bradley, J 1992 'The topographical development of Scandinavian Dublin.' In F. H. A. Aalen and K. Whelan (eds). Dublin City and County: from Prehistory to Present. Dublin: Geography Publications.
- Chartered Institute for Archaeologists 2014a Standards & Guidance for Archaeological Excavation
- Chartered Institute for Archaeologists 2014b Standards & Guidance for an Archaeological Watching Brief (Monitoring)
- Chartered Institute for Archaeologists 2014c Standards & Guidance for Field Evaluation
- Chartered Institute for Archaeologists 2014d Standards & Guidance for Desk Based Assessments.
- Clarke, H.B 1990 Medieval Dublin: The Living City Dublin: Irish Academic Press
- De Courcy, J.W. 1996 The Liffey in Dublin Gill & Macmillan, Dublin
- Department of Arts, Heritage, Gaeltacht and the Islands. 1999a Framework and Principles for the Protection of the Archaeological Heritage. Dublin. Government Publications Office.
- Department of Arts, Heritage, Gaeltacht and the Islands. 1999b Policy and Guidelines on Archaeological Excavation. Dublin. Government Publications Office.
- Dublin City Development Plan 2016-2022
- The Dublin Magazine, 1763
- Elder, S. 2005 Archaeological Assessment at Mabbot Lane, rear of No. 91 Gardiner Street, Dublin 1, Licence Ref.: 05E0185
- Environmental Protection Agency. 2015 (Draft) Advice Notes on Current Practice (in the preparation of Environmental Impact Statements). Dublin. Government Publications Office.
- Environmental Protection Agency. 2017 (Draft) Guidelines on the Information to be Contained in Environmental Impact Statements. Dublin. Government Publications Office.
- Halliday, S. 2002 68-69 Talbot Street, Dublin 1: Results of an Archaeological Assessment, 02E1102
- Hayes-McCoy, G.A. 1989 Irish Battles: A Military History of Ireland Appletree: Belfast
- The Irish Builder, 1897
- Joyce, P. W. 1870. Irish Local Names Explained. Sydney: Wentworth Press.
- Lynch, R. 2003a Archaeological Monitoring of Sean Mac Dermott Street Dublin 1, 03E0991
- Lynch, R. 2003b Archaeological Monitoring of Liberty Corner, James Joyce St/Foley St, Dublin 1, 03E0819
- McQuade, M. 2008 Gone Fishin' pgs. 8-11 In Archaeology Ireland Spring 2008
- National Monuments Service, Department of Culture, Heritage and the Gaeltacht. Sites and Monuments Record, County Dublin.
- National Museum of Ireland. Topographical Files, County Dublin.

- Stout, G. and Stout, M. 1997 Early Landscapes: from Prehistory to Plantation. In F.H.A. Aalen et. al. (eds), Atlas of the Irish Rural Landscape. Cork. Cork University Press

Cartographic Sources

- John Speed, Map of Dublin, 1610
- William Petty, Down Survey, Co. Dublin, 1655
- Bernard de Gomme, The City and Suburbs of Dublin, 1673
- Thomas Phillip, Map of Dublin, 1685
- Charles Brooking, Map of Dublin, 1728
- John Rocque, A plan of the city of Dublin and the environs, 1756
- Dublin City Corporation Map, 1761
- John Taylor, Map of the Environs of Dublin, 1816
- Thomas Larcom, Map of the County and City of Dublin, 1836
- Ordnance Survey maps of County Dublin, 1838, 1847, 1864, 1889, and 1909

Web References

- www.excavations.ie – Summary of archaeological excavation from 1970–2018
- www.archaeology.ie – DoCHG website listing all SMR sites.
- www.osiemaps.ie – Ordnance Survey aerial photographs dating to 1995, 2000 & 2005 and 6-inch/25-inch OS maps.
- www.heritagemaps.ie – The Heritage Council web-based spatial data viewer which focuses on the built, cultural and natural heritage.
- www.googleearth.com – Satellite imagery of the proposed development area.
- www.booksulster.com/library/plnm/placenamesC.php – Contains the text from Irish Local Names Explained by P.W Joyce (1870).
- www.logainm.ie – Placenames Database of Ireland launched by Fiontar agus Scoil na Gaelige and the DoCHG.
- www.archiseek.com – Database on Irish architecture
- www.dia.ie – The Dictionary of Irish Architects contains information on architects, builders and craftsmen born or working in Ireland during the period 1720 to 1940, and information on the buildings on which they worked.

CHAPTER 14
BUILT HERITAGE: ARCHITECTURAL

OCTOBER 2019

Table of Contents

14 Built Heritage

14.1 Introduction

This chapter identifies and assesses the historic environment of the site, evaluates the potential impacts that the proposed development might have on the architectural heritage of the site and its wider urban context. The assesses includes the direct, indirect, cumulative and residual impact of the proposed development for both the construction and operational stage of the proposed development.

This chapter of the Environmental Impact Assessment Report (EIAR) is undertaken to identify and record the location, nature and extent of any historic architectural features, fabric or artefacts within the site of a proposed residential development at Connolly Station that includes the demolition of existing twentieth century structures and their replacement with new high quality buildings. A detailed Architectural Heritage Assessment Report is submitted with the application to be consulted in conjunction with this section of the EIAR.

Amiens Street railway station, a historic complex of buildings associated with the 19th century railway system occupied a pivotal position between the city and port during the heyday of railway travel and shipping but by the twentieth century the area had declined and suffered from considerable social deprivation as the traditional employment opportunities of the docks constricted. Today the regeneration of docklands as a successful commercial and residential district is bringing new vitality to the area and an established community inhabits the residential streets to the east of the site.

The lands connected with the proposed development are presently occupied by offices, carparking and delivery areas associated with the station. It presently shares a close physical and working relationship with the railway station, elements of which will be retained within the proposed development. The application area comprises the northern section of site of the wider development site. The southern part of the site will be subject to a further Section 34 planning application to Dublin City Council (DCC) the details of which are contained in the Masterplan that accompanies the application.

The site contains protected structures listed on the RPS as 'Connolly Station: *All 19th century portions of main railway station complex*. (Record of Protected Structures (RPS) ref: 130).' See **Appendix 14.B**[1] for photographs.

The main purpose of this section of the EIAR is to assess the significance and sensitivity of the existing architectural heritage, to give a description of the impacts of the proposed development, and in turn to evaluate the likely and significant impacts of the proposed development on this environment.

14.1.1 Author Information

This section of the Environmental Impact Assessment Report (EIAR) was prepared by Clare Hogan B.Arch MUBC RIAI Grade 1 conservation architect. A graduate of the school of architecture UCD (1974) with a Master's Degree in Building and Urban Conservation (2003), she also holds a Master's degree in Spatial Planning from Bolton Street.

She is a member of the Royal Institute of the Architects of Ireland with 35 years' experience as a conservation architect both in the private and public service, specialising in surveying and

[1] Referenced Appendices are contained within Volume III of the EIAR

evaluating historic buildings, sites and landscapes for the purposes of conservation works, environmental impact assessment, management and development control.

14.2 Proposed Development

The proposed development consists of the demolition of existing 20th century structures located within the site and the construction a residential scheme of apartments and amenity areas in seven blocks ranging in varying heights across the site. The proposed development proposals include an extensive element of public realm landscaping works, semi-private roof gardens and soft landscaping. For the residents of the scheme a ‘highline’ walkway connects and links the buildings and landscaped outdoor spaces at an upper level. The height strategy involves a stepping down in height towards the eastern boundary and the two storey residential units on Oriel Place and adjoining streets.

A full description of the proposed development is set out in **Chapter 2** of this EIAR. Briefly, the proposed development consists primarily of an apartment building complex comprising the construction of 741 Build To Rent (BRT) residential units arranged around communal courtyard areas over a surface-level pedestrian retail area and an underground carpark with ancillary residential support facilities. Conservation works to protected structures and landscaping proposals for the site are elements of the proposed development.

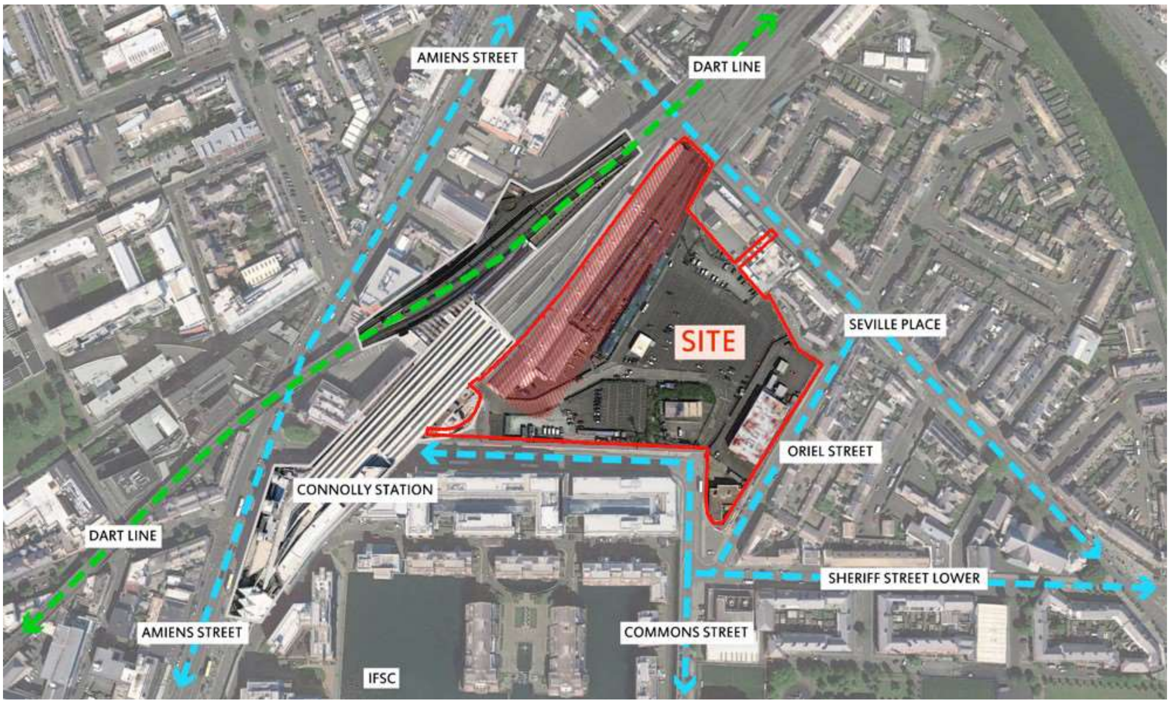


FIGURE 14-1 PROPOSED SITE LAYOUT

14.3 Methodology

14.3.1 Desktop Study

The assessment is based on a desktop study of known architectural, historical and mapping resources and the acquisition of new information arising from site inspections and surveys undertaken by the design team and carried out during 2018 and 2019. It identifies and assesses the historic environment of the site, evaluates the potential impacts that the proposed development will likely have on the architectural heritage of the site and its wider urban context and includes recommendations for the mitigation and monitoring of the impact of the proposed development on the protected structures present within the site.

14.3.2 Legislative Context and Institutional Context

The term 'architectural heritage' is defined in the Architectural Heritage (National Inventory) & Historic Monuments Act, 1999, as meaning all:

a) *structures and buildings together with their settings and attendant grounds, fixtures and fittings,*
b) *groups of such structures and buildings,*
c) *sites, which are of architectural, historic, archaeological, artistic, cultural, scientific, social or technical interest*.

For the purposes of this report the terms 'architectural heritage' and 'built heritage' have the same intended meaning and are used interchangeably.

The sensitivity of receptors in this assessment was informed by the Architectural Heritage Protection Guidelines for Planning Authorities issued by the Department of Arts, Heritage and the Gaeltacht (DAHG) 2011. The Guidelines provide a series of headings under which a building or structure should be evaluated in order to assess its qualities and to consider if it merits Protected Structure Status as a building of special interest. The characteristics of special interest are as follows: Architectural, Historical, Archaeological, Artistic, Cultural, Scientific, Technical and Social. If a building can be considered as of particular significance under any of these headings, the building or structure can be categorised as of either "Local", "Regional", "National" or "International" importance. Policy relating to development proposals within the curtilage of a protected structures is included in section 13.5 of the Architectural Heritage Protection Guidelines.

The *National Inventory of Architectural Heritage* (NIAH) compiled by the Department of Arts Heritage and the Gaeltacht (DAHG) provides an online register of historic buildings and features/street furniture that have been identified as having architectural interest and is maintained by the DAHG's architectural section. Buildings identified on the inventory are not necessarily included on the current Record of Protected Structures.

A primary source of architectural heritage information is the Dublin City Development Plan (2016-2022) and which was referenced for the Record of Protected Structures (RPS) to identify buildings within the site whose setting is likely to be effected by the proposed development. Within the document and due to their date of construction the Luggage Store and the Workshop building and sections of the stone boundary wall of the site are designated as protected structures as 19th century construction within the curtilage of Connolly Station:

- Connolly Station: *All 19th century portions of main railway station complex*. (RPS ref: 130)

The Planning and Development Regulations, 2001, state that an Environmental Impact Statement is required to include a description of the aspects of the environment likely to be significantly affected by the proposed development, of ... '*material assets, including the architectural and archaeological heritage, and the cultural heritage*'.

The relevant Irish legislation, international charters, local development plans and guidelines relating to this assessment may be summarised as follows:

Irish legislation / Government policy

- Local Government (Planning and Development) Acts 2000-2013
- Action on Architecture Government Policy on Architecture 2002-2005
- Architectural Heritage and Historic Properties Act, 1999
- The Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999
- Heritage Act, 1995

International Charters and Conventions

- Valetta Convention on the Protection of the Archaeological Heritage, 1992
- Joint ICOMOS-TICCIH Principles for the Conservation of Industrial Heritage Sites, Structures, Areas and Landscapes (The Dublin Principles), 2011
- The Burra Charter for Places of Cultural Significance, 1999
- The International Council on Monuments and Sites (ICOMOS), advisory body to UNESCO concerning protection of sites and recommendation, 1992
- Granada Convention 1984 Council of Europe Convention on the Protection of the Architectural Heritage of Europe
- Venice Charter for the Conservation and Restoration of Monuments and Sites (*Venice 1964*)

Local Authority Development Plans & other Plans/Strategies

- Dublin City Development Plan 2016 – 2022
- Dublin City Heritage Plan 2002-2006 (2002)
- Government Policy on Architecture (Urban consolidation/Adaptive Reuse Policies)
- Dublin City Council Industrial Heritage Record (DCIHR)
- Public Realm Strategy, Dublin City Council, 2012

Heritage and EIA Guidelines;

- Architectural Heritage Protection Guidelines for Planning Authorities issued by the Department of Arts, Heritage and the Gaeltacht (DAHG) in 2011
- Advice series Department of Arts Heritage and the Gaeltacht (DAHG)
- National Inventory of Architectural Heritage at DAHG
- Guidelines for the Assessment of Architectural heritage Impacts of National Road schemes, National Roads Authority 2005
- Guidelines on the information to the contained in Environmental Impact Assessment Reports, August 2017 Draft EPA
- Advice notes on Current Practice (in the preparation of Environmental Impact Statements), EPA 2015
- Charter for the Conservation of Historic Towns and urban areas (*Washington Charter - 1987*)

14.3.3 Policy Context

Dublin City Development Plan 2016-22. Within the operative plan, Chapter 11 deals with Built Heritage and Culture and provides the following strategic approach to protecting and enhancing the built heritage of the city that Dublin City Council will follow. *'The strategic approach to the protection and enhancement of the city's built heritage shall be guided by the recommendations on the Historic Urban Environment adopted on 10 November 2011 by UNESCO's General Conference, providing for the historic urban landscape approach that sees urban heritage as a social, cultural and economic asset for the development of cities, with tangible and intangible urban heritage as sources of social cohesion, factors of diversity and drivers of creativity, innovation and urban regeneration.'*

The necessity to manage change when dealing with heritage in order to retain its significance is well established conservation practice and is the driving force behind the listing of buildings of special interest. The Plan states: *'The purpose of protection is to manage and control future changes to these structures so that they retain their significant historic character.'* And furthermore *'Changes of use of protected structures, which will have no detrimental impact on the special interest and are compatible with their future long-term conservation, will be promoted.'*

The relevant policies provided within the operative Plan are:

Policy CHC1 *To seek the preservation of the built heritage of the city that makes a positive contribution to the character, appearance and quality of local streetscapes and the sustainable development of the city.*

Policy CHC2 *To ensure that the special interest of protected structures is protected. Development will conserve and enhance Protected Structures and their curtilage and will:*

(a) *Protect or, where appropriate, restore form, features and fabric which contribute to the special interest.*
(b) *Incorporate high standards of craftsmanship and relate sensitively to the scale, proportions, design, period and architectural detail of the original building, using traditional materials in most circumstances.*
(c) *Be highly sensitive to the historic fabric and special interest of the interior, including its plan form, hierarchy of spaces, structure and architectural details fixtures and fittings and materials.*
(d) *Not cause harm to the curtilage of the structure; therefore, the design, form, scale, height, proportions, siting and materials of new development should relate to and complement the special character of the protected structure.*
(e) *Protect architectural items of interest from damage or theft while buildings are empty or during course of works.*
(f) *Have regard to ecological considerations for example, protection of species such as bats.*

14.3.4 Definitions

This chapter assesses the direct, indirect, cumulative and residual impact of the proposed development for both the construction and operational stage of the proposed development in accordance with the EIA Directive.

The EIA Directive required Annex IV(5) requires that the EIAR assesses “the likely significant effects on the [environmental] factors should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project.”

In accordance with the National Roads Authority (NRA) ‘Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes’ which sets out examples of architectural heritage, this report seeks to identify the structures of heritage merit that will be directly impacted by the proposed scheme. A direct impact is where a feature of architectural heritage merit is physically located within the footprint of a potential development site.

As stated in Chapter 1, each chapter of this EIAR assesses the direct, indirect, cumulative and residual impact of the proposed development for both the construction and operational stage of the proposed development.

Potential effects of the proposed development on the architectural heritage resource can be described in three categories:

14.3.4.1 Direct Physical Effects

Direct physical effects describe those development activities that directly cause damage to the fabric of a heritage asset through design or activities related to construction works.

14.3.4.2 Indirect Physical Effects

Indirect physical effects describe those processes, triggered by development activity, that lead to the degradation of heritage assets.

14.3.4.3 Effects on Setting

Effects on the setting of heritage assets describes how the presence of a development changes the surroundings of a heritage asset in such a way that it affects (positively or negatively) the heritage significance of that asset. Visual effects are most commonly encountered.

14.3.5 Documentary and Cartographic Sources

As the country's capital, Dublin has been subject to numerous mapping projects, and the present study draws on maps relevant to the historic development of the site. These maps are located in **Appendix 14.A** and indicate the different buildings that were located on the site between 1844 and 1900. Thom's Almanac and Official Directory which, dated 1844 the same year as the opening of Amiens Street Railway station, shows the site where buildings associated with the running of the railway are located alongside railway tracks.

The maps and plates in Appendix 14.A and 14.B are:

- Plan of the City of Dublin 1812
- Plan of Dublin 1818
- Map of Dublin 1836 and detail of same
- Frasers Map of Dublin 1855
- Plates of Amiens Street Locomotive Shed and Butt Bridge
- Ordnance Survey 1864
- Ordnance Survey 1864 and 1847
- Ordnance Survey 6in Cassini map
- Map of City of Dublin Thom's Almanac 1844 - 1880
- Map of the City of Dublin and its environs MH Gill and Sons 1907
- Ordnance Survey map 1906-9

The following mapping sources of historic information were consulted for the study area:

- Pre-Ordnance Survey mapping. UCD
- Ordnance Survey 6" mapping (1829-1841) and Ordnance Survey 25" mapping (1897-1913)
- Secondary cartographic sources included maps from the Irish Historic Towns Atlas series.

Documentary and literary references held by the Dublin City Archives, the Railway Archives and the Irish Architectural Archives were consulted to inspect archival material, publications on local history, commissioned reports and articles, including a previously commissioned Environmental Impact Statement by Shaffrey Associates for the site and carried out in 2011.

14.3.6 Field Inspection and Consultation

Walk-over surveys of the site enclosed by Sheriff Street Lower, Oriel Street Upper, Amiens Street and Saville Place were carried out in 2018 and 2019. These included inspections accompanied by local authority planners on 11th October 2018 and the Conservation Officer on 23rd November 2018.

14.4 Baseline Scenario

The context and setting of Sheriff Street Lower and Oriel Street Upper have altered radically since the middle of the 19th century when the railway station was constructed. Amiens Street, historically a boundary line between city functions to the west and the activities of the port to the east offers the accessible, public face of the railway station. Sheriff Street Lower is dominated by an apartment block/commercial block located on its south side and small-scale terraced accommodation lines the east side of Oriel Street Upper.

The site contains structures which date from the middle of the 19th century together with office buildings constructed throughout the twentieth century.

14.4.1 Designated Architectural Heritage

The description of the Protected Structures within the Dublin City Development Plan 2016-2022 as '*All 19th century portions of main railway station complex*' indicates that the buildings listed as Protected Structures (RPS No. 130) include the boundary walls of the site located on Sheriff Street Lower and Oriel Street Upper, the Luggage Store, and the Workshop building as shown in **Figure 14.2**. The end walls of the Luggage Store and Workshop buildings are also parts of the protected structures.

The subjects of this assessment comprise:

- All elements of RPS No. 130 as detailed in the preceding paragraph.
- Significant composed or accidental views from the 18th and early 19th century urban planning schemes.
- Views and vistas observable from the historic core of the city.

14.4.2 The Historic Development of the Site and its Environs

In 1682 Dublin's City Assembly divided slob land at the mouth of the river Liffey into 152 lots. The lands were described as 'the strand between Mabbot's Mill (in the area of the present Connolly Station) and the Furlong of Clontarf'. 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'. Perhaps such a huge reclamation undertaking was beyond the efforts of the individual leaseholders and a more systematic effort was necessary to save and reclaim the area from the sea.

Commencing in the 1720s the north side of the city was laid out and extensively developed by three generations of the Gardiner family. As long as The Strand (Amiens Street) was located on the seashore it effectively corralled this Georgian development to its west. The North Wall Quay was begun in 1717 and by the late 1750s the North Lotts and East Wall area had been reclaimed and laid out in their distinctive grid pattern. These reclaimed lands included Sheriff Street Lower and Seville Place. Rocque's Map (**Figure 14.2**) documents the eastern expansion and the development of the reclaimed land formed by the canalisation of the Liffey. (Rocque's Plan of the City of Dublin and the environs). The relocation of the Custom House eastwards from Wellington Quay moved the port's centre of gravity to the north wharfs, with bonded warehouses located close by flanking the Custom House Dock and George's Dock. As they were targeted for break-ins a high stone security wall surrounded these buildings.

Figure 14-2 Extract from Roque's Map (1756) showing the Approximate Location of the Proposed Development Site

In the mid-19th century, located on undeveloped land between the historic city and the port, the area provided the perfect site for a railway station. The context and setting of Sheriff Street Lower and Oriel Street Upper altered radically when the railway company began developing this railway station along with its ancillary buildings on the green fields of the underdeveloped North Lotts district, avoiding built up areas closer to the city centre. On the 1836 map (see **Appendix 14.A**) Sheriff Street Lower can be seen running along the northern boundary of the bonded warehouses at the Revenue Dock before making sharp turns to divide the North Lotts in an east to west direction. Very little development has been undertaken in the surrounding fields. Whilst maps of this period show the proposed line of the Dublin Drogheda railway, they also show little construction otherwise apart from a grouping of houses on Seville Place.

The Dublin and Drogheda Railway was incorporated by an Act of Parliament on 13 August 1836. Construction began on the railway in 1840 and the line was opened for business on 24 May 1844. This made it the second completed railway in Ireland. With the arrival of the railway lines development progressed eastwards transforming a vast expanse of featureless unproductive land into a thriving industrial district. A vinegar works, vitriol works and a glass works had existed in this district prior to the construction of the railway extension and by 1876 they were joined by new streets, houses, a church, three railway stations and numerous new industries including saw mills, oil stores, charcoal works and iron works (see **Appendix 14.A**).

The penetration of the railway line and associated building changed the district dramatically. The location of the classically designed station terminus with its campanile and towers closed the vista from Amiens Street and the construction of the loop line in 1891 connected the station to the southern network. Whilst the line was opened in 1844 the actual station building was not completed. Although the Dublin and Drogheda Railway was closer to the port than the other four railways, it lacked a direct connection to the Liffey quays. This was branched into the area at a later date and by 1893 the line to Belfast was completed.

Amiens Street had been effectively a boundary line between the port and industrial functions to the west and the commercial and residential development of the north Georgian city. As early as the mid-19th century much of its laid-out streets and row housing had begun their slide into slum conditions and tenements with the Monto district beside Amiens street becoming notorious as a red-light district. Seville Place provided housing generated by employment in the port and the nearby industrial activity (See **Appendix 14.A**).

The arrival of the railway line had a profound impact on the area with employment rising between the port and dock activities. A densely populated residential area developed with small scale terraced accommodation on tight plots. Churches and schools were built, and a strong community resulted (See **Appendix 14.A**).

14.4.3 Existing Site Description

The development site is of a relatively modern date, coinciding with the advent of the railway to Amiens Street in the mid-19th century and has retained significant elements of transport heritage. It has considerable historic and industrial heritage significance as part of the city's first main railway terminus. Artificially built up and infilled to a level matching the railway tracks and the main railway station and sloping down to the level of Sheriff Street Lower and Oriel Street Upper in the south and east of the site. The lands originally provided space for ancillary buildings required for the running of the railway lines. Today it is mainly in use as surface car parking, emergency services access and a delivery route to the station.

The site is approached from Amiens Street via an underpass where the railway bridge is supported on stout cast iron columns. The site is framed by two streets, Sheriff Street Lower to the south and Oriel Street Upper along its eastern edge, the railway sidings to the west, and Oriel Hall and CIE buildings to the north. The current main entrance is located almost in its original position close to the junction of these two streets. Close by a small office building constructed in c.1926 occupies the southerly tip of the site with a high brick wall closing the vista from Commons Street. Otherwise the lands are bounded by the railway station and tracks.

The physical enclosure of the site is characterised by high boundary walls projecting a closed and forbidding aspect to the immediate streets. Even in daylight there is an abiding industrial character to the environment surrounding the site, particularly along Sheriff Street Lower which is devoid of street level vitality.

Along Sheriff Street Lower the boundary wall incorporated the external envelope of two buildings associated with the station the Luggage Store and Workshop building. The street level vaults of these buildings remain although their upper storeys were removed following a catastrophic fire.

The southern boundary at Sheriff Street Lower occupies the entire block. On its eastern boundary the high stone wall of the site on Oriel Street Upper faces terraces of small scale two and three storey row housing. A small development at Oriel Hall is tucked into a cul de sac facing part of the site's northeast boundary with a modern stone construction as the subject site boundary.

The main approach to the site from the Docklands and the River Liffey is along Commons Street towards Oriel Street Upper and is an eclectic mixture of character and scale. Oriel House occupies a position at the most southerly aspect of the site where four streets intersect. It turns its back on the streets and faces into the site with its streetscape presence marked by a high, curved brick wall of varying height enclosing the rear yard.

It has been assessed as part of the Architectural Heritage Assessment Report accompanying this application and also within the Architectural Heritage Impact Assessment Report prepared by Shaffrey Associates and both reports determined the rating of the building to be of Local Interest. The appraisal by the NIAH assessment, usually based on external inspection only, found that *'The building displays some architectural pretension through the use of classical devices such as stone cornicing and symmetry, which serve to enliven an otherwise functional building.'*

The urban character and architectural quality of the site is generally poor with the exception of the retaining walls and the buildings along Sheriff Street Lower which, notwithstanding their condition and demolition of the upper levels, have retained architectural merit and are characteristic of 19th century industrial construction. Their present appearance is dilapidated due to the neglected appearance of the stonework.

The site currently provides car parking and delivery routes for the station with various modern administration buildings of no architectural merit including the Central Control Building, the Fastrack building, the Irish Regional Building Maintenance, CIE group IT and HR, and the Rolling Stock Maintenance shed. The palisade fencing and tarmacadam routes through the site coupled with sheds and unattractive buildings make it an unappealing environment. The northern boundary of the site is formed by linear railway buildings and the railway tracks entering Connolly.

14.4.4 Significant Protected Structures in the Vicinity the Site

There are a number of important protected structures within the environs of the site, in particular the landmark Custom House (See **Table 14.1** and **Figure 14.3**).

Significant Protected Structures Located within Environs of the Site	**RPS Reference No.**
Custom House, Custom House Quay	2096
Aldborough House	6844
Connolly Station, Amiens Street Station	130
Stack A Warehouse Custom House Quay	2094

TABLE 14-1 SIGNIFICANT PROTECTED STRUCTURES LOCATED WITHIN ENVIRONS OF THE SITE

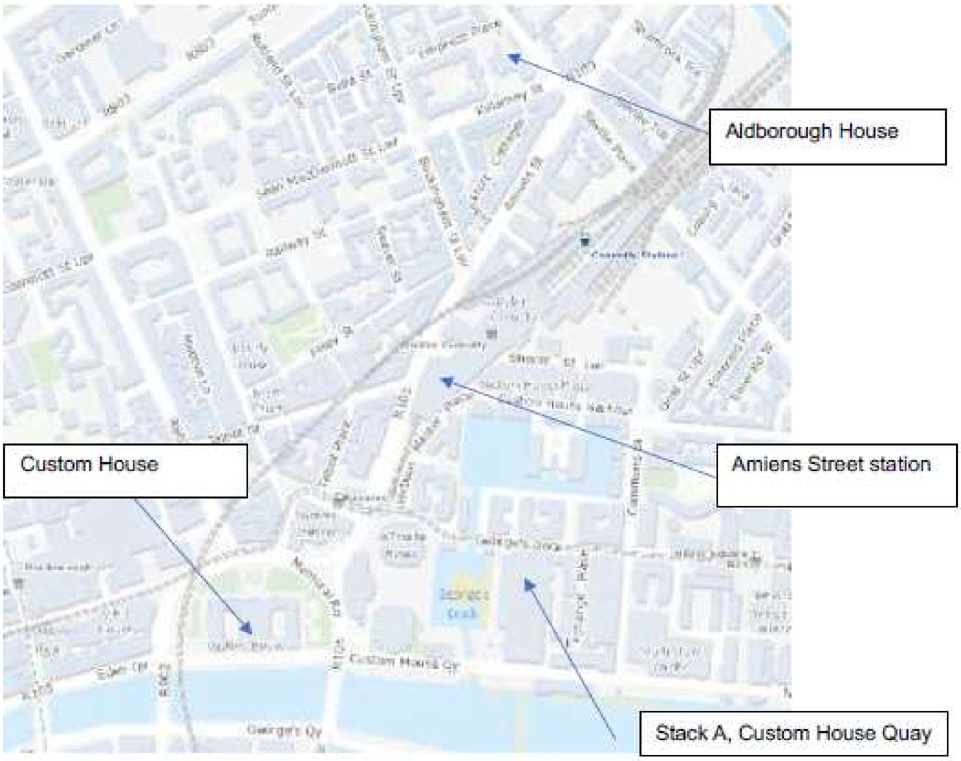
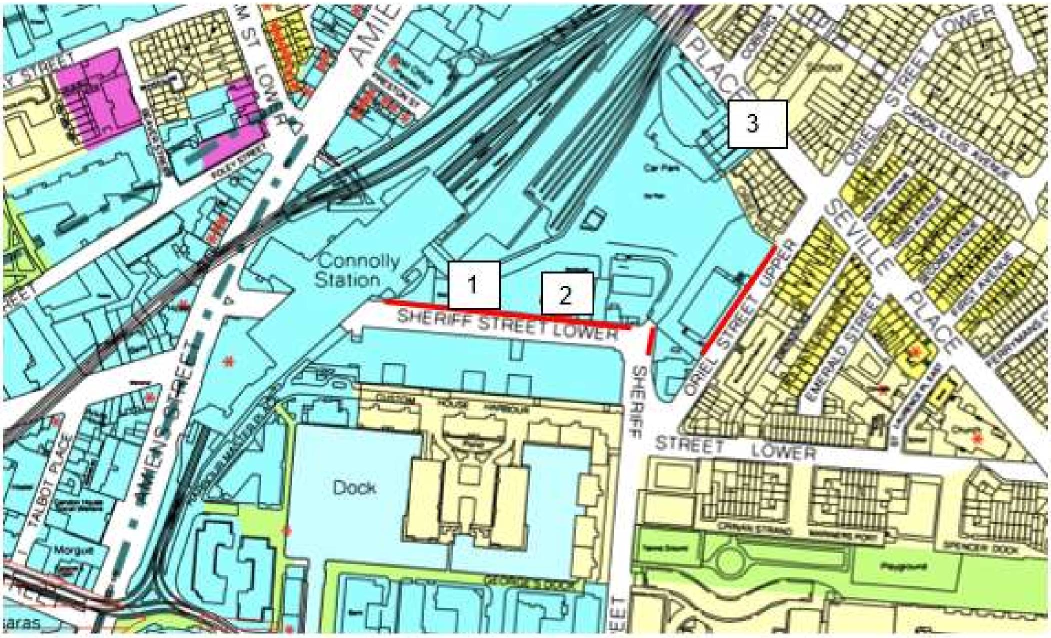


FIGURE 14-3 LOCATION OF SIGNIFICANT PROTECTED STRUCTURES WITHIN STUDY AREA (AREA SHOWN ON MAP)

14.4.5 Protected Structures

The protected structures (RPS Ref. No. 130) that are assessed in this report comprise the boundary walls of the site addressing Sheriff Street Lower and Oriel Street Upper and also the east side walls of the Luggage Store and the west side wall of the Workshop and a vaulted structure located on Seville Place. These elements are shown in **Figure 14.4**. The table in **Figure 14.4** lists the elements of architectural heritage significance located within the site.



Key :

Red line denotes 19th century boundary wall along Sheriff Street Lower and Oriel House Upper

1: The Luggage Store
2: Workshop building
3. Seville Place vault
4. Red asterix denotes protected structure vicinity of the site

FIGURE 14-4 PROTECTED STRUCTURES (RPS REF. NO. 130) WITHIN AND NEAR SITE

14.5 Proposed Works

14.5.1 Works Relating to the Built Heritage

Appendix 14.C gives the materials and methods to be used for conservation works to be carried out to the end walls of the Luggage Store, Workshop, Seville Place vault and Sheriff Street Lower and Oriel Street Upper boundary walls.

14.5.1.1 Excavation and Demolition

It is proposed to excavate the site infill and lower the existing elevated ground level to the street level of Sheriff Street Lower to construct the basement car park. The final block ground floor level will be approximately at the existing the levels of Sheriff Street Lower and Oriel Street Upper. There is a possibility that foundations of buildings such as the sawmills and goods shed indicated on historic maps may have been retained within the site infill. It is likely that obsolete tracks would have been removed for their salvage value.

14.5.1.2 Conservation of 19th Century Boundary Walls

In common with 19th century industrial buildings the palette of building materials used in construction was limited and the simple stone and mortar construction of the walls embody the functional tradition of that period. Saturation of the stonework of the walls over such a long period of time has led to the deterioration and loss of its core and sections may require remedial treatment, such as structural support, grouting, cleaning, replacement lost or damaged stone and re-pointing. Three pedestrian entrances and other sections of the wall bounding Oriel Street Upper are currently blocked up with modern masonry blocks.

Elements of the original entrance to the site include remnants of cut stone gate piers located beside the present car park entrance. They flank a vehicular and pedestrian entrance. Some stonework of the original walls remains in situ interspersed with modern blockwork and reconstituted stone. 19th century stone to be salvaged and retained for re-use on site in accordance with the submitted salvage strategy in the Architectural Heritage Assessment Report that accompanies the planning application.

Along Oriel Street Upper variations in the limestone and coursing of the 19th century construction indicates different periods when repairs were carried out to the wall and openings blocked up.

14.5.1.3 Provision of Openings on Sheriff Street Lower

New openings are proposed within the stone boundary wall that will provide public pedestrian access to the street level of the proposed development. Three blocked up arched openings located in the screen wall between the Luggage Store and the Workshop Building on Sheriff Street Lower are proposed to be re-opened. The stone salvaged from these openings will be used to carry out repairs to the remaining walls and rebuilding where required. There is a possibility of remnants of 20th century warehouse retained behind these arches.

14.5.1.4 Provision of openings on Oriel Street Upper

Conservation of 19th century boundary wall and provision of pedestrian access and vehicular access openings in the protected wall bounding Oriel Street Upper. The proposed openings within the boundary wall along Oriel Street Upper are intended to provide open access to the amenities of the site to allow the public to transit through Connolly Quarter and encourage access by the public through the site.

The incorporation of a section boundary wall within the construction of the extension to Block D above the wall located along Oriel Street Upper.

14.5.1.5 The Luggage Store and Workshop Building End Walls

The proposed entrances and pedestrian approach to the proposed development from Sheriff Street Lower will be flanked by the end walls of the Luggage Store and Warehouse building. It is intended to carry out necessary conservation works to the stonework of these walls as part of this Strategic Housing Development application. This might include remedial treatment, such as structural support, grouting, replacement lost or damaged stone and re-pointing. The full conservation strategy, assessment, adaptive re-use proposals and implementation for the buildings will form part of a separate Section 34 application to Dublin City Council.

14.5.1.6 Seville Place Vault

It is intended to incorporate a vault located on Seville Pace into a new pedestrian link from Seville Place to within the proposed Connolly Quarter and all its amenities. It is intended to carry out necessary conservation works to the stone and brickwork of the structure as part of this Strategic Housing Development application. This might include remedial treatment, such as structural support, grouting, replacement lost or damaged stone and re-pointing.

14.5.1.7 Demolition of Twentieth Century Buildings

In order to enable development on this site it is necessary to demolish a number of existing administration buildings dating from the second half of the twentieth century. These buildings have no architectural or heritage interest.

14.5.1.8 Demolition of Oriel House

The proposed development also requires the demolition of twentieth century Oriel House, an office building that housed a department of the railway company. Oriel House is not included in the Record of Protected Structures; however, it has been identified in the NIAH inventory (reference number 50060567). A full description, assessment and rationale for demolition is provided in the accompanying Architectural Heritage Assessment Report submitted with the SHD application.

14.5.1.9 Site Context within Historic Core

The site is positioned within the historic core of the city and south east of the Gardiner Estate, a series of significant planned urban set pieces that transformed Dublin during the 18th and early 19th century. There will be no direct works to any elements of the historic core of the city and the indirect effects are assessed in section 14.6 Predicted impacts.

14.5.2 Significance of the Built Heritage

The Luggage Store and Workshop buildings are considered to be of Regional Interest.

On Sheriff Street Lower the portion of nineteenth century boundary wall between the Luggage Store and Workshop buildings is relatively intact and an intrinsic element of the original enclosure of the site and considered to be of Local Interest.

On Oriel Street Upper the nineteenth century boundary wall is less intact, and this indicates considerable conservation interventions. It contributes to the character of the area and may be considered to possess Local Interest.

Limestone paving and setts contained within the site are considered to be of Local Interest.

Oriel House was built in c. 1926 and this building is considered to be of Local Interest.

Architectural Heritage Resource	Description	Special Interest Rating
19th century boundary Walls Protected structures (Ref. No.130)	Calp limestone wall at Sheriff Street Lower and Oriel Street Upper, arches located between Luggage Store and Workshop. End walls of Luggage Store and Workshop. 19th century elements of limestone piers at site entrance.	Architectural, technical, social Local interest
Industrial heritage	20th century setts, weighbridge.	Local interest
Oriel House (NIAH Ref. No. 50060567)	Circa 1926 redbrick single-story office building with yard and out building. Orientated inwards to the site with brick boundary wall facing the Sheriff Street Lower/Commons Street junction	Local interest Record only
The Luggage Store The Workshop building Seville Place Vault	The Luggage Store constructed mid-19th century, as two storey building with, at street level, a series of eight vaults. Fronted with dressed arches, framed with limestone pilasters and stringcourse. At the upper level trains entered the building and luggage was hoisted from street level to connect with the trains. Only the ground floor remains following a catastrophic fire in which the roof and first floor were destroyed. The Workshop building of which only the vaulted ground floor remains, was built at the same time as the Luggage Store. Simple utilitarian format without any of the architectural presence of the other building. Three segmental arches lead into three vaults. Stone walled brick arched vault set within limestone wall	Regional interest Regional interest Regional interest
20th century buildings within site	The Central Control Building, the Fastrack building, the Irish Regional Building Maintenance, CIE group IT and HR, the Rolling Stock Maintenance shed.	No special interest Record only

Architectural Heritage Resource	Description	Special Interest Rating
Views and vistas	Composed city views from the urban schemes of the 18th and early 19th century and the historic city core.	Regional

TABLE 14-2 SUMMARY TABLE OF ARCHITECTURAL HERITAGE SIGNIFICANCE

14.5.3 Sensitivity

This is a robust industrial site and the surviving fabric of the protected structures is a legacy of good quality building materials and techniques defying years of neglect and impacts imposed by the effect of the surrounding historic infill and the later surface treatment that has permitted severe water penetration.

From street level the appearance of the site is forbidding. It is almost completely surrounded by high stone walls with the current main access point leading from Sheriff Street Lower. The Sheriff Street Lower elevation benefits from a series of architecturally detailed openings that once led into the Luggage Store and Workshop building adding presence and rhythm to the street.

14.5.4 Verified Views

FIGURE 14-5 LOCATION AND DIRECTION OF VIEWPOINTS

The visual envelope for the site extends beyond its immediate environs on account of the height and massing of the proposed development and the likely visual impact on the historic core of the city includes views from key vantage points which have been prepared by Modelworks and submitted with the application documentation. The photographs from these vantage points (shown in **Figure 14.5**) illustrate significant representative views towards the site. The direction of view follows a composed view (e.g. the Georgian mile), where it exists, along a street, otherwise the view is directed towards the development site (e.g. view from St. Stephen's Green).

Talbot Street is sensitive to any redevelopment proposals that occur in the background of the main

Composed city views from the urban schemes of the 18th and early 19th century and the historic city core are one of the delights of the city. Consideration has been given to the likelihood of views from the north and south Georgian quarters. Views (see **Appendix 14.1** – Historic Views Verified Photomontages report accompanying this application) to illustrate the street vistas and views from Henrietta Street, Mountjoy Square and the north Georgian mile, the river Liffey, St. Stephens Green, College Green, Trinity College, Merrion Square and the south Georgian Mile to ascertain whether the proposed development might feature. With the exception of Talbot Street these significant vantage points experience no changes to the city horizon on account of distance and the intervening structures in the city landscape.

The southern bank of the River Liffey corridor was considered likely to offer glimpses of both existing and proposed high buildings on the site. Locations were selected as significant viewpoints of the Custom House, Busarus and Stack A warehouse building (now CHQ). However, examination of the verified views demonstrates that despite the open space afforded by the river, the proposed development is screened by buildings.

14.6 Assessment of Impacts

The site is in the vicinity of important buildings, in particular Gandon's masterpiece - the Custom House. It is anticipated that the proposed development due to its height and form will have an impact on wider setting and views.

Following consultation with the Conservation Officer of Dublin City Council strategic viewpoints were selected to illustrate with computer generated images the impact of the proposals on sensitive city vistas. **Table 14.3** (and see **Appendix 14.1** – Historic Views Verified Photomontages report accompanying this application) provides the assessment of the verified views and vistas to indicate visual impact from the proposed development upon these views. With the exception of the vista along Talbot Street from where the Campanile of Connolly Station can be seen in the distance above the Loop Line Bridge, the verified views have indicated that the proposed development will have no impact on these views and vistas from within the historic core of the city.

The construction of a residential development within the site, associated landscaping proposals and the introduction of general public access will have a significant permanent effect on the protected structures and on their setting. This effect when balanced against the long-term social sustainability of the residential development and potential significant improvement in the public realm, vitality and facilities of the neighbourhood is considered to be positive.

View Reference	Description of View	Visual impact
C01	O'Connell Street	No Impact
C02	Hugh Lane Gallery, Parnell Square	No Impact
C03	Henrietta Street	No Impact
C04	View along St Stephens Green facing North East	No Impact
C05	View from centre of St Stephen's Green	No Impact
C06	View along Merrion Row, Government Buildings	No Impact
C07	View along Georgian Mile from junction Mount Street	No Impact
C08	College Green	No Impact
C09	Trinity College, Front Square	No Impact
C10	Nassau Street across Trinity College playing fields	No Impact
C11	Gardiner Street from Mountjoy Square	No Impact
C12	Buckingham Street	No Impact
C13	Talbot Street	Moderate Impact
C14	Custom House	No Impact
C15	Custom House and warehouse Stack A (CHQ)	No Impact

TABLE 14-3 HISTORIC VIEWS TAKEN WITHIN HISTORIC CORE

14.6.1 Do Nothing Scenario

In the absence of the proposed development going ahead and consequently no conservation works carried out, the historic fabric of the Protected Structures (Luggage Store, the Workshop, Seville Place vault and the 19th century boundary walls) buildings will inevitably continue to deteriorate.

The Protected Structures will not have an improved architectural context in the absence of a material change of the overall form of development and usage at the site.

Views and vistas from the historic inner city will not have any altered visual impacts with the exception of the vista along Talbot Street which is closed by the campanile of the railway station building.

The Protected Structures boundary walls presently create a barrier to engagement of the community with the site and have a forbidding aspect to the adjacent street life, contributing little positive impact to the local area and the newer docklands residents. Should the proposed development not proceed the opportunity to introduce this important urban, cultural and social improvement will be lost in an area that already suffers from social disadvantage.

14.6.2 Construction Phase Impacts

In accordance with the EPA Guidelines (Draft 2017) the likely significance of effects can be: Profound - Very significant- Significant - Moderate - Slight - Not significant - Imperceptible.

In addition, these can either be positive or negative, be local, regional, national, or international in extent, and effects can be permanent, long-term, medium-term, short-term, temporary, brief, or momentary effects.

During the construction phase the site will be excavated of the infilling material that provided the elevated site levels required for connection of the Dublin to Drogheda railway tracks as they entered the city. There is potential for physical damage to adjacent protected structures during this process.

<u>Significance: slight to significant, negative, permanent impact</u>

There is the potential for damage and loss of historic building fabric of the boundary walls during the removal of corroded ties, forming of openings and during the insertion of structural supports. Such damage can be caused by insufficient protection being provided by the temporary or permanent works design for the historic building fabric.

<u>Significance: Moderate to significant, negative permanent impact</u>

Damage to protected structures from construction machinery and damage to protected structures from vibrations during excavation infill and lowering of site levels for basements. Worst case scenario would be the loss of a protected structure. Appropriate site management procedures and vibration monitoring are required to be in place and appropriate avoidance measures undertaken to avoid any such damage.

<u>Significance: Slight to moderate, negative, permanent impact.</u>

Damage to protected structures from construction machinery and damage to protected structures from vibrations during excavation infill and lowering of site levels for basements. Worst case scenario would be the loss of a protected structure. Appropriate site management procedures and vibration monitoring are required to be in place and appropriate avoidance measures undertaken to avoid any such damage.

<u>Significance: Slight to moderate, permanent negative impact</u>

Damage to protected structures from airborne dust or debris.

<u>Significance: imperceptible, short-term, neutral, impact.</u>

14.6.3 Operational Phase Impacts

Proposed works to the protected structures will result in some change and intervention. These works have been specifically designed to respond to the architectural character of the protected structures and to reinforce their architectural and urban heritage qualities.

Significance: slight to significant, permanent, positive impact

Conservation works to the protected structures are proposed to address the deteriorated condition of the building fabric and are intended to be carried out and completed in phase with the new development.

Significance: significant, permanent, positive impact

The removal of the infill material from the site will have a beneficial physical and visual impact on the protected structures located on and around the site.

Significance: significant, permanent, positive impact

The potential visual impact of the development upon the setting of significant protected structures within the vicinity of the site and the wider landscape of the city is demonstrated with computer generated verified images as shown in **Appendix 14.1** – Historic Views Verified Photomontages report accompanying this application).

Significance: slight to moderate, neutral impact

The massing and height of the development will have a visual impact on the predominantly two to three storey housing along Oriel Street Upper and adjacent residential streets.

Significance: slight to moderate, permanent, neutral impact

The proposed demolition of Oriel House and the twentieth century buildings on the site will not have an adverse impact on the character of the area or the setting of the protected structures. The demolition of Oriel House is required in order to provide an essential architectural feature of urban design at a critical approach to the proposed development and to enable delivery of the overall objectives of a sustainable future of the development with a flagship building. This building will be the subject of a future planning application.

Significance: slight to moderate, permanent, positive impact

14.6.4 Cumulative Impacts

The Connolly Quarter Masterplan shows a design for the development of the entire site comprising the lands under agreement between CIE and Oxley Holdings Limited. Oxley Holdings Limited intend to submit an application under Section 34 to Dublin City Council for the development of office and hotel blocks. These are Blocks A, D3, and E detailed in the Masterplan. It is considered that the cumulative effects from the works required to implement the masterplan are positive, permanent, and is not significant.

No other cumulative impacts upon the architectural or cultural heritage resource have been identified as part of the assessment.

14.7 Mitigation Measures

14.7.1 Incorporated Design Mitigation

Potential negative impacts on the building fabric and integrity of the built heritage arising from the proposed development can be minimised during the construction phase and operational phase by adherence to best practice and to the Architectural Heritage Protection Guidelines and the Advice Series issued by the Department of Arts Heritage and the Gaeltacht.

The key mitigation measures are:

- Promoting minimum intervention.
- Using appropriate materials and methods.
- Implement a regular maintenance programme.
- Complying with the Building Regulations.

The physical interventions to the protected structures will be advanced with design and specifications to a detailed level to indicate all interventions to the historic building fabric including interface with the new building and any structural intervention required.

14.7.2 Construction Phase Mitigation

In accordance with the EPA Guidelines (Draft 2017) the likely significance of effects can be: Profound- Very significant- Significant - Moderate - Slight - Not significant - Imperceptible. In addition, these can either be positive or negative; local, regional, national, or international in extent; and effects can be permanent, long-term, medium-term, short-term, temporary, brief, or momentary effects.

During the construction phase the site will be excavated of the infilling material that provided the elevated site levels required for connection of the Dublin to Drogheda railway tracks as they entered the city. There is potential for physical damage to adjacent protected structures during this process.

<u>Significance: slight to significant, negative permanent impact</u>

There is the potential for damage and loss of historic building fabric of the boundary walls during the removal of corroded ties, forming of openings and during the insertion of structural supports. Such damage can be caused by insufficient protection being provided by the temporary or permanent works design for the historic building fabric.

Significance: Moderate to significant, negative permanent impact

Damage to protected structures from construction machinery and damage to protected structures from vibrations during excavation infill and lowering of site levels for basements. Worst case scenario would be the loss of a protected structure. Appropriate site management procedures and vibration monitoring are required to be in place and appropriate avoidance measures undertaken to avoid any such damage.

Significance: Slight to moderate, permanent negative impact

Damage to protected structures from airborne dust or debris. Protection measures are required to avoid any damage.

The boundary wall of the site will experience potential impacts and regardless of the significance or the extent of these impacts the existing structures will be recorded to Level 3 inventory standard prior to the commencement of construction works. This will include full measured, written, drawn and photographic surveys of all buildings and features of interest identified as part of the 19th century heritage. Works intended to be carried out to the protected structures are to be preceded by detailed assessment and recording of historic materials and construction methods. Copies of all documentation will be provided to the Railway Archives and the Irish Architectural Archives.

Analysis and testing of materials and methods will also be undertaken in advance of works commencing.

Structural analysis and condition surveys have been undertaken on protected structures within the site. By this means potentially negative impacts will be minimised, while positive impacts such as the conservation of historic building fabric will be implemented. Protection and temporary works will be provided for the protected structures throughout the construction period to prevent and damage or loss of historic fabric.

As a result of dismantling sections of the boundary wall for the provision of entrances a quantity of 19th century durable Calp limestone blocks will become available. It is proposed to reuse the stone elsewhere within the scheme in accordance with the salvage strategy prepared for the elements of heritage interest and to carry out repairs to the walls, works to protected structures and to integrate within landscape proposals.

The use of specialist contractors with relevant experience, skill and qualifications will be employed to carry out conservation works to protected structures.

Where the infilled material adjacent to the boundary wall is to be excavated, in the event of necessary amendments of the proposed works to protected structure that cannot be anticipated at this stage or any works that alter the character of the protected structure will require a further planning application or Section 5 Declaration.

A summary of the construction and operational mitigation measures is given in **Table 14.5**.

14.7.3 Operational Phase Mitigation

14.7.3.1 Architectural Design

The architectural treatment and detailing of the new buildings was designed to reflect the robust, industrial character of the industrial heritage and historic railway architecture. High quality materials specified to be used in connection with the protected structures are intended to provide immediate and long-term resilience and enhanced visual appearance.

The implementation of this scheme will significantly enhance public access, physically and intellectually, to a historic industrial landscape. Public access within the proposed development demonstrates a commitment to integrate heritage with the city.

The massing of the buildings has been considered and designed to minimise the visual impact on the setting of significant buildings in the vicinity of the site, sensitive views and vistas of the 18th century city and Estates and the adjacent residential conservation areas north and east of the site.

The incorporation of boundary wall within the building Block D will not affect the integrity of the historic fabric. The design of modern intervention to the protected structure is detailed to a high standard in a contemporary idiom and will be clearly legible against the conserved historic fabric.

A salvage strategy to ensure the retention, storage and reuse on site of heritage elements removed during the construction phase has been devised to be implemented during the works.

Provision of a regular maintenance programme will be introduced to ensure ongoing maintenance and care of protected structures on site.

A summary of the construction and operational mitigation measures is given in **Table 14.5.**

Resource	Character	Significance	Mitigation
19th century boundary walls	The site is bounded along Sheriff Street Lower and Oriel Street Upper with high walls constructed in 1844 mainly with Calp limestone. Defensive character. Lends prison like quality to the streets.	Protected Structure (Ref no. 130) Local interest	Full recording and condition survey prior to commencement. Vibration and settlement monitoring for construction phase. Protection from works.
Oriel House	Flat roofed modern building-built c.1926 with moulded stone cornice. Elements of the architectural detailing features Arts and Craft character externally. No internal features of special interest.	Not protected NIAH Ref. No. 50060567 Local interest	Demolition proposed. Full recording to Level 3 to be issued to Local Authority and archives
Site infill	Original site was infilled behind high walls a constraint imposed by the railway levels and security. Industrial character.	Local interest	Protection and monitoring to the 19th century walls required during construction phase
Historic views and vistas	Important views from the 18th century Estate planned set pieces and viewpoints of the historic centre of the city.	National to Regional interest	Impact removed or reduced due growth of the city and intervening buildings.

TABLE 14-4 SUMMARY OF MITIGATION MEASURES

14.8 Monitoring

14.8.1 Monitoring - Construction Phase

During the construction phase expert architectural and urban conservation advice will be incorporated within the detailed design and appropriate inspections and guidance provided for the implementation of the works.

Monitoring during the construction phase is necessary so that any demolitions, excavations and removals on site are undertaken with care in order to ensure minimisation of impacts results to protected structures.

14.8.2 Monitoring – Operational phase

On completion of the construction works a regular maintenance programme to ensure care of protected structures will be provided to the site owner for implementation.

14.9 Residual Impact Assessment

14.9.1 Built Heritage

The proposed new development will introduce a significant change to the existing character of the site and the immediate urban context. When the various mitigation measures outlined in the previous section have been carried out the residual impacts that will affect features or buildings within the site and also within the wider urban context will have their impact reduced through the planning, design and construction of the proposed development.

Area	Excavation/Construction stage	Decay (long term)
19th century boundary walls. End walls Luggage Store and Workshop, vault at Seville Place	Potential slight to significant effect due to loss or damage during excavation and construction stage	Low
Removal site infill	Significant effect	N/A
Historic views and vistas	Potential slight to moderate effect in terms of visual impact	N/A
Protected structures outside site	Negligible	N/A

TABLE 14-5 RESIDUAL EFFECTS OF PROPOSED DEVELOPMENT ON PROTECTED STRUCTURES WITHIN THE SITE AND THE BUILT ENVIRONMENT OF THE WIDER URBAN CONTEXT AREA

14.10 Difficulties Encountered in Compiling Information

No significant difficulties were encountered in compiling the relevant information and the current report is based on desktop review and non-disturbance on-site assessment only. No intrusive opening up, investigations or excavations have been carried out to the building fabric of the protected structures or to other features in the site.

14.11 References and Sources

- Brady, J & Simms (eds) Dublin Through Space and Time (c.900-1900) Dublin 2005
- Bunbury, Turtle. Research for Dublin Docklands – An Urban Voyage commissioned 2009 by DDDA
- Dublin City Development Plan 2016-22
- Casey, Christine. Dublin (Buildings of `Ireland `series) New Haven and London. 2005
- Clarke, H.B., Simms, A. and Gillespie, R. (eds) 2002 Irish Historic Town Atlas: Dublin Parts
- D'Alton, John. The history of Drogheda. Public Dublin 1844.
- Dublin City Council, 2008. Dublin City Industrial Heritage Record Phase 5 North City, 3 Volumes.
- Rowley Ellen (ed) More than concrete blocks: Dublin's twentieth century buildings and their stories.
- Rynne, C. Industrial Ireland 1750-1930 An archaeology The Collins Press 2006
- Setting of Heritage Assets. 2015 Advice series from Historic England
- Shaffrey Architectural Heritage Impact Assessment reports and 2011 EIS planning application documentation.
- Shepherd, W. E., 1994. The Midland Great Western Railway of Ireland, Leicester, Midland Publishing.

Cartographic Sources

- John Rocque, Map of Co. Dublin, 1760
- William Wilson's Map of Dublin, 1798
- Ordnance Survey 6", 25", 5ft maps of County Dublin (1837, 1864, 1886, 1907, 1935)
- Irish Historic Towns Atlas No. 11 Dublin, Part I to 1610 (Clarke 2002) and Irish Historic
- Towns Atlas No. 19 Dublin, Part II 1610 to 1756 (Lennon 2008).

Appendices (See Volume III)

- **Appendix 14.A** Reviews historic mapping relevant to the period of the development of the site and that reveals the development of the urban landscape over time.
- **Appendix 14.B** provides Photographs of the protected structures designated for their heritage interest and contained within the site and form part of the Strategic Housing Development application.
- **Appendix 14.C** provides Method Statement for the conservation of 19th century stonework at the site at Connolly Station.
- **Appendix 14.1** (Historic Views Verified Photomontages report accompanying this application) evaluates verified views taken from sensitive locations within the historic core of the city.

CHAPTER 15

INTERACTIONS OF THE FOREGOING

OCTOBER 2019

Table of Contents

15 Interactions of the Foregoing

The construction, operational and cumulative impacts of the proposed development have been assessed within each chapter of the EIAR. This chapter considers the significant interactions of impacts between each of the separate disciplines.

In practice many impacts have slight or subtle interactions with other disciplines. This chapter highlights those interactions which are considered to potentially be of a significant nature. Discussions of the nature and effect of the impact is primarily undertaken within each of the relevant chapters, while this chapter identifies the most important potential interactions.

This chapter has been prepared by Paula Galvin of McCutcheon Halley Chartered Planning Consultants. Paula holds an MSc in Spatial Planning, a BA in Geography, a Diploma in Environmental Impact Assessment (EIA) Management and a Diploma in Planning and Environmental Law. She has practised as both a planning and environmental consultant for over 15 years and has directed the preparation of Environmental Impact Assessment Report (EIARs) for a range of development types including residential, commercial, renewable energy and waste.

15.2.1 Population and Human Health

During the construction phase, the following aspects would interact with population and human health and in the absence of mitigation may give rise to likely significant effects.

- **Material Assets - Traffic and Transport:** There is potential for impact on human health from increased traffic flow for construction vehicles in the local area and this has potential to impact upon road safety.
- **Noise & Vibration**: There is potential for impact on human health associated with noise during the construction phase.
- **Air Quality and Climate:** There is potential for impact on human health from dust associated with construction activities.

During the operational phase the potential interactions are;

- **Landscape**: The landscape plan will impact on the quality of the private and public open spaces, which could impact on people's health and well-being.
- **Material Assets - Traffic and Transport:** Traffic flows within the site will have the potential to create safety risks for pedestrians and cyclists.
- **Air Quality and Climate:** There is potential for impact on human health from a deterioration in air quality associated with emissions from vehicles.

The potential significant impact on human health have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.2.2 Landscape and Visual

During the construction phase, the following aspects would interact with landscape and visual and in the absence of mitigation may give rise to likely significant effects.

- **Land and Soils:** There is potential for impact on landscaping from the reuse of fill material and the appropriateness of available soils during the construction phase.

During the operational phase the potential interactions are:

- **Population and Human Health:** The landscape plan will impact on the quality of the private and public open spaces, which will impact on people's health and well-being.
- **Biodiversity:** The landscaping has significant interaction with biodiversity in relation to the planting scheme.

The potential significant impacts of landscape and visual have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.2.3 Material Assets: Traffic and Transport

During the construction phase, the following aspects would interact with traffic and transport and in the absence of mitigation may give rise to likely significant effects.

- **Noise and Vibration:** Construction traffic may give rise to localised noise and vibration effects.
- **Air Quality and Climate:** Emissions from construction traffic may impact local air quality and climate in terms of increased emissions of greenhouse gases from vehicles.

During the operational phase the potential interactions are;

- **Air Quality and Climate:** Emissions from traffic associated with future occupants may impact local air quality and climate in terms of increased emissions of greenhouse gases from vehicles.

The potential significant impacts of material assets of traffic and transport have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.2.4 Material Assets: Built Services

During the construction phase, the following aspects would interact with built services and in the absence of mitigation may give rise to likely significant effects.

- **Population and Human Health**: Connections to existing services may require a temporary interruption to existing services in the local area.
- **Land and Soils:** The construction of the proposed services (water supply, drainage, power, and telecommunications, etc.) may affect the local hydrological and hydrogeological environment as there is a risk of suspended solids run off.

During the operational phase the potential interactions are:

- **Water:** There will be an increased demand on potable water supply.

- **Air Quality and Climate**: The built services have an interaction with climate in the availability and use of non-greenhouse gas reliant power and heat sources. Emissions from a building CHP system may impact local air quality and climate in terms of increased emissions of greenhouse gases from development.

The potential significant impacts of built services have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.2.5 Land and Soils

During the construction phase, the following aspects would interact with land and soils and in the absence of mitigation may give rise to likely significant effects.

- **Land and Soils:** There is potential for impact on landscaping from the reuse of fill material and the appropriateness of available soils during the construction phase.
- **Water:** Site preparatory works (i.e. demolition, site clearance, basement excavation, etc.) during the construction stage have the potential to impact on the hydrology and hydrogeology due to the risk of suspended solids becoming entrained in surface water runoff and accidental spills etc.
- **Biodiversity:** Site preparatory works have the potential to cause impact on the biodiversity of the site, through removal and disturbance of habitats and species.
- **Cultural Heritage:** Site clearance works may impact on sub-surface archaeology.

During the operational phase, the following aspects would interact with land and soils and in the absence of mitigation may give rise to likely significant effects:

- **Land and Soils:** The basement structure will have the potential to impact on the sub-surface hydrogeology due to the introduction of the basement structure.

The potential significant impacts of land and soils have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.2.6 Water

During the construction phase, the following aspects would interact with water and hydrology and in the absence of mitigation may give rise to likely significant effects.

- **Material Assets: Built Services:** The construction of the proposed services (water supply, drainage, power, telecommunication, etc.) may affect the local hydrological and hydrogeological environment as there is a risk of suspended solids run off.
- **Land and Soils:** Site preparatory works (i.e. demolition, site clearance, basement excavation, etc.) during the construction stage have the potential to impact on the hydrology and hydrogeology due to the risk of suspended solids becoming entrained in surface water runoff and accidental spills etc.
- **Biodiversity:** Any negative impact on water quality may impact biodiversity.

During the operational phase the potential interactions are:

- **Material Assets: Built Services:** There will be an increased demand on potable water supply and on the municipal drainage system.

The potential significant impacts of water and hydrology have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.2.7 Biodiversity

During the construction phase, the following aspects would interact with biodiversity and in the absence of mitigation may give rise to likely significant effects:

- **Land and Soils:** Site preparatory works have the potential to cause impact on the biodiversity of the site, through removal and disturbance of habitats and species.
- **Water:** Any negative impact on water quality arising from accidental spillages etc. may impact biodiversity.

During the operational phase the potential interactions are:

- **Landscape and Visual**: They quality of the landscaping plan and appropriateness of the species may significantly impact biodiversity.

The potential significant impacts of biodiversity have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.2.8 Noise and Vibration

During the construction phase, the following aspects would interact with noise and vibration and in the absence of mitigation may give rise to likely significant effects:

- **Population and Human Health:** There is potential for impact on human health associated with noise and vibration generated during the construction phase.

- **Material Assets: Traffic and Transport:** Construction traffic may give rise to localised noise and vibration effects.

No potential operational interactions were identified.

The potential significant impacts of noise and vibration have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.2.9 Air Quality and Climate

During the construction phase, the following aspects would interact with air quality and climate and in the absence of mitigation may give rise to likely significant effects:

- **Population and Human Health:** There is potential for impact on human health from dust associated with construction activities.
- **Material Assets: Traffic and Transport:** Emissions from construction traffic may impact local air quality and climate in terms of increased emissions of greenhouse gases from vehicles.

During the operational phase the potential interactions are:

- **Population and Human Health:** There is potential for impact on human health from a deterioration in air quality associated with emissions from vehicles.
- **Material Assets: Traffic and Transport:** Emissions from traffic associated with future occupants may impact the local air quality and climate in terms of emissions of greenhouse gases from vehicles.
- **Material Assets: Built Services:** The built services have an interaction with climate in the availability and use of non-greenhouse gas reliant power and heat sources.

15.2.10 Cultural Heritage - Built Heritage Architectural and Archaeology

During the construction phase, the following aspects would interact with cultural heritage and in the absence of mitigation may give rise to likely significant effects.

- **Cultural Heritage**: Site clearance works may impact on the protected structures (ref. no. 130) on-site.
- **Cultural Heritage:** Site clearance and excavation works may impact on sub-surface archaeology.

No potential operational interactions were identified.

The potential significant impacts of cultural heritage have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

CHAPTER 16
SUMMARY OF MITIGATION MEASURES

OCTOBER 2019

Table of Contents

16 Summary of Proposed Mitigation Measures

A key objective of the Environmental Impact Assessment process is to identify likely significant environmental impacts at the pre-consent stage and where necessary to propose measures to mitigate or ameliorate such impacts. This chapter of the EIAR summarises the proposed mitigation measures set out in Chapters 4 to 14.

It is proposed that the appointed contractor will develop a site-specific Construction and Environmental Management Plan (CEMP) prior to works commencing on-site. All the mitigation measures proposed within the individual specialists' assessments will be incorporated into the plan.

16.1 Population and Human Health

16.1.1 Incorporated Design Mitigation

Well-designed residential units within the proposed development which allow year-round sunlight to penetrate, universal access, energy efficient measures and high-quality finishes and materials;

Incorporating attractive and functional public realm and landscaping treatments within the layout, including a paved plaza, seating areas;

Provision of extensive connections and permeability for pedestrians and cyclists throughout the development and between the adjoining street network; and

the inclusion of a comprehensive foul and surface water management system.

16.1.2 Construction Mitigation

O'Connor, Sutton, Cronin Consulting Engineers (OSCS) have prepared a Construction and Environmental Management Plan (CEMP), and a Construction & Demolition Waste Management Plan (CDWMP) under separate cover, to accompany the application for the proposed development. The CEMP and CDWMP will be further updated by the contractor and agreed with Dublin County Council prior to commencement of any construction (i.e. including demolition) works on site.

These plans will be updated by selected contractor, to incorporate any design changes from the planning process prior, to work commencing on site. The main purpose of a CDEMP is to provide a mechanism for implementation of the various mitigation measures which are described in this EIAR and contained within the CEMP and CDWMP that accompany this application under separate cover.

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

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

Adherence to the construction phase mitigation measures presented in this EIAR will ensure that the construction of the proposed development will have an imperceptible and neutral impact in terms of health and safety.

16.1.3 Operation Mitigation

None proposed.

16.2 Landscape & Visual

16.2.1 Incorporated Design Mitigation

The proposal involves the comprehensive redevelopment of a large, underutilised brownfield city centre site beside one of the city's main transport hubs. In its policy statement on building height, the DCDP (referencing the non-statutory document *Managing Intensification and Change: A Strategy for Dublin Building Height, 2000*) identifies the Connolly area - in which the subject site is the only available development opportunity – as suitable for high-rise (50m+) development.

The DCDP states:

> *''Clustering of taller buildings of the type needed to promote significant densities of commercial and residential space are likely to be achieved in a limited number of areas only. Taller buildings (over 50m) are acceptable at locations such as at major public transport hubs, and some SDRAs…*
>
> "*There are also a few areas where there are good transport links and sites of sufficient size to create their own character, such that a limited number of mid-rise (up to 50m) buildings will help provide a new urban identity.*
>
> "*taller buildings can also play an important visual role and can make a positive contribution to the skyline of a city. Dublin City Council recognises the merit of taller buildings, including landmark buildings, in a very limited number of locations at a scale appropriate for Dublin".*

The subject site can be considered one of the limited number of areas/sites in the city at which the above policies can be realised.

The DCDP policy for the Connolly area is also supported by the more recently published NPF and Building Height Guidelines, both of which encourage high density/taller development particularly at public transport hubs and on large, underutilised brownfield sites.

These policies have significant implications for the Connolly area and receiving environment. Implementation of the policy will inevitably result in very significant townscape and visual change, as it encourages a new development/design paradigm including new building typologies and scale, which will contrast with existing/previous development types.

Such change has been identified in the assessments in Section 5.7.3 (townscape impacts) and 5.8.3 (visual impacts) above. However, the effects have been assessed as positive since (a) they are supported by policy, and (b) the proposal exhibits understanding of and appropriate response to the sensitivities and opportunities presented by the townscape context. No further mitigation measures other than those incorporated in the design are proposed.

16.2.2 Construction Mitigation

None proposed.

16.2.3 Operation Mitigation

None proposed.

16.3 Material Assets: Traffic and Transport

16.3.1 Incorporated Design Mitigation

16.3.1.1 Car Parking

Given the highly accessible nature of the development site by all modes of public transport operating in Dublin including heavy rail, light rail, intercity and regional bus and Dublin Bus combined with the proximity to the major employment centres in Dublin City, it has been deemed appropriate to restrict the level of car parking provided at the site.

This is in accordance with the allowances set out in the Dublin City Council (DCC) Development Plan and the standards set out in the Guidelines for Planning Authorities, Design Standards for New Apartments. This strategy has been further developed through discussion with DCC Transportation Planners and the National Transport Authority who have identified the site as a candidate for zero parking provision.

On this basis, it is proposed to provide just 58 no. parking spaces for the Strategic Housing Development (SHD) development, all of which will be for use by an on-site car club only. This will ensure access to a vehicle for essential, infrequent trips is maintained while preventing commuting trips by car which are not feasible with a car club as use of vehicles is charged until it is returned to the original pickup location.

This measure will be supported by the implementation of a parking management plan which will include:

- Early and ongoing engagement with residents with respect to the availability of car parking;
- Strict control of access to car parking including on-site monitoring of car parking usage with associated control measures e.g. clamping.
- This overall parking strategy will ensure minimal car usage at the site which in turn considerable limits and potential associated impact.

16.3.1.2 Travel Plan

A development specific Travel Plan will be implemented at the site which sets out a series of measures to facilitate and encourage a positive modal shift towards more sustainable modes of transport. These measures will be refined based on travel surveys conducted at the occupied development but typically include:

- Appointment of a site Mobility Manager to oversee the implementation of the plan;
- Ongoing liaison with relative bodies including public transport providers such as Dublin Bus and Irish Rail;
- Providing ongoing information with respect to existing, amended and proposed public transport, cycle and pedestrian infrastructure and services;
- Providing information with respect to technological advances which improve the use of public transport such as apps and integrated ticketing systems;
- Developing new or advising of existing databases to facilitate and promote car sharing, walking groups, cycle groups etc.;
- Organising learning opportunities which promote travel by sustainable means such as bike repair tutorials;
- Advising of and providing information with respect to available initiatives such as tax saver tickets and the Cycle to Work scheme which may be of benefit to residents.

16.3.1.3 Cycle Parking

- To ensure travel by bicycle continues to be facilitated and encouraged, a total of 1,406 no. covered cycle parking spaces are to be provided for use by residents and visitors.
- The above measures will facilitate a considerable modal share towards more sustainable means of transportation including public transport, walking and cycling. This in turn will lead to a more active population at the development while also mitigating against increased emissions associated with travel by car.

16.3.2 Construction Mitigation

This stage of the development will be dealt with by the appointed contractor through the development and implementation of a *Construction & Environmental Management Plan*. This plan will be agreed with the Local Authority prior to the commencement of construction and will ultimately include details on the following

- Daily and weekly working hours;
- Agreed haul routes for incoming materials;
- Licensed hauliers to be used;
- Disposal sites, if necessary;
- Travel arrangements for construction personnel;
- Appropriate on-site parking arrangements for construction personnel to prevent overspill parking on the local road network;
- Temporary construction entrances to be provided;
- Wheel wash facilities if required;
- Road cleaning and sweeping measures to be put in place if required;
- Temporary construction signage to be put in place and maintained;

Any proposed traffic management measures such as temporary traffic lights and signage on any public roads.

16.3.3 Operation Mitigation

None proposed.

16.4 Material Assets: Built Services

16.4.1 Incorporated Design Mitigation

16.4.1.1 Surface Water Drainage

Surface water runoff from the proposed development will be managed in accordance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS), with surface water attenuation and retention included as part of the main surface water drainage system.

The surface water management proposals would reduce the overall impact of the subject site on the existing environment by adopting a SuDS approach by combining elements such as green roofs, blue roofs, bio-retention areas, pervious paving, attenuation storage and flow control within the proposed development.

16.4.1.2 Wastewater Drainage

The proposed wastewater drainage system is designed in accordance with:

- I.S. EN12056: 2000 *'Gravity Drainage Systems inside Buildings'*;
- I.S. EN752: 2017 *"Drain & Sewer Systems outside Buildings*"; and
- Irish Water's *'Code of Practice for Wastewater Infrastructure'* (IW-CDS-5030-03 Revision 1).

The proposed drainage system will therefore be designed with appropriate capacity for the development and ensure self-cleansing velocities are achieved to reduce the risk of blockages and odors.

16.4.1.3 Water Supply

The proposed watermain infrastructure is designed in accordance with:

- Irish Water's *'Code of Practice for Water Infrastructure'* (IW-CDS-5020-03 Revision 1).

The proposed system will therefore provide appropriate capacity for the development to minimize the risk of low service pressure.

16.4.1.4 Electricity Supply

All proposed power cables within the development will be underground or internal within buildings and will be installed according to ESB Networks specifications.

16.4.1.5 Gas Supply

All natural gas works will be designed and constructed in accordance with I.S. 820, I.S. 329, I.S. 265 and Bord Gais Networks "Industrial Commercial Guidelines for Designers/Builders".

16.4.1.6 Telecommunications

All proposed telecommunications cabling within the development will be underground or internal within buildings.

16.4.2 Construction Mitigation

16.4.2.1 Surface Water Drainage

The Contractor will be required to prepare and implement a Surface Water Management Plan that ensures avoidance and minimisation of effects. Surface water storage in excavations may be directed to on-site settlement ponds, where silt removal will be facilitated prior to discharge off site at a controlled rate. Periodic testing of the surface water discharge may also be undertaken.

If concrete mixing is carried out on site, the mixing plant will be sited in a designated area with an impervious surface.

To minimise any impact on the water environment from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas or chemical storage containers.

16.4.2.2 Wastewater Drainage

Any construction phase discharge to the wastewater sewerage infrastructure shall comply with the conditions of a Discharge Licence from Irish Water.

In order to reduce the risk of defective or leaking sewers, all new sewers will be pressure tested and CCTV surveyed to ascertain any possible defects. Such defects, if they arise, would be repaired prior to the connection of any future development to the sewers.

16.4.2.3 Water Supply

The watermains will be tested according to the requirements of Irish Water prior to commissioning.

16.4.2.4 Electricity Supply

The ESB will install all of the new incoming supplies to the proposed development. All electrical work will be carried out by authorised personnel who have the required expertise. ESB will also liaise with residents and keep customers fully informed of any brief outages which may be required.

Any construction phase site lighting or security installed by the contractor will be looking inwards to the compound and will not impact on neighbouring properties.

16.4.2.5 Gas Supply

Gas networks Ireland will carry out all works on the gas supply network in a controlled manner to avoid loss of service to existing customers. All work in the vicinity of the gas transmissions network will be completed in compliance with the Bord Gais Networks document *'Code of Practice 2011 – Working in the Vicinity of the Transmission Network'.*

16.4.2.6 Telecommunications

The relevant utility provider will install all of the new incoming supplies to the new development. All of the work will be carried out by authorised personnel who have expertise in the required works. This will minimise disruption to surrounding areas.

16.4.3 Operation Mitigation

16.4.3.1 Surface Water

Surface water runoff from the proposed development will be managed in accordance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS), with surface water attenuation and retention included as part of the main surface water drainage system.

The surface water management proposals will reduce the overall adverse effects of the subject site on the existing environment by adopting a SuDS approach by combining elements such as green roofs, blue roofs, bio-retention areas, pervious paving, attenuation storage and flow control.

The proposed drainage system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

16.4.3.2 Wastewater Drainage

The proposed wastewater drainage system is designed in accordance with

- I.S. EN12056: 2000 *'Gravity Drainage Systems inside Buildings'*,
- I.S. EN752: 2017 *"Drain & Sewer Systems outside Buildings*"; and
- Irish Water's *'Code of Practice for Wastewater Infrastructure'* (IW-CDS-5030-03 Revision 1).

The proposed drainage system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

16.4.3.3 Water Supply

The proposed watermain infrastructure is designed in accordance with:

- Irish Water's *'Code of Practice for Water Infrastructure'* (IW-CDS-5020-03 Revision 1).

The proposed water supply system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

16.4.3.4 Electricity Supply

All proposed power cables within the development will be underground or internal within buildings. The proposed electricity supply system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

16.4.3.5 Gas Supply

All natural gas works will be designed and constructed in accordance with I.S. 820, I.S. 329, I.S.

265 and Bord Gais Networks “Industrial Commercial Guidelines for Designers/Builders”. The proposed gas supply system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

16.4.3.6 Telecommunications

All proposed telecommunications cabling within the development will be underground or internal within buildings. The proposed telecommunications system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

16.5 Land & Soils

16.5.1 Incorporated Design Mitigation

In order to reduce the impact of the development on the lands and soils of the site, the proposed basement depths will be optimised in order to keep the excavations required to a minimum, and hence this will reduce the amount of soils to be exported off-site, reduce the amount of materials to be imported to the site, and a reduction in machinery operation time.

It is proposed that where soils are to be exported off-site, a local facility will be chosen where feasible, and hence reduce the carbon footprint associated with the transport and handling of the material.

16.5.2 Construction Mitigation

In order to reduce the impacts on the soils, geology and hydrogeological environment several mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

16.5.2.1 Control of Soil Excavation

Topsoil and subsoil will be excavated to facilitate the formation of basement levels, ramp access, construction of a new sewer and water mains connections, roadways and all other associated services. The project will incorporate the; reduce, reuse and recycle approach in terms of soil excavations on site. The construction will be carefully planned to ensure only material required to be excavated will be excavated with as much material left in situ as possible. All excavation arisings will be reused on site where possible/if suitable.

Soil stripping, earthworks and stockpiling of soil will be carried out during the works. Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated through the implementation of an appropriate earthworks handling protocol during construction.

It is anticipated that any stockpiles will be formed within the boundary of the excavation and there will be no direct link or pathway from this area to any surface water body. It is anticipated that only local/low level of stockpiling will occur as the bulk of the material will be excavated either straight into trucks for transport off site or will be reused in other areas of the site as fill.

Dust suppression measures (e.g. damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping will ensure that the surrounding environment are free of nuisance dust and dirt on roads.

16.5.2.2 Export of Material from the Site

Where material cannot be reused off site it will be sent for recovery/disposal at an appropriately permitted/licenced site. This will be discussed further in the Construction and Demolition Waste Management Plan.

Site investigations have established that there is contamination present onsite in the upper 6.5m of soils and the limited number of soil samples available for waste soil classification were determined to be suitable for disposable as Non-Hazardous material.

All material will be managed according to the applicable Waste Management Acts and subsequent regulations. Nonetheless material, which is exported from site, if not correctly managed or handled, could negatively impact human beings as well as water and soil environments.

Additional Soil Classification will be undertaken as part of the site development and control of any material will be carried out in accordance with the Waste Management Act and further details are included in the Construction Management Plan and the Construction and Demolition Waste Management Plan.

16.5.2.3 Sources of Fill and Aggregates

All fill and aggregate for the project will be sourced from reputable suppliers as per the project Contract and Procurement Procedures. All suppliers will be vetted for:

Aggregate compliance certificates/declarations of conformity for the classes of material specified for the project;

Environmental Management status; and

Regulatory and Legal Compliance status of the suppliers.

The use of fill and aggregate containing recycled or recovered materials shall be considered.

16.5.2.4 Fuel and Chemical Handling

The following mitigation measures will be taken at the construction site in order to prevent any spillages to ground of fuels and prevent any resulting soil and/or groundwater quality impacts:

- Designation of bunded refuelling areas on the site (if required);
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used the following measures will be taken: a) any flexible pipe, pump, tap, or valve will be fitted with a lock and will be secured when not in use; b) All bowser units to carry a spill kit and operatives must have spill response training; and c) Portable generators or similar static operation fuel containing equipment will be places on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during construction the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside concrete bunded areas;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site they should be done so secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

The aforementioned list of measures is non-exhaustive and will be included in the Construction Management Plan.

16.5.2.5 Construction Management Plan

In advance of work starting on site, the works Contractor will author a Construction Methodology document considering their approach and any additional requirements of the Design Team or Planning Regulator.

The Contractor will also prepare a Construction Management Plan and Environmental Plan. The Construction Management Plan sets out the overarching vision of how the construction of the project will be managed in a safe and organised manner by the Contractor with the oversight of the Developer.

The CMP is a living document and it will go through several iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures in the EIAR and any subsequent conditions relevant to the project.

16.5.2.6 Control of Water during Construction

Run-off from excavations/earthworks cannot be prevented entirely and is largely a function of the prevailing weather conditions. Earthwork operations will be carried out such that surfaces, as they are being raised, shall be designed with adequate drainage, falls and profile to control run-off and prevent ponding and flowing.

Care will be taken to ensure that exposed soil surfaces are stable in order to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts. All run-off will be prevented from directly entering any water courses.

During the basement construction, after the Made Ground has been dug, it is possible water ingress will occur when the dig progresses into the Gravel layer, a discharge licence will likely be required to enable discharge of water to sewer to keep the excavation dry.

Should any discharge of construction water be required during the construction phase, discharge to foul sewer will be regulated under a Discharge Licence obtained from the Regulator (Irish Water) issued under the *Water Pollution Act*. Attenuation, pre-treatment and monitoring of discharge water will likely be required under any *Discharge Licence (Section 16 Licence).*

Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, silt sacks and settlement tanks) and hydrocarbon interceptors. Active treatment systems such as Siltbusters or similar may be required depending on turbidity levels and discharge limits.

Qualitative and quantitative monitoring will be implemented as per the Conditions of any Discharge Licence. The client's environmental consultant will audit the sampling and analysis results as required to ensure conformance to the discharge licence limits and testing frequency requirements.

16.5.3 Operation Mitigation

During the operational phase of the Connolly Station development the basement has the potential to impact on the geological environment of the area, the impact of the basement is unavoidable.

The proposed scheme will have a combination of district and local heating systems, within the proposed development, all of which will be fuelled by mains gas. Therefore, there is no requirement for fuel oil storage thus removing any potential source.

16.6 Water and Hydrology

16.6.1 Incorporated Design Mitigation

16.6.1.1 Local Hydrology

Surface water runoff from the proposed development will be managed in accordance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS), with surface water attenuation and retention included as part of the main surface water drainage system.

The surface water management proposals would reduce the overall impact of the subject site on the existing environment by adopting a SuDS approach by combining elements such as green roofs, blue roofs, bio-retention areas, pervious paving, attenuation storage and flow control within the proposed development.

16.6.1.2 Wastewater Drainage

The proposed wastewater drainage system is designed in accordance with:

- I.S. EN12056: 2000 *'GRAVITY Drainage Systems inside Buildings';*
- I.S. EN752: 2017 *'Drain & Sewer Systems outside Buildings'; and*
- Irish Water's *'Code of Practice for Wastewater Infrastructure'* (IW-CDS-5030-03 Revision 1).

The proposed drainage system will therefore be designed with appropriate capacity for the development and ensure self-cleansing velocities are achieved to reduce the risk of blockages and odors.

16.6.2 Construction Mitigation

16.6.2.1 Local Hydrology

The Contractor will be required to prepare and implement a Surface Water Management Plan that ensures avoidance and minimisation of effects. Surface water storage in excavations may be directed to on-site settlement ponds, where silt removal will be facilitated prior to discharge off site at a controlled rate. Periodic testing of the surface water discharge may also be undertaken.

If concrete mixing is carried out on site, the mixing plant will be sited in a designated area with an impervious surface.

To minimise any impact on the water environment from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas or chemical storage containers.

16.6.2.2 Wastewater Drainage

Any construction phase discharge to the wastewater sewerage infrastructure shall comply with the conditions of a Discharge Licence from Irish Water. In order to reduce the risk of defective or leaking sewers, all new sewers will be pressure tested and CCTV surveyed to ascertain any possible defects. Such defects, if they arise, would be repaired prior to the connection of any future development to the sewers.

16.6.3 Operation Mitigation

16.6.3.1 Local Hydrology

Surface water runoff from the proposed development will be managed in accordance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS), with surface water attenuation and retention included as part of the main surface water drainage system.

The surface water management proposals will reduce the overall adverse effects of the subject site on the existing environment by adopting a SuDS approach by combining elements such as green roofs, blue roofs, bio-retention areas, pervious paving, attenuation storage and flow control.

The proposed drainage system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

16.6.3.2 Wastewater Drainage

The proposed wastewater drainage system is designed in accordance with

- I.S. EN12056: 2000 *'Gravity Drainage Systems inside Buildings'*, I.S. EN752: 2017 *"Drain & Sewer Systems outside Buildings*": and
- Irish Water's *'Code of Practice for Wastewater Infrastructure'* (IW-CDS-5030-03 Revision 1).

The proposed drainage system will be commissioned and subject to a regular operational inspection and maintenance regime to ensure the system keeps operating within the design specifications.

16.7 Biodiversity

16.7.1 Incorporated Design Mitigation

The following measures are taken from the bat survey report in relation to artificial lighting:

- "All luminaires used should lack UV/IR elements to reduce impact.
- LED luminaires should be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (<2700 Kelvins is recommended to reduce the blue light component of the LED spectrum).
- Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- The use of specialist bollard or low-level downward directional luminaires should be considered in bat sensitive areas to retain darkness above.
- Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.
- Only luminaires with an upward light ratio of 0% and with good optical control should be used.
- Luminaires should always be mounted on the horizontal, i.e. no upward tilt.
- Any external security lighting should be set on motion-sensors and short (1min) timers.
- As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.
-
- In relation to urban lighting, avoid lighting over reflective surfaces and, where possible, use timers
- to reduce lighting during hours of the night when it is not needed.
-
- For pedestrian lighting, use low level lighting that is as directional as possible and below three lux
- at ground level with an aim to having it below 1 lux at ground level.

The landscaping is taken from the bat survey report in relation to landscaping:

- Native hedgerow tree species
- Individual deciduous trees (in lines) that could potentially provide commuting corridors through the proposed development site
- Flower rich meadows, scrub and groups of trees
- Where possible, include water features connected to other green spaces
- Green roofs, communal wildlife friendly gardens and potentially living walls with climbing plants and creepers with a view of provide connected pockets of foraging habitat (linking in with other streetscape planting e.g. individual trees)

Avoid the use of chemicals (weed killers, etc.) within the development zone.

16.7.2 Construction Mitigation

If possible, the demolition of existing buildings should be completed outside the bird breeding season. Potential mitigation measures are to install netting on potential nesting spaces before the end of February to prevent any nesting occurring.

The existing buildings should be surveyed during the breeding season to determine their use by nesting birds during the year of construction. Depending upon the outcome of this survey, further mitigation may be required.

16.7.3 Operation Mitigation

None proposed.

16.8 Noise and Vibration

16.8.1 Incorporated Design Mitigation

None proposed.

16.8.2 Construction Mitigation

To the extent practicable, complete works during standard construction hours. Where practical, organise for deliveries to be made during standard construction hours and carry out loading and unloading away from sensitive receivers.

Using quieter construction methods where required and where considered reasonable and feasible. Avoid rock hammering; where possible by using other excavation methods such as jaw crushers and, if unavoidable, use the smallest practical excavator/backhoe and hammer. Use rubber wheeled in preference to steel tracked equipment. Make sure all diesel equipment is fitted with appropriate mufflers (e.g. residential grade). Where acceptable from an occupational health and safety perspective, using quieter alternatives to reversing alarms (such as spotters, closed circuit television monitors and 'smart' reversing alarms).

Switch off equipment when not in use (including during breaks and down times of more than 30 minutes).

Where reasonable and feasible, locate haulage routes as far away as possible from residential receivers. Truck movements will be restricted to identified haulage routes.

Where possible, avoid using noisy plant simultaneously or close together to avoid cumulative noise impacts.

Orientate equipment and excavation work sites where possible to reduce noise emissions to sensitive receivers.

Maintain equipment in efficient working order.

Establish a noise complaint handling procedure and respond quickly to resolve any complaints in accordance with Dublin City Council established policy.

16.8.3 Operation Mitigation

Based on a typical 15 dB reduction for an open window and the worst case external ambient sound levels measured on site, internal sound pressure levels for any future occupants of this development are expected to be in the region of 50 dB $L_{Aeq,16hr}$ during the day and 43 dB $L_{Aeq,8hr}$ at night,

Typical double glazing 6/6/6mm provides 31dB Rw (BS EN 12354–3:2000 Building Acoustics. Estimation of acoustic performance in buildings form the performance of elements. Airborne sound insulation against outdoor noise), which provides in excess of the required acoustic performance to meet the BS8233 internal noise levels recommended criteria, day and night.

To ensure that windows do not have to be opened for prolonged periods, it is proposed to also incorporate an acoustic ventilation system into the proposed dwellings closest to the proposed link road and existing roads with an equivalent sound reduction index to the glazing of 31 dB Rw.

16.9 Air Quality and Climate

16.9.1 Incorporated Design Mitigation

None proposed.

16.9.2 Construction Mitigation

16.9.2.1 Communications

Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.

Display the head or regional office contact information.

16.9.2.2 Dust Management

Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.

Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. Make the complaints log available to the local authority when asked.

Record any exception incidents that cause dust and/or air emissions, either on or off site, and the actions taken to resolve the situation in the logbook.

Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within the 100m of the site boundary.

Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and inspect log available to the local authority when asked.

Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.

Erect solid screens or barriers around dusty activities or the site boundary that are least as high as any stockpiles on site. Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.

Avoid site runoff of water or mud Keep site fencing, barriers and scaffolding clean using wet methods.

Cover, seed of fence stockpiles to prevent wind whipping. Ensure all vehicles switch off engines when stationary, no idling vehicles.

Only use cutting, grinding, or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction.

Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.

Use enclosed conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet methods. Avoid bonfires and burning of waste materials.

16.9.2.3 Demolition

Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). Ensure effective water suppression is used during demolition operations.

Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground. Avoid explosive blasting, using appropriate manual or mechanical alternatives.

With regards to Earthworks, re-vegetate earthworks are exposed areas/soil stockpiles to stabilise surface as soon as practicable.

16.9.2.4 Construction

Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a process, in which case ensure that appropriate additional control measures are in place.

Ensure bulk cement and other dine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling to prevent dust.

For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

16.9.2.5 Trackout

Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. Avoid dry sweeping of large areas.

Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.

Implement wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

Ensure there is an adequate area of hard surfaced road between the wheel wash facility and site exit, where the site size and layout permits. Access gates to be located at least 10m from receptors where possible.

16.9.3 Operation Mitigation

None proposed.

16.10 Cultural Heritage: Archaeology

16.10.1 Incorporated Design Mitigation

None proposed.

16.10.2 Construction Mitigation

All excavation associated with the construction of the basements that will form part of the proposed development will be subject to archaeological monitoring. This will ensure the identification of any archaeological features that may be present, which may be associated with the former estuarine area.

This will be carried out by a suitably qualified archaeologist. Full provision will be made available for the resolution of any archaeological deposits or features that may be identified, should that be deemed the most appropriate way to proceed.

Following the removal of modern infill within the area of proposed development (down to the post-medieval levels) all ground disturbances carried out in vicinity to the workshop (c. 1860), saw mill (c. 1870) and goods shed (c. 1880) will be subject to archaeological monitoring. This will ensure the identification of such features.

The excavation of the post-medieval reclamation deposits will be subject to archaeological monitoring. This will include inspection of the deposits in order to allow for the retrieval of any archaeological artefacts that might be present. Monitoring will be carried out by a suitably qualified archaeologist and based on a specified programme of finds retrieval.

If any features of archaeological potential are discovered during the monitoring of construction works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the National Monuments Service of the DoCHG and Dublin City Archaeologist.

16.10.3 Operation Mitigation

None proposed.

16.11 Cultural Heritage: Architectural

16.11.1 Incorporated Design Mitigation

Potential negative impacts on the building fabric and integrity of the built heritage arising from the proposed development can be minimised during the construction phase and operational phase by adherence to best practice and to the Architectural Heritage Protection Guidelines and the Advice Series issued by the Department of Arts Heritage and the Gaeltacht.

The key mitigation measures are:

- Promoting minimum intervention.
- Using appropriate materials and methods.
- Implement a regular maintenance programme.
- Complying with the Building Regulations.

The physical interventions to the protected structures will be advanced with design and specifications to a detailed level to indicate all interventions to the historic building fabric including interface with the new building and any structural intervention required.

16.11.2 Construction Mitigation

Protection measures are required to avoid any damage. The boundary wall of the site will experience potential impacts and regardless of the significance or the extent of these impacts the existing structures will be recorded to Level 3 inventory standard prior to the commencement of construction works.

This will include full measured, written, drawn and photographic surveys of all buildings and features of interest identified as part of the 19th century heritage. Works intended to be carried out to the protected structures are to be preceded by detailed assessment and recording of historic materials and construction methods. Copies of all documentation will be provided to the Railway Archives and the Irish Architectural Archives.

Analysis and testing of materials and methods will also be undertaken in advance of works commencing.

Structural analysis and condition surveys have been undertaken on protected structures within the site. By this means potentially negative impacts will be minimised, while positive impacts such as the conservation of historic building fabric will be implemented. Protection and temporary works will be provided for the protected structures throughout the construction period to prevent and damage or loss of historic fabric.

As a result of dismantling sections of the boundary wall for the provision of entrances a quantity of 19th century durable Calp limestone blocks will become available. It is proposed to reuse the stone elsewhere within the scheme in accordance with the salvage strategy prepared for the elements of heritage interest and to carry out repairs to the walls, works to protected structures and to integrate within landscape proposals.

The use of specialist contractors with relevant experience, skill and qualifications will be employed to carry out conservation works to protected structures.

Where the infilled material adjacent to the boundary wall is to be excavated, in the event of necessary amendments of the proposed works to protected structure that cannot be anticipated at this stage or any works that alter the character of the protected structure will require a further planning application or Section 5 Declaration.

16.11.3 Operation Mitigation

The architectural treatment and detailing of the new buildings were designed to reflect the robust, industrial character of the industrial heritage and historic railway architecture. High quality materials specified to be used in connection with the protected structures are intended to provide immediate and long-term resilience and enhanced visual appearance.

The implementation of this scheme will significantly enhance public access, physically and intellectually, to a historic industrial landscape. Public access within the proposed development demonstrates a commitment to integrate heritage with the city.

The massing of the buildings has been considered and designed to minimise the visual impact on the setting of significant buildings in the vicinity of the site, sensitive views and vistas of the 18th century city and Estates and the adjacent residential conservation areas north and east of the site.

The incorporation of boundary wall within the building Block D will not affect the integrity of the historic fabric. The design of modern intervention to the protected structure is detailed to a high standard in a contemporary idiom and will be clearly legible against the conserved historic fabric.

A salvage strategy to ensure the retention, storage and reuse on site of heritage elements removed during the construction phase has been devised to be implemented during the works.

Provision of a regular maintenance programme will be introduced to ensure ongoing maintenance and care of protected structures on site.