Ruirside Developments Limited
Environmental Impact Assessment Report | January 2020

42A Parkgate Street, Dublin 8

Volume 2:
Environmental Impact Assessment Report

265381-00

ARUP

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Glossary

AA	Appropriate Assessment
AADT	Annual Average Daily Traffic
ACA	Architectural Conservation area
ACM	Asbestos Containing Material
ADF	Average Daylight Factors
Ambient noise	The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.
Archaeology	The scientific study of past societies through the physical material and environmental remains they leave behind. It investigates their houses, settlements and tombs and everyday implements. It seeks to understand the landscape, vegetation and climate of previous times as they affected, and were affected by, past peoples.
Archaeological Excavation	The scientific process of systematically digging up, recording, and removing artefacts and other features from an archaeological site in order to analyse and predict past human behaviour.
Archaeological Monitoring	Involves ‘an archaeologist being present in the course of the carrying-out of the development works (which may include conservation works), so as to identify and protect archaeological deposits, features or objects which may be uncovered or otherwise affected by the works’ (DAHGI 1999a, 28).
Archaeological Test Excavation	'Test excavation is that form of archaeological excavation where the purpose is to establish the nature and extent of archaeological deposits and features present in a location which it is proposed to develop (though not normally to fully investigate those deposits or features) and allow an assessment to be made of the archaeological impact of the proposed development. It may also be referred to as archaeological testing'. Test trenching usually involves ‘the excavation of long narrow slit trenches to achieve a cross-sectional transect or group of transects across a site in which archaeological features and deposits may be noted. (DAHGI 1999a, 27).
Architectural Heritage	Structures and buildings which are of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest.
Argillaceous	Rocks containing clay minerals
Artefact	A portable object manufactured, modified, or used by humans
Assessment area	Geographical area considered in the environmental assessment for a given topic.
AQS	Air Quality Standards
Background noise	The steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T ($L_{AF90,T}$).
Baseline	Refers to existing conditions as represented by latest available survey and other data.
Bioclastic	Rocks derived from shell fragments or similar organic remains
BRE	Building Research Establishment

Bronze Age	A period of prehistory when metal-working was first introduced to Ireland, c. 2500 - 500BC.
BS	British Standards
BTR	Build to Rent
C&D	Construction and Demolition
C&DWMP	Construction and Demolition Waste Management Plan
CCTV	Closed-Circuit Television
CEMP	Construction Environmental Management Plan – A document which outlines how a construction project will avoid, minimize or mitigate effects on the environment and the surrounding area.
CFA	Continuous Flight Auger
CFD	Computational Fluid Dynamics
CFRAM	Catchment Flood Risk Assessment and Management
CGI	Computer Generated Imagery
CHC	Cultural Heritage Count
CHO	Community Healthcare Organisation
CHP	Combined Heat and Power
CIE	Commission of Illumination
CIF	Construction Industry Federation
CIRIA	Construction Industry Research and Information Association – A research and information organisation who publish reports and technical papers covering building and civil engineering as well as transport and utilities infrastructure.
Cist	A rectangular or polygonal structure used for burial purposes, constructed from stone slabs set on edge and covered by one or more horizontal slabs or capstones. Cists may be built on the surface or sunk into the ground or set within a cemetery cairn or cemetery mound. They date to the Bronze/Iron Ages (c. 2400 BC - AD 400).
CO2e	Carbon Dioxide Equivalent
COMAH	Control of Major Accidents Hazards involving Dangerous Substances
COR	Certificate of Registration
CORINE	Co-Ordinated Information on the Environment
CSO	Central Statistics Office
CTMP	Construction Traffic Management Plan
Cultural Heritage	Cultural heritage is a broad and open term which has now come to include a wide range of tangible and intangible cultural considerations that are linked to and bound up in cultural memory and associations, belief, traditions, past knowledge, traditional and arcane practices, craft and building skills, and oral tradition of local populations. It encompasses aspects of archaeology, architecture, history, landscape and garden design, folklore and tradition and topography. Cultural heritage is expressed in the physical landscape in numerous often interrelated ways.
Cultural Landscapes	Emphasizes the interrelationship of people and the natural environment and conveys information about the processes and activities that have shaped the landscape and its living communities. Cultural heritage landscapes may be organically evolved landscapes as opposed to designed landscapes.

	Some are ‘continuing landscapes’ which maintain the historic use and continue to evolve while other are ’relict landscapes’ where the evolutionary process has come to an end but within which important landscape features or built heritage resources survive from its historic use and are still visible.(Cultural heritage resources report – Built heritage & cultural heritage landscapes environmental assessment report, Unterman McPhail Associates Heritage Resource Management Consultants, Toronto, Ontario Canada. September 2008).
CWMP	Construction Waste Management Plan
CYPSC	Children and Young People’s Services Committees
DAC	Disability Access Certificates
DART	Dublin Area Rapid Transit
dB	Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro-pascals (20 μPa).
dB(A)	An ‘A-weighted decibel’ - a measure of the overall noise level of sound across the audible frequency range (20 Hz – 20 kHz) with A-frequency weighting (i.e. ‘A’–weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
DCC	Dublin City Council
DEAP	Dwelling Energy Assessment Procedure
DES	Department of Education and Skills
Desk Study	The survey and analysis of published and other existing information relating to an area, site or structure.
DEWG	Duffy Ely Giffone Worthington
DLRCC	Dún Laoghaire-Rathdown County Council
DMR	Dry Mixed Recyclables
DMRB	Design Manual for Roads and Bridges
DoCCAE	Department of Communications, Climate Action and Environment
DoECLG	Department of Environment, Communities and Local Government
DoEHLG	Department of Environment, Heritage and Local Government
DoELG	Department of Environment and Local Government
DoHPLG	Department of Housing, Planning and Local Government
Down Survey	Taken in the years 1656 - 1658, the Down Survey of Ireland is the first ever detailed land survey on a national scale anywhere in the world. The survey sought to measure all the land to be forfeited by the Catholic Irish in order to facilitate its redistribution to Merchant Adventurers and English soldiers. Copies of these maps have survived in dozens of libraries and archives throughout Ireland and Britain, as well as in the National Library of France.
Eastern CFRAM	Eastern Catchment Flood Risk Assessment and Management Study –The CFRAM study was commissioned by the Office of Public Works (OPW) in 2011 and was completed by the end of 2016. The CFRAM study is the principle vehicle for meeting the requirements of the EU Floods Directive and is in line with current National Flood Policy.
EC	European Commission
ED	Electoral Division

EEA	European Economic Area
EEC	European Economic Community
EIA	Environmental Impact Assessment
EIA Directive	Council Directive 2014/52/EU on the assessment of certain public and private projects on the environment.
EIAR	Environmental Impact Assessment Report
EMR	Eastern-Midlands Region
EPA	Environmental Protection Agency
ERBDA	Eastern River Basin District Area – An area defined under the ERBD River Basin Management Plan 2009 - 2015.
ESB	Electricity Supply Board
ESBN	Electricity Supply Board Network
ETS	Emissions Trading Scheme
EU	European Union
FDA	Framework Development Area
Filter Drain	Filter drains are shallow trenches filled with stone/gravel that create temporary subsurface storage for the attenuation, conveyance and filtration of surface water runoff.
Filter Strip	Filter strips are uniformly graded and gently sloping strips of grass or other dense vegetation that are designed to treat runoff from adjacent impermeable areas by promoting sedimentation, filtration and infiltration.
Fluvial	Relating to a river, i.e. fluvial flow is the flow of freshwater
Food Vessel	Food Vessels are an Early Bronze Age, c. 2400 - 1500 BC, pottery type commonly associated with cremation burials. It is not known what food vessels were used for and they only received their name as antiquarians decided they were not beakers (regarded as drinking-vessels) and so it provided a good contrast.
Foundry	A workshop or factory for casting metal.
FRA	Flood Risk Assessment – can be undertaken at any scale from the national down to the individual site and comprises 3 stages: Flood risk identification, initial flood risk assessment and detailed flood risk assessment.
g	Gram
GDA	Greater Dublin Area
Geomorphology	the study of the physical features of the surface of the earth and their relation to its geological structures.
GHG	Greenhouse Gas
GI	Ground Investigation, see SI, site investigation
GIS	Geographical Information Systems
Green Roof	Green roofs are areas of living vegetation, installed on the top of buildings, for a range of reasons including visual benefit, ecological value, enhanced building performance and the reduction of surface water runoff.
GMIT	Galway-Mayo Institute of Technology
GoI	Government of Ireland

GTI	Global Terrorism Index
h or hr	Hour
ha	Hectares
HA10	Hydrometric Area 10 – An area within the Eastern River Basin District Area (ERBDA) as defined under the ERBD River Basin Management Plan 2009 - 2015.
Hertz (Hz)	The unit of sound frequency in cycles per second.
HGV	Heavy Goods Vehicle
HRB	Health Research Board
HSA	Health and Safety Authority
HSE	Health Service Executive
Hydraulic Model	A hydraulic model is a mathematical model of a water/sewer/storm system and is used to analyse the system's hydraulic behaviour.
Hydrogeology	The study of water below the ground surface and geological aspects of surface water.
Hydrological Regime	Hydrological regime refers to variations in the state and characteristics of a water body which are regularly repeated in time and space and which pass through phases, e.g. seasonal.
ICE	Institute of Civil Engineers
IEMA	Institute of Environmental Management and Assessment
IFI	Inland Fisheries Ireland
IPI	Irish Planning Institute
ISM	Independent Site Management
ISO	International Standards Organisation
IT	Information Technology
IW	Irish Water
Justification Test	An assessment of whether a development proposal within an area at risk of flooding meets specific criteria for proper planning and sustainable development and demonstrates that it will not be subject to unacceptable risk nor increase flood risk elsewhere. The justification test should be applied only where development is within flood risk areas that would be defined as inappropriate under the screening test of the sequential risk-based approach adopted by this guidance.
k	Kilo
Karst	An area of high rainfall characterised by dissolution features due to the soluble nature of the bedrock (e.g. limestone).
KDC	Key District Centres
$L_{Aeq,T}$	This is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period (T). The closer the L_{Aeq} value is to either the L_{AF10} or L_{AF90} value indicates the relative impact of the intermittent sources and their contribution. The relative spread between the values determines the impact of intermittent sources such as traffic on the background.
L_{AFN}	The A-weighted noise level exceeded for N% of the sampling interval. Measured using the “Fast” time weighting.

L_{AF90}	Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval; it is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to estimate a background level. Measured using the "Fast" time weighting.
L_{AF10}	Refers to those A-weighted noise levels in the upper 10 percentile of the sampling interval; it is the level which is exceeded for 10% of the measurement period. It is typically representative of traffic noise levels. Measured using the "Fast" time weighting.
L_{AFmax}	Refers to the instantaneous fast time weighted maximum sound level measured during the sample period.
Lidar	A remote sensing technology that measures distance by illuminating a target with a laser and analysing the reflected light.
Linkardstown burial	A circular mound covering a central large cist or chamber which contains an inhumed burial/burials, of usually one or two males, with distinctive decorated pottery. Radiocarbon dates for these burials centre around 3500 BC.
LVIA	Landscape & Visual Impact Assessment
m	Metre
M	Mega
m^2	Square metre
m^3	Cubic metre
MASP	Metropolitan Area Strategic Plan
mBGL	Metres below ground level
Megalithic structure (present location)	A construction of large stones of a 'megalithic' nature which, though comparable in certain respects with megalithic tombs, cannot be classified as any other known archaeological monument type on present evidence. In this case the megalithic structure has been moved from its original location. These may date from the prehistoric period onwards.
Mitigation	This is defined as measures which avoid or reduce environmental effects which are not included in the design of the proposed development or otherwise included 'up front' in the scheme description (such as the CoCP).
mm	Millimetre
MMP	Mobility Management Plan
MNR	Mixed Non-Recyclables
mOD	Metres Above Ordnance Datum
MRIAI	Royal Institute of the Architects of Ireland Membership
National Inventory of Architectural Heritage (NIAH)	The National Inventory of Architectural Heritage (NIAH) is a unit within the Heritage and Planning Division of the DAHG. It was placed on a statutory footing by the Architectural Heritage (National Inventory) and Historic Monuments Act 1999. The NIAH's role is to identify record and evaluate the post-1700 architectural heritage of Ireland. It aims to promote the appreciation of, and contributes to the protection of, the built heritage by systematically recording a representative sample of that built heritage on a nationwide basis. The surveys provide the basis for the recommendations of the Minister to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS).

National Monuments (NM)	The term 'national monument' as defined in Section 2 of the National Monuments Act (1930) means a monument *'the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto…'* National monuments in State care include those which are in the ownership or guardianship of the Minister for Arts, Heritage and the Gaeltacht. Section 5 of the National Monuments Act (1930) allows owners of other national monuments to appoint the Minister for the Arts, Heritage and the Gaeltacht or the relevant local authority as guardian of such monuments, subject to their consent. This means in effect that while the property of such a monument remains vested in the owner, its maintenance and upkeep are the responsibility of the State.
NCDWC	National Construction and Demolition Waste Council
NDP	National Development Plan
NE	Northeast
NEEAP	National Energy Efficiency Action Plan
Neolithic	A period of prehistory between c. 4000 - 2500BC.
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
Non-Renewable Resource	A resource that cannot be replaced.
Norse Settlement	An area of settlement initiated by or under the control of Vikings. 'Norse' is commonly used as another general descriptive term for Viking, but technically refers to those Vikings from Norway.
NPF	National Planning Framework
NPSDD	National Physical and Sensory Disability Database
NPWS	National Parks and Wildlife Service
NTS	Non-Technical Summary
NREAP	National Renewable Energy Action Plan
NRA	National Roads Authority, currently known as TII
NW	Northwest
NZEB	Nearly Zero Energy Building
Octave Band	A frequency interval, the upper limit of which is twice that of the lower limit. For example, the 1,000Hz octave band contains acoustical energy between 707Hz and 1,414Hz. The centre frequencies used for the designation of octave bands are defined in ISO and ANSI standards.
OD	Ordnance Datum
OPW	Office of Public Works – is an Irish Government agency whose primary function is to support the implementation of Government policy and advise the Minister for Public Expenditure and Reform and the Minister of State at that Department, principally in the disciplines of property (including heritage properties) and flood risk management.
OS	Ordnance Survey
OSI	Ordnance Survey Ireland

OWMP	Operational Waste Management Plan
PFRA	Preliminary Flood Risk Assessment – A high level flood risk assessment completed as part of the CFRAM's study.
Pit-burial	A pit-burial can vary from an oval or subrectangular pit large enough to accommodate a crouched inhumation to a small circular pit with only space for a deposit of cremated bone or a cinerary urn. They date to the Bronze (c. 2400 - 500 BC) and Iron Ages (c. 500 BC - AD 400).
Pleasure Gardens	The pleasure garden forms one of the six parts of the 18th century "perfect garden", the others being the kitchen garden, an orchard, a park, an orangery or greenhouse, and a menagerie. It is used to describe (in a historic context) public gardens used for recreation and entertainment, but also smaller (private) gardens where visitors could drink tea and stroll.
Pluvial Flooding	Usually associated with convective summer thunderstorms or high intensity rainfall cells within longer duration events, pluvial flooding is a result of rainfall-generated overland flows which arise before run-off enters any watercourse or sewer. The intensity of rainfall can be such that the run-off totally overwhelms surface water and underground drainage systems.
PM	Particulate Matter
pNHA	Proposed Natural Heritage Area – An area identified by the NPWS on a non-statutory basis as sites of significance for wildlife and habitats.
PPV	Peak Particle Velocity – is defined as the instantaneous maximum velocity reached by a vibrating element as it oscillates about its rest position and is measured in mm/s.
Preservation In-Situ	Preservation in-situ is the actual physical preservation of archaeological sites and monuments, including archaeological deposits, features and structures. There should always be a presumption in favour of avoiding developmental impacts on the archaeological heritage. 'Preservation in-situ must always be the first option to be considered rather than preservation by record in order to allow development to proceed and, preservation in-situ must also be presumed to be the preferred option.' (Framework and Principles for the Protection of the Archaeological Heritage, 1999).
Protected Structures	A protected structure is a structure that is considered to be of 'special interest', which is broadly defined by the Planning and Development Act, 2000 as structures of architectural, historical, archaeological, artistic, cultural, scientific, social or technical point of interest. The 2000 Act requires each planning authority to compile and maintain a Record of Protected Structures (RPS).
PSDP	Project Supervisor Design Process
PV	Photovoltaic
R_w	Weighted Sound Reduction Index – This is the value of the sound insulation performance of a partition or element measured under laboratory conditions. It is a weighted single figure index that is derived from values of sound insulation across a defined frequency spectrum. Technical literature typically presents sound insulation data in terms of the R_w parameter.
R'_w	Weighted Apparent Sound Reduction Index – This is similar to R_w but is used to express *in-situ* sound insulation performance, where issues such as flanking issue noise transfer may affect the measured level. As stated previously, technical literature typically uses the R_w parameter.

	In order to reflect the likely *in-situ* performance of an element an appropriate correction should be applied for the expected reduction in performance. Note that in instances where significant flanking issues are present the *in-situ* performance may be further reduced.
Rain Garden	A shallow planted depression that allows runoff to pond temporarily on the surface, before filtering through vegetation and underlying soils prior to collection or infiltration.
RIBA	Royal Institute of British Architects
RBMP	River Basin Management Plan – As required by the EU Water Framework Directive (2000/60/EC), these plans will establish a strategic plan for the long-term management of the River Basin District, set out objectives for waterbodies, and in broad terms identify what measures are planned to meet these objectives, and act as the main reporting mechanism to the European Commission.
Receptor	Something that could be adversely affected by the proposed development, such as people, an ecological system, property, water body or social infrastructure.
RMP	Record of Monuments and Places – The Record of Monument and Places (RMP) is a statutory list of all known archaeological monuments provided for in the National Monuments Acts. There are over 120,000 Recorded Monuments included in the RMP. The RMP consists of a published county-by-county set of Ordnance Survey maps on which monuments are marked by a circle and an accompanying book which specifies the type of monuments.
RPA	Railway Procurement Agency, currently known as TII
RPS	Record of Protected Structures – The RPS is a mechanism for the statutory protection of the architectural heritage and is listed in every County Development Plan and Town Development Plan.
RQD	Rock Quality Description
RSES	Regional Spatial and Economic Strategy
s	second
SAC	Special Areas of Conservation - (including candidate SACs) protected under the provisions of the Habitats Directive.
SAPS	Small Area Population Statistics
SDCC	South Dublin County Council
SDRA	Strategic Development and Regeneration Area
SE	Southeast
SFRA	Strategic Flood Risk Assessment – an area-wide assessment of all types of significant flood risk to inform strategic land use planning decisions. Normally produced by Local Authorities as part of County Development Plans.
SHD	Strategic Housing Development
SI	Site Investigation
SI	Statutory Instrument
Site	The entire area within the planning boundary for the proposed development.
Site Inspection/Survey	A visual inspection of a survey area to identify and locate any archaeological sites and monuments that survives as upstanding earthworks or historic structures.

	The survey gathers information to establish the extent, nature, character, condition, quality and date of the surviving archaeological, historical and cultural heritage features within the survey area (as far as is possible). It assists in establishing the functional relationships between any identified archaeological and historical features and the impact of development upon it. It also provides information for appropriate further work to mitigate any potential impact.
Site Walkover	A site walkover is a visual survey of the project site carried out by a competent person to establish if there are any obvious indications of likely issues which may impact on the design and construction of a project. These are usually carried out as part of the desk study for the site.
SLA	Stephen Little and Associates
SO_x	Sulphur Oxides
SPA	Special Protection Area - (including proposed SPAs) protected under the provisions of the Birds Directive.
SPPR	Specific Planning Policy Requirement
Spring tide	The exceptionally high and low tides that occur at the time of the new moon or full moon when the sun, moon and earth are approximately aligned.
Sqm	Square metre (m^2)
SuDS	Sustainable Urban Drainage Systems – Drainage systems that are considered to be environmentally beneficial causing minimal or no long term detrimental impact.
SW	Southwest
TII	Transport Infrastructure Ireland
Topography	detailed mapping or charting of the features of a relatively small area, district, or locality. Within this report it refers to the elevation of the land relative to sea level.
UCD	University College Dublin
uPVC	Unplasticised Polyvinyl Chloride
US/ USA	United States/United States of America
V	Volt
W	Watt
Water Butt	Small-scale garden water storage device that collects rainwater from the roof via the drainpipe.
WEEE	Waste Electrical and Electronic Equipment
WGM	Waste Generation Model
WHO	World Health Organisation
WSA	Waste Storage Areas
WFD	Water Framework Directive – Council Directive 2000/60/EC establishing a framework for Community action in the field of water policy.
WWTP	Waste Water Treatment Plant
µ	Micro

1 Introduction and Need for the Development

1.1 Introduction

Ruirside Developments Ltd. intend to apply for permission to develop apartments, commercial office, retail and café/restaurant floorspace at the existing Hickey's site, 42A Parkgate Street, Dublin 8 (hereafter referred to as 'the proposed development').

The proposed development, as described in detail in **Chapter 3**, Description of the Proposed Development, will facilitate the much-needed regeneration of a currently underutilised, brownfield site, and will provide modern residential accommodation in a city centre location.

As the development provides for more than 100 no. residential units and those units are proposed on land zoned for mixed-use development, including residential, the proposal is deemed to be a Strategic Housing Development (SHD), under the provisions of the *Planning and Development (Housing) and Residential Tenancies Act 2016*[1] and the *Planning and Development (Strategic Housing Development) Regulations 2017*[2].

Arup has been commissioned by Ruirside Developments Limited to prepare an Environmental Impact Assessment Report (EIAR) for the proposed development, to accompany the consent application which will be submitted to An Bord Pleanála, as the competent planning authority, in relation to SHD applications. Refer to **Section 1.8** and **1.9** for information on the planning process and approach to EIA (including the legal basis for the decision to submit and EIAR).

The EIA Directive of 1985 has been amended three times by Council Directives 97/11/EC, 2003/35/EC and 2009/31/EC. It was ultimately codified and repealed by Council Directive 2011/92/EU on 13 December 2011. Directive 2011/92/EU has now been amended in 2014 by Directive 2014/52/EU. The Directive of 2011, as amended by the Directive of 2014 will be referred to herein as "***the EIA Directive.***"

This EIAR has therefore been prepared in accordance with *Directive 2014/52/EU*[3].

[1] GoI, 2016. *Planning and Development (Housing) and Residential Tenancies Act 2016.* Stationery office, Dublin.
[2] GoI, 2017. *Planning and Development (Strategic Housing Development) Regulations 2017.* Stationery office, Dublin.
[3] Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

The EIAR has also been prepared in accordance with the *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (published in August 2018)*[4] and the *2017 Draft EIA Guidelines published by the EPA*[5] *(August 2017)*.

The EIA Directive is implemented in Ireland under the *Planning and Development Act 2000*, as amended (hereinafter "***the PDA 2000***") and the Planning and Development Regulations 2001, as amended ("***the Regulations***"). Significant amendments to the legislative requirements for EIA were introduced by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.[6]

1.2 Overview of the Proposed Development

The proposed development is a mixed use residential and commercial scheme comprising Build to Rent (BTR) residential units with associated residential amenities and facilities, commercial office and café/ restaurant floor space. A new public square is provided, along with a public internal riverside walk and private amenity courtyard.

The proposed development comprises some 481 No. residential units with 3698 sqm commercial office space, 214 sqm retail and 444 sqm café/ restaurant space. The residential units are served by amenity and management areas including a reception area, a post room, a quiet room, gym, business suites, lounge and TV rooms and other bookable rooms for cultural and amenity use. In addition to the above amenity facilities are miscellaneous support facilities including sub/switch room, waste management areas, electric meters, administrative areas and cycle parking areas. At basement level further bicycle parking is provided, as well as car parking.

At ground floor level the proposed development will largely consist of retail, café/ restaurant and resident's amenity/ancillary facilities which will serve to activate the street level and new open spaces.

The development will be characterised by a landmark 29 storey tower on the eastern corner of the site. A detailed description of the proposed development is included in **Chapter 3**, Description of the Proposed Development of this EIAR.

[4] DHPLG, 2018. *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.* Stationery office, Dublin
[5] EPA, 2017. *Guidelines on The Information To Be Contained In Environmental Impact Assessment Reports*. Dublin, Ireland.
[6] EU (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018)

1.3 Need for the Proposed Development

According to the *Dublin City Development Plan 2016 - 2022*[7], the population of Dublin city is projected to increase by approximately 8,434 people per year, over the plan period (until 2022). To accommodate this population growth, an additional 4,215 estimated housing units needs to be delivered per year, in Dublin.

The *Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region*[8], identifies the need for accelerated delivery of housing in Dublin, to ensure the development of high quality and affordable homes located within sustainable communities in order to meet the existing and future needs of a growing population.

Similarly, the *Dublin City Housing Strategy (2016 - 2022)*[9], details the pressing need to ensure a speedy, effective and sustainable step-up in future housing supply to catch-up with the overheating segments of Dublin's housing market and thereby reduce price inflation in owner occupied and rental housing tenures. Additionally, the scale of unmet housing needs has grown over the period of the previous city development plan and requires an increase in social housing output for rental.

The *Dublin City Council 2018 Housing Strategy Review*[10] concludes that Dublin's near future housing supply remains inadequate and imbalanced. There is not yet sufficient affordable housing provision for rental or for owner occupation. The Housing Strategy Review concludes that Dublin needs to boost its affordable housing supply across all tenures and work to fast-track its planning and its provision using today's new construction methodologies that can speed development and housing delivery to the quality standard required. Dublin also needs to deliver greater access to affordable housing across all housing tenures.

The proposed development will provide some 481 residential units in a prime city centre location. This will contribute positively to the housing targets for Dublin, as outlined in the City Development Plan, and the RSES. In addition, the SHD application is intended to speed up the planning process and to satisfy the need for the accelerated delivery of housing in Dublin.

Chapter 5, Planning and Policy sets out the strategic planning context of the proposed development and provides a statement of consistency relating the proposed development to a suite of planning and policy documents.

1.4 Site Location and Layout

The site of the proposed development is located at 42A Parkgate Street, at a key river crossing to the west of the city centre between the River Liffey and Parkgate Street, as illustrated in Figure 1.1 and Figure 1.2.

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[7] DCC, 2016. *Dublin City Development Plan 2016-2022.,* Dublin, Ireland.
[8]Eastern and Midland Regional Assembly (2019) *Regional Spatial and Economic Strategy for the Eastern and Midland Region.* Stationery Office, Dublin.
[9] DCC, 2016. *Dublin City Housing Strategy (2016-2022).* Dublin
[10] DCC, 2018. *Dublin City Housing Strategy Review*. Dublin.

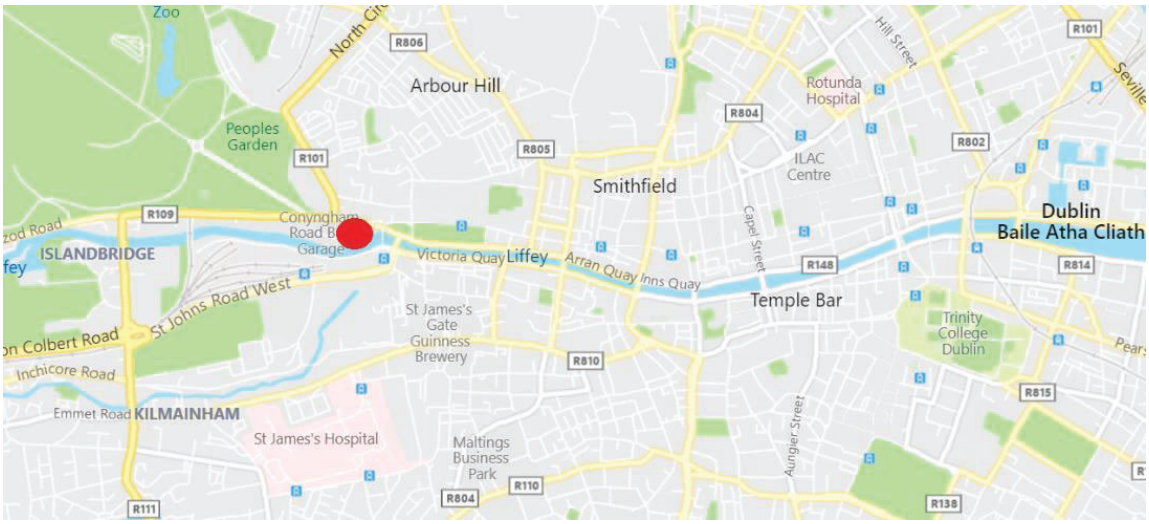

Figure 1.1: Location of the Proposed Development (site indicated as red dot).

Figure 1.2: Ariel Photo of the proposed development site.

The subject site is a brownfield site of approximately bounded by Parkgate Street to the north, the River Liffey to the south, the junction of Sean Heuston 0.82 ha Bridge and Parkgate Street to the east, and the Parkgate Place office and residential development to the west. The subject site forms the eastern section of the former industrial site between Parkgate Street and the River Liffey. This industrial site was divided some time prior to 1940, and the western section now forms the Parkgate Place office and residential development.

The site lies within a Conservation Area and contains a number of protected structures, as outlined in the Dublin City Council Record of Protected Structures. The following structures located within the site are included in the Record of Protected Structures:

- Riverside stone wall;
- Turret at the eastern end of the site;
- Square tower on the riverfront; and
- Entrance stone arch on the Parkgate Street frontage.

The site comprises a number of buildings that date back as far as 1861 when the site was originally established as an ironworks, known as Phoenix Ironworks. The site occupies the eastern half of the lands of the former ironworks and is defined by defensive boundary walls on the two primary elevations on Parkgate street to the north and by the River Liffey to the south.

The development site is well served by public transport. Heuston Station is approximately 200m from the site and provides national and regional rail services, as well as LUAS services. A number of Dublin Bus routes serve Parkgate Street, which provide further access across the city. There is a Dublin Bike Station directly adjacent to the site near Heuston Bridge, as well as dedicated cycle lanes on many of the nearby roads that provide safe cycling for cyclists.

The site is very near the LUAS stops at Heuston Station and the National Museum of Ireland, cross city bus routes and has access to the M50 via the Chapelizod bypass. The site is directly located within a mixed-use urban centre.

1.5 Site History

The site of the proposed development has a varied industrial history. It was historically known as the Long Meadows and the first buildings on site appear to have been the Phoenix Ironworks in 1808. In 1880 the site was bought by the Sir Edward Guinness and was redeveloped as a cloth manufacturing company, Kingbridge Woollen Mills. The site was used as a Shell Factory during the First World war and for a period afterwards as a Government depot from 1910 to 1917. In 1924 it was again redeveloped as a Printers for Cahill & Co and from the 1970s, the site has been in the ownership of Hickeys Fabrics.

Refer to **Chapter 12,** Architectural Heritage for further detail on the industrial history of the proposed development site.

1.6 Recent Planning History

The site has been the subject of one previous recent planning permission. A summary of this planning application is detailed below. A number of other planning applications were made on the site from the 1960s to the 1980s. Due to the significant intervening period they have not been detailed herein.

Reg. Ref. 3613/06 (ABP Reg. Ref. PL29N.221587)

Hickey and Company Limited applied for permission on 21 June 2006 for a mixed use residential and commercial development, to include offices, retail, restaurant and creche facilities, including the following:

- The relocation, refurbishment and repair of a stone archway (Protected Structure) from its current position on Parkgate Street to a location south west of its current position within the site.
- Construction of office block with 6 floors
- 2 connecting residential blocks in an L shape fronting Parkgate Street and River Liffey – ranging in height from 7 - 9 floors to accommodate 139 no. residential units
- creche at ground floor level
- 2no. ground floor retail units
- restaurant cafe at ground floor and mezzanine level
- 4 no. own door duplex office units
- pedestrianised street from Parkgate Street to the River ending in an overhanging public plaza
- vehicular access from Parkgate Street to 159 no. basement car parking spaces and 215 no. bicycle spaces
- 2 no. ESB substations

Dublin City Council requested Further Information regarding 10no. items on 10 August 2006. Following a response to this on 22 November 2006, the Planning Authority granted permission subject to 34no. conditions on 19 December 2006.

This decision was appealed by 2no. 3rd parties and also by the 1st party applicant. An Bord Pleanála decided to overturn the decision of Dublin City Council and refuse permission for the following 2no. reasons:

1. *The application site lies within the Heuston Station and Environs Framework Development Area (FDA7), as designated in the current Dublin City Development Plan, on a significant visual connection running from the City Quays to the Phoenix Park and the Wellington Monument and in an area close to the key focal point of Heuston Station with " .. famous views into and around the station environs .." as identified in the Heuston Gateway Regeneration Strategy and Development Framework Plan. Furthermore, the site is located within a conservation area, as designated in the development plan, wherein it is the stated policy of the planning authority to protect the character and historic fabric and to ensure that new buildings complement the character of the existing architecture in design, materials and scale. In addition, the site lies in close proximity to and affecting the setting of protected structures including Heuston Station to the south of the river and in a location of significant historic, amenity and tourism importance. Having regard to the scale, massing and generalised design, which is bland and repetitive, it is considered that the proposed development would not reflect the pivotal and sensitive nature of the site and would interfere with views and prospects of special amenity in the environs of the site which it is necessary to preserve, would detract from the character and appearance of the conservation area at this point and would adversely affect the setting of protected structures in the vicinity.*

The proposed development would, therefore, seriously injure the amenities of the area and be contrary to the proper planning and sustainable development of the area.

2. *The proposed development includes proposals to demolish and relocate a protected structure (entrance stone arch) within the site. It is considered that there are no exceptional circumstances to warrant the removal of this protected archway from its historical position and that its removal would detract from the character and appearance of the conservation area where it is the policy of the planning authority to protect and enhance the character and historic fabric of such areas. The proposed development would, therefore, seriously injure the amenities of this conservation area and would be contrary to the proper planning and sustainable development of the area.*

Permission was refused for the entire development on 14 September 2007.

The development proposal now before the Board is considered to successfully address the previous concerns raised in the context of the application at that time, and responds to the significant change in planning circumstances that has arisen in the meantime.

1.7 Existing and Neighbouring Land-Use

The site of the proposed development, as illustrated in Figure 1.1 and Figure 1.2, is currently in use by Hickey's Wholesale Fabrics and has been since the 1970s. It has over this time become severely dilapidated in parts.

The site of the proposed development sits between the Criminal Courts Building and the main entrance to the Phoenix park to the west, Heuston Station to the south and Collins Barracks to the east. It is also adjacent to major transport corridors and the LUAS which connects to the city centre. The site of the proposed development is located to the immediate east of the Transport Infrastructure Ireland (TII) main offices, as well as the 'Parkgate Place' apartments and offices. There are also a number of public parks and amenities in the area.

The site is within walking distance of Dublin city centre and significant employment locations, high capacity urban public transport, high frequency urban bus services, and across the river from Heuston station. The site is therefore one with excellent local and nationwide connectivity.

The Phoenix Park is within 500m of the site and is a large urban park of 707 hectares comprising of woodlands, ponds and walks as well as a wide range of amenities, including sports clubs, Dublin Zoo and bike rentals. Collins Barracks located within 500m of the site contains the Museum of Decorative Arts along with courtyards and gardens. The Irish Museum of Modern Art is a 1.1km walk from the site.

There are several public squares and external amenity spaces directly adjacent to the site and also a number of creches, clubs, playing fields and sports facilities located in the vicinity.

1.8 Overview of the Planning Process

1.8.1 Overview of the Planning Process

Section 4(1) of the *Planning and Development (Housing) and Residential Tenancies Act 2016,* as amended, (referred to herein as *"**the SHD Act**")* provides that an application for permission for a SHD shall be made directly to An Bord Pleanála under this section and not to a Planning Authority.

The purpose of the SHD process is to accelerate the delivery of much needed housing in accordance with the principles and objectives contained in the '*Rebuilding Ireland: Action Plan for Housing and Homelessness*[11]*'* as an emergency measure justified by the evidence-based housing crisis.

The SHD application process to An Bord Pleanála consists of two principal stages:

Stage 1: Pre-Application Consultation: Pre-application consultation is mandatory for prospective applicants prior to making an application for strategic housing development (SHD). Prospective applicants consult first with the relevant planning authority and then with An Bord Pleanála who will form and issue an Opinion as to whether documents submitted constitute a reasonable basis for an application or whether further consideration or amendment to the documents is required. Guidance and pre-application request forms are available for prospective applicants and planning authorities.

Refer to **Section 1.11** for further information on the consultation process.

Stage 2: Planning Application: Applicants submit consent applications for SHD directly to An Bord Pleanála. Applications are to be decided within a mandatory 16-week time period which also provides for a public consultation period and the submission of a report by the planning authority.

1.8.2 Legislative Overview

The proposed development constitutes a Strategic Housing Development in accordance with Section 3 of the SHD Act[2]

Section 3 of the SHD Act confirms, inter alia, that: -

""strategic housing development" means—

(a) the development of 100 or more houses on land zoned for residential use or for a mixture of residential and other uses,

(b) the development of student accommodation units which, when combined, contain 200 or more bed spaces, on land the zoning of which facilitates the provision of student accommodation or a mixture of student accommodation and other uses thereon,

[11] GoI, 2016. *Rebuilding Ireland: Action Plan for Housing and Homelessness*. Stationery Offices, Dublin.

(ba) development—

(i) consisting of shared accommodation units that, when combined, contain 200 or more bed spaces,

and

(ii) on land the zoning of which facilitates the provision of shared accommodation or a mixture of shared accommodation thereon and its application for other uses,",

"(c) development that contains developments of the type to which all of the foregoing paragraphs, or any two of the foregoing paragraphs, apply, or",

(d) the alteration of an existing planning permission granted under section 34 (other than under subsection (3A)) where the proposed alteration relates to development specified in paragraph (a), (b), (ba)or (c),

each of which may include other uses on the land, the zoning of which facilitates such use, but only if —

i) the cumulative gross floor space of the houses, student accommodation units, shared accommodation units or any combination thereof comprises not less than 85 per cent, or such other percentage as may be prescribed, of the gross floor space of the proposed development or the number of houses or proposed bed spaces within student accommodation or shared accommodation to which the proposed alteration of a planning permission so granted relates,

and

ii) the other uses cumulatively do not exceed —

I) 15 square metres gross floor space for each house or 7.5 square metres gross floor space for each bed space in student accommodation, or shared accommodation in the proposed development or to which the proposed alteration of a planning permission so granted relates, subject to a maximum of 4,500 square metres gross floor space for such other uses in any development, or

II) such other area as may be prescribed, by reference to the number of houses or bed spaces in student accommodation or shared accommodation within the proposed development or to which the proposed alteration of a planning permission so granted relates, which other area shall be subject to such other maximum area in the development as may be prescribed;"

As the development provides for more than 100 no. dwellings and those dwellings are proposed on land zoned for mixed use development, including residential, the proposal amounts to a strategic housing development.

1.9 Approach to the EIA

1.9.1 Definition of EIA

EIA supports the decision-making process as it is integrated into consenting processes for new development projects. This ensures that consent decisions are made in the knowledge of the environmental consequences of the project.

Section 171A of the PDA 2000 provides the following definition of "environmental impact assessment":

171A. In this Part—

'environmental impact assessment' means a process—

(a) consisting of—

(i) the preparation of an environmental impact assessment report by the applicant in accordance with this Act and regulations made thereunder,

(ii) the carrying out of consultations in accordance with this Act and regulations made thereunder,

(iii) the examination by the planning authority or the Board, as the case may be, of—

(I) the information contained in the environmental impact assessment report,

(II) any supplementary information provided, where necessary, by the applicant in accordance with section 172(1D) and (1E), and

(III) any relevant information received through the consultations carried out pursuant to subparagraph (ii),

(iv) the reasoned conclusion by the planning authority or the Board, as the case may be, on the significant effects on the environment of the proposed development, taking into account the results of the examination carried out pursuant to subparagraph (iii) and, where appropriate, its own supplementary examination, and

(v) the integration of the reasoned conclusion of the planning authority or the Board, as the case may be, into the decision on the proposed development, and

(b) which includes—

(i) an examination, analysis and evaluation, carried out by the planning authority or the Board, as the case may be, in accordance with this Part and regulations made thereunder, that identifies, describes and assesses, in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of the proposed development on the following:

(I) population and human health;

(II) biodiversity, with particular attention to species and habitats protected under the Habitats Directive and the Birds Directive;

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

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

(V) the interaction between the factors mentioned in clauses (I) to (IV), and

(ii) as regards the factors mentioned in subparagraph (i)(I) to (V), such examination, analysis and evaluation of the expected direct and indirect significant effects on the environment derived from the vulnerability of the proposed development to risks of major accidents or disasters, or both major accidents and disasters, that are relevant to that development;

For the purpose of this EIAR, Ruirside Development Ltd. is the 'developer' of the proposed development and An Bord Pleanála is the 'competent authority' responsible for undertaking the EIA and integrating its reasoned conclusion in this regard into the consent decision for the proposed development.

1.9.2 Legislative Context

Section 17 of the *PDA 2000*[12] sets out the requirement for an EIA as follows:

"172 (1) An environmental impact assessment shall be carried out by the planning authority or the Board, as the case may be, in respect of an application for consent for proposed development where either—

(a) the proposed development would be of a class specified in—

(i) Part 1 of Schedule 5 of the Planning and Development Regulations 2001, and either—

(I) such development would equal or exceed, as the case may be any relevant quantity, area or other limit specified in that Part, or

(II) no quantity, area or other limit is specified in that Part in respect of the development concerned,

[12] Inserted by European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018), article 17.

or

(ii) Part 2 of Schedule 5 of the Planning and Development Regulations 2001 and either—

(I) such development would equal or exceed, as the case may be any relevant quantity, area or other limit specified in that Part, or

(II) no quantity, area or other limit is specified in that Part in respect of the development concerned,

or

(b)(i) the proposed development would be of a class specified in Part 2 of Schedule 5 of the Planning and Development Regulations 2001 but does not equal or exceed, as the case may be, the relevant quantity, area or other limit specified in that Part, and

(ii) the planning authority or the Board, as the case may be, determines that the proposed development would be likely to have significant effects on the environment."

The Fifth Schedule of the *Regulations*[12] specifies classes of development where to which requirements relating to EIA apply. Where a project exceeds a threshold set out for the particular category of development under Part 1 or Part 2 of the Fifth Schedule, then it must be subjected to EIA.

An overview of the proposed development is provided in **Section 1.2**, and a detailed description of the same is provided in **Chapter 3**, Description of the Proposed Development. As previously outlined, the proposed development will provide for some 481 residential units.

The relevant class of development with regard to EIA, is Class 10(b)(i) of Part 2 of the Fifth Schedule to the Regulations, namely: *"Construction of more than 500 dwelling units"*. It is noted that the number of units, although very close to, does not exceed the threshold in this instance. However, Part 2 of Schedule 5 also references the following:

'Any project listed in this Part which does not exceed a quantity, area or other limit specified in this Part in respect of the relevant class of development, but which would be likely to have significant effects on the environment, having regard to the criteria set out in Schedule 7'.

Article 92 of the Regulations, defines sub-threshold development as follows:

"*sub-threshold development' means development of a type set out in Schedule 5 which does not exceed a quantity, area or other limit specified in that Schedule in respect of the relevant class of development*;"

Given the size of development vis a vis the relevant threshold and the potential for significant effects, particularly in terms of environmental factors such as landscape and visual impact and architectural heritage, it was decided that an EIAR should be prepared for the proposed development, on a sub-threshold basis, to be submitted to An Bord Pleanála to inform its decision on the SHD application.

1.9.3 Guidance

This EIAR has been prepared with due regard to the following overarching guidance on EIA:

- European Commission (2017) *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report*[13]*;*
- Department of the Environment, Community and Local Government (2013) *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*[14];
- Government of Ireland (2018) *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (August 2018)[15];
- Department of the Environment, Heritage and Local Government (2003) *Environmental Effect Assessment (EIA) Guidance for Consent Authorities regarding Sub-Threshold Development*[16];
- Department of Housing, Planning, Community and Local Government (2017) *Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licensing Systems*[17];
- Department of Housing, Planning, Community and Local Government (2017) *Circular PL 1/2017 - Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on the Administrative Provisions in Advance of Transposition*[18];

[13] EC, 2017. *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report;*
[14] DECLG, 2013. *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*. Stationery Office, Dublin.
[15] GoI, 2018. *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*. Stationery Office, Dublin.
[16] DEHLG, 2003. *Environmental Effect Assessment (EIA) Guidance for Consent Authorities regarding Sub-Threshold Development*. Stationery Office, Dublin.
[17] DHPCLG, 2017. *Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems*. Stationery Office, Dublin.
[18] DHPCLG, 2017. Circular PL 1/2017 - *Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on the Administrative Provisions in Advance of Transposition.* Stationery Office, Dublin.

- Department of Housing, Planning and Local Government (2018) *Circular PL 05/2018 -Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private projects on the environment (the EIA Directive) and Revised Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*[19]; and
- Environmental Protection Agency (2017) *Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (Draft August 2017)[20].

Additional topic-specific guidance used to undertake assessments is identified in **Chapters 6 – 20**, as appropriate.

1.9.4 Methodology

1.9.4.1 General EIA Methodology

The methodology adopted for the preparation of this EIAR comprised a systematic analysis of the effects of the proposed development in relation to the existing environment. The overall methodology for preparation of the EIAR is discussed under the following headings:

- Basis for assessment;
- Impact assessment and mitigation; and
- Significance of environmental issues.

1.9.4.2 Basis for Assessment

The impact assessment examines the existing environmental conditions within the study area for each element of assessment and then determines the potential effects associated with the proposed development during its construction and operational phases.

The study area considered within this EIAR may differ for each aspect of the environment being examined and is extended to incorporate all areas where there was potential for significant effect. Further information on the extent of study area considered for each topic is addressed in the relevant corresponding EIAR chapter.

[19] DHPLG, 2018. Circular PL 05/2018 -*Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private projects on the environment (the EIA Directive) And Revised Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.* Stationery Office, Dublin.
[20] EPA, 2017. *Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports*. Dublin.

1.9.4.3 Impact Assessment and Mitigation

The preparation of the EIAR was an iterative process, linking into the design development process.

The approach adopted in the impact assessment and preparation of the EIAR was generally based on that recommended in the *Draft Guidelines on the information to be contained in Environmental Impacts Assessment Reports* (EPA, 2017)[5], as outlined below.

A design was developed and the potential effects of the proposal on the receiving environment were identified along with mitigation measures, as required.

1.9.4.4 Significance of Environmental Effects

The glossaries contained in the Draft *Guidelines on the Information to be Contained in Environmental Impact Assessment* Reports (EPA, 2017)[5] describes an impact as *"Change resulting from the implementation of project"* and the significance of an impact as *"The importance of the outcome of the impact (or the consequence of change) for the receiving environment."*

It is important to note that terminology varies under different pieces of legislation. The term 'effect' is generally used throughout this EIAR. Where there is reference to the term 'impact' it should be understood that this has the same meaning as 'effect', and that both terms are interchangeable.

The following factors were considered when determining the significance of the effect, both positive and negative, of the proposed development on the various aspects of the receiving environment:

- The quality and sensitivity of the existing/baseline receiving environment;
- The relative importance of the environment in terms of national, regional, county, or local importance;
- The degree to which the quality of the environment is enhanced or impaired;
- The scale of change in terms of land area, number of people effected, number and population of species affected, including the scale of change resulting from cumulative effects;
- The consequence of that effect/change occurring;
- The certainty/risk of the effect/change occurring;
- Whether the effect is temporary or permanent; and
- The degree of mitigation that can be achieved.

The relevant terms listed in Table 1.1**,** as outlined in the EPA guidelines have been used consistently throughout this EIAR to describe specific effects. Further information on the specific methodologies utilised for the assessment of each environmental aspect is included in the relevant EIAR chapters.

Table 1.1: Description of Effects

Quality of Effects	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/Adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Significance of Effects	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not Significant An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant Effects An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics.
Duration and Frequency of Effects	**Momentary Effects** Effects lasting from seconds to minutes.
	Brief Effects Effects lasting less than a day.
	Temporary Effects Effects lasting less than a year.
	Short-term Effects Effects lasting one to seven years.
	Medium-term Effects Effects lasting seven to fifteen years.
	Long-term Effects Effects lasting fifteen to sixty years.
	Permanent Effects Effects lasting over sixty years.

	Reversible Effects Effects that can be undone, for example through remediation or restoration.
	Frequency of Effects Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).
Types of Effects	**Indirect Effects** Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative Effects The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	Do-Nothing Effects The environment as it would be in the future should the subject project not be carried out.
	Worst-case Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects When the full consequences of a change in the environment cannot be described.
	Irreversible Effects When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SO_x and NO_x to produce smog).

1.9.5 Structure of the EIA Report

- **Volume 1** provides the non-technical summary. This summarises the findings of the EIAR in a clear, accessible format that uses non-technical language and supporting graphics. The non-technical summary describes the proposed development, existing environment, effects and mitigation measures and relevant aspects of the EIAR in a manner that can be easily understood by the general public;
- **Volume 2** encompasses the main EIAR including introductory chapters in addition to 'assessment' chapters for each environmental aspect in accordance with Article IV of the EIA Directive. The front-end chapters **(Chapters 1 – 5)** provide the relevant project context; the assessment chapters **(Chapters 6 – 20)** provide a description of the relevant environmental aspects and likely significant effects; and summary chapters address cumulative impact and interactions **(Chapter 21 – 22);**

- **Volume 3** provides the technical appendices. This may include other relevant drawings, modelling outputs, background reports and/or supporting documents.

1.10 Project Team

This section provides an overview of the project team that has been appointed by Ruirside Developments Limited, and has contributed to the design of the proposed development to date as well as the preparation of the SHD consent application.

1.10.1 Design team

The following sets out a list of consultants that have been involved in the proposed development to date:

- Reddy Architecture & Urbanism – Preparation of the Development Plan compliant Site Plan for the site and the detailed layout and design of the proposed development.
- Lafferty Project Management- Project Management
- Arup – Provision of guidance on roads and drainage design, structural and facade design, lighting, flooding and other infrastructural requirements of the proposed development including liaising with Irish Water and Dublin City Council Transport and Water Services Department as appropriate; co-ordination and preparation of EIAR.
- Mitchell's & Associates Landscape Architects– Preparation of the landscape masterplan.
- Stephen Little & Associates Chartered Town Planners & Development Consultants – Provision of town planning guidance and co-ordination of the pre-planning and planning application for the SHD to An Bord Pleanála.
- ARC Consultants – provision of Architectural Heritage report outlining the historical buildings located on site and provision of Visual Impact Assessment which will assess the proposals visual impact on the surrounding environment.
- IN2 Consulting Engineers – providision of a Sunlight / Daylight analysis of the proposal and a Site Wind Analysis as required by the Building Height Guidelines
- Model Works – provision of Verified Photomontages from key views across
- Dublin City showcasing the existing and proposed views
- Courtney Deery Heritage Consultancy – preparation of an Archaeological Study assessing the archaeological importance of the lands.
- REDVertex-CGIs and Visualisations
- MSA- Fire and DAC
- Linesight- Cost Consultants
- Ashview Consultants- PSDP

- Moore Group- Ecology and NIS
- AWN Consulting – Waste Management, Acoustic Consultants and Hydrology Risk Report
- Access Advisors - Access strategy
- Wilson Harnell - Public Relations and Project Communication
- Aramark- Life cycle costing and management stategy
- ISM - Telecommunications
- EY - DKM Economic Consulants- Economic Report
- John Worthington – Townscape Consultant

1.10.2 EIA team

This EIAR has been prepared on behalf of Ruirside Developments Limited by a multi-disciplinary consultancy team of competent experts led by Arup with input from specialist sub-consultants.

Arup has been awarded an EIA Quality Mark by the Institute of Environmental Management and Assessment in recognition of its excellence in EIA activities. Further, all technical leads are considered to be qualified and competent experts in their fields in accordance with Article 5(3) of the EIA Directive, given their academic qualifications, professional affiliations and professional experience on other EIAs for major infrastructure projects.

Appendix 1.1 provides further detail on the competency and qualifications of experts that have contributed to this EIAR.

1.11 Consultation

1.11.1 Overview

Extensive consultation has been undertaken with a range of stakeholders during the development of the EIAR and statutory consent application in order to:

- Provide information on the proposed development;
- Ascertain and understand the views of stakeholders; and
- Seek input from stakeholders on the design, construction and assessment aspects of the proposed development.

The design of the proposed development has taken cognisance of the outcomes of the various consultation, as detailed in the statement of consistency which is included in the planning application.

It should be noted that this section describes project-wide consultation that has been undertaken. Where appropriate, **Chapters 6 – 20** identify specific consultation that has been undertaken to support individual assessments and assessment chapters.

1.11.2 Dublin City Council - Pre-Application Consultation

Under the SHD Act consultations are now mandatory for SHD applications and include a series of obligations for both the Planning Authority and prospective applicant.

A Planning Authority is obliged to keep all records of Section 247 consultation meetings and submit these to An Bord Pleanála when a Pre-Application request is made for a SHD under section 5(1) of the SHD Act.

A number of consultations were carried out with Dublin City Council, under Section 247 of the *SHD Act of 2016*[2].

In addition to the below listed formal Pre-Planning Meetings, consultation was also held with officials from the individual Local Authority Departments throughout this process. This included the Housing Department to discuss the requirements of the Department as regards Part V units on site, as well as the Drainage and Transport Departments to discuss technical aspects of the development as they emerged.

Meeting No. 1st – 3rd September 2018

This meeting was attended by the following official of the Planning Authority: Mary Conway Deputy City Planner.

In response to an initial concept presentation by Reddy Architecture & Urbanism this meeting explored a number of the fundamental principles associated with the redevelopment of this site; mix of uses; provision of build to rent; views and vista's; building height; and riverside walk.

Meeting No. 2nd – 19th December 2018

This meeting was attended by the following officials of the Planning Authority: Mary Conway, Deputy City Planner; and Rhona Naughton, Senior Planner.

At this meeting Reddy Architecture & Urbanism presented to the Planning Authority a provisional outline of the development proposals. The Planning Authority responded well to the proposed site layout, with the built form presenting 'fingers' to the river rather than a wall. They advised that the key topics for further discussion included public realm, use mix, massing, materiality and conservation.

Meeting No. 3rd – 18th January 2019

That meeting was attended by the following officials of the Planning Authority: Mary Conway, Deputy City Planner; and Rhona Naughton, Senior Planner.

The following key issues were discussed at this meeting:

- The Planning Authority sought a greater use mix/ ratio compliance with Z5 zoning objective;
- Further detail was requested on public realm;
- Protected structures;

- Further detail requested regarding the communal private space;
- The manner in which entrance points to the residential component address he public realm;
- Apartment size and mix; and
- Separation distances to neighbouring buildings

Meeting No. 4th –31st January 2019

This meeting was attended by the following officials of the Planning Authority: Mary Conway, Deputy City Planner; and Rhona Naughton, Senior Planner.

Further discussion took place describing how the design had evolved to respond to previous DCC feedback. Points of note included:

- Applicant to deliver on DCC's vision of providing increased employment use of the site;
- Further detail requested on residential amenities and facilities;
- Detail on delineation between common private space and public space at ground level discussed;
- Requested more contextual elevations and site sections to understand conditions within the spaces, under cantilevers, along streets, moving through spaces, and negotiating site level changes;
- Sought further detail on Parkgate Street streetscape. Contextual elevations to show height, scale, layers, detailing, finish;
- Significant (heritage) views of the site were to be identified;
- Slenderness ratio of the tower;
- Materiality; and
- How the scheme can embrace its heritage context.

Meeting No. 5th –28th February 2019

This meeting was attended by the following officials of the Planning Authority: Mary Conway, Deputy City Planner; Rhona Naughton, Senior Planner; and Mary McDonald, Conservation Officer

This meeting focused on conservation and architectural heritage, in particular:

- Treatment of Protected Structures, including the Liffey Wall;
- Parkgate Street wall;
- Overall conservation approach; and
- Streetscape.

Meeting No. 6th –21st March 2019

- This meeting was attended by the following officials of the Planning Authority: Mary Conway, Deputy City Planner, Rhona Naughton, Senior Planner

This was the final Section 247 meeting and covered the following topics:

- Scale, massing and slenderness of tower;
- Façade treatment;
- Materiality;
- The Parkgate Street elevation and transition to neighbouring buildings; and
- It was determined that the applicant would provide a further drawing pack to DCC for comment prior to lodging to the Board. It would also include the Part V proposals, in order to comply with the SHD application requirements. This pack was subsequently delivered to DCC on 31st May 2019, concluding the Section 247 consultation.

Meeting No. 8 – 18th November 2018

This meeting was attended by the following officials of the Planning Authority: Mary Conway, Deputy City Planner; Rhona Naughton, Senior Planner; and Mary McDonald, Conservation Officer.

The purpose of this meeting was to engage with the planning authority following the pre-application meeting and prior to lodgement of the application. At this meeting, the applicant outlined design updates that had been made in response to the planning authority's previous comments, as well as An Bord Pleanala's opinion.

The meeting covered the following topics:

- Design, height and massing
- Residential amenity
- Architectural heritage
- The proposed mix of uses
- Visual Impact Assessment

Further refinements to the scheme were made following this meeting to respond to the planning authority's commentary.

1.11.3 An Bord Pleanála Pre-Application Consultation

Pre-application consultation is mandatory for prospective applicants prior to making an application for SHD to An Bord Pleanála. Ruirside Developments Limited consulted first with Dublin City Council, as described in **Section 1.10.3**, and then with An Bord Pleanála at a pre-application meeting on 18th September 2019.

An Bord Pleanála issued its opinion and determination on the proposed development on 2nd October 2019.

It was the opinion of An Bord Pleanála, that the documents submitted as part of the pre-application consultation required further consideration and amendment to constitute a reasonable basis for an application for SHD.

The proposed design has taken on board the comments raised during the consultation process.

1.11.4 Consultation with Prescribed Bodies

Pursuant to article 285(5)(a) of the *Planning and Development (Strategic Housing Development) Regulations 2017*[1], the following authorities will be notified on the submission of the planning application to An Bord Pleanála:

1. Transport Infrastructure Ireland
2. National Transport Authority
3. Coras lompair Éireann
4. Commission for Railway Regulation
5. Irish Water
6. Irish Aviation Authority
7. Minister for Culture, Heritage and the Gaeltacht (archaeology, nature conservation and built heritage)
8. Heritage Council (archaeology, nature conservation and built heritage)
9. Inland Fisheries Ireland
10. An Chomhairle Ealaion
11. Failte Ireland
12. An Taisce - the National Trust for Ireland (archaeology, nature conservation) and built heritage)
13. Dublin City Childcare Committee

1.12 Difficulties Encountered During the Assessment

Difficulties encountered in the preparation of the EIAR are outlined in each chapter as they relate to the various environmental topics.

1.13 References

Department of the Environment, Community and Local Government, 2013. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Stationery office, Dublin

Department of the Environment, Heritage and Local Government, 2003. Environmental Effect Assessment (EIA) Guidance for Consent Authorities regarding Sub-Threshold Development. Stationery Office, Dublin.

Department of Housing, Planning, Community and Local Government, 2017. Circular PL 1/2017 - Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on the Administrative Provisions in Advance of Transposition. Stationery Office, Dublin.

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Government of Ireland, 2017. Planning and Development (Strategic Housing Development) Regulations 2017. Stationery office, Dublin.

Government of Ireland, 2018. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Stationery Office, Dublin.

2 Alternatives

2.1 Introduction

This chapter explores the alternatives considered for the proposed scheme, the site criteria set by the client and the reasons for choosing the site for the proposed development. The design objectives, client vision and alternative configurations examined during the design process are also presented.

A description of the author's qualifications and experience is presented in **Appendix 1.1**.

This chapter has been prepared with due regard to the overarching guidance on EIA as outlined in **Section 1.9.3**.

2.2 Do-nothing

The site is located on the River Liffey, directly opposite and to the North of Heuston Station with significant frontage onto Parkgate Street. The lands are comprised of a derelict former 2 storey dwelling, a large former retail warehouse building and several outbuildings which are ancillary to the warehouse use. There is vehicular access and limited on site car parking to serve the premises. The site is impermeable to the public currently and there is no public access to the river. If the development were not to proceed, the commercial use is likely to continue.

2.3 Choice of Site Location

The site was purchased by Ruirside Developments Ltd. due to its location adjacent to the largest transportation interchange hub in the city, and the site also being capable of supporting a significant and landmark residential-led mixed use scheme.

The site stands at a unique location, that experiences significant movement in the city – the Liffey watercourse flows east and is tidal here, the Sean Heuston bridge caters for Luas and pedestrians north to south, the adjacent Frank Sherwin bridge caters for traffic moving north, and the Quay roads parallel the Liffeys movement.

Directly opposite and to the North lies Heuston Station, the largest transportation interchange hub in the city, a place of arrival and departure for thousands every day.

Its location and aspect on the River Liffey and the special character of structures on the site such as the continuous cut stone wall to the northern boundary, the circular turret at the sites apex and the formal stone archway onto Parkgate Street also identify it as a development site of unique character in the city.

2.4 Design Strategy

The design strategy acknowledges the sites potential and has built upon the Dublin City Council Development Plan and the objectives of the Strategic Development Area (SDRA 7) of that plan in the following design strategy objectives:

- To create a visual and physical connection between Parkgate Street and the River Liffey through the lands by integrating significant heritage elements such as the river boundary wall, the stone arch and the stone warehouse structures;
- To enhance public realm, open space and the amenity of the site;
- To identify this signature location with a landmark building to the East of the site at the confluence of the river and the Bridge whilst respecting the views to the Wellington Monument, and from points along the City Quays;
- To harness the potential of this city centre location with a high-density residential scheme with significant public realm and appropriate employment uses; and
- To maximise the public facing uses at lower levels to activate the street scape onto Parkgate Street.

It is considered that the provision of a significant landmark scheme with a high-quality public realm, combining a mix of uses including residential, office, cultural, retail and service uses to become a highly desirable destination to live, work and visit and will accord with the policy objectives under the *Dublin City Development Plan* and National Planning Policy. Within the Development Plan, the site lies within the Heuston and Environs Strategic Development Area (SDRA 7). The criteria referred to in SDRA 7, and in particular, objectives 1 and 5 being:

"*1. To develop a new urban gateway character area focused on the transport node of Heuston Station with world class public transport interchange facilities, vibrant economic activities, a high-quality destination to live, work and socialise in, a public realm and architectural designs of exceptional high standard and a gateway to major historic, cultural and recreational attractions of Dublin City.*"

"*5. To incorporate mix-use in appropriate ratios in order to generate urban intensity and animation. This will require the major uses of residential and office to be complemented by components of culture, retail and service elements.*

The vision for SDRA7 is expressed as follows:

"*To create a coherent and vibrant quarter of the city that captures the public imagination with high quality services, development, design and public spaces that consolidate and improve the existing strengths of the area.*"

Planning Permission was granted on the site in 2006 for a mixed-use development by Dublin City Council, however this decision was overturned and the planning permission was refused following an appeal to An Bord Pleanála. **Section 2.7** refers to the reasons for this refusal in greater detail and the current schemes response to these reasons.

In composing a scheme for the site, the design strategy has taken cognisance of the reasons for the previous planning refusal as well as a comprehensive review of the site, its context, setting in the city and relationship with the River.

2.5 Layouts and Design

The overall layout of the proposed development has developed over a period of 12 months with regular interactions and reviews with the Planning Department, Conservation Office, and Transportation Department of Dublin City Council and with An Bord Pleanála. The following aspects have been the subject of consideration and amendment arising from this interaction:

- The Turret and the river boundary wall;
- Prominence of the Archway;
- Ground plane mix and location of uses; and
- Massing of buildings onto the river and Parkgate Street.

Details of consultations with Dublin City Council and An Bord Pleanála are outlined in **Section 1.11** of **Chapter 1**, Introduction and Need for the Development.

2.6 Alternative Designs Considered

In accordance with the *EIA Directives* and *Article 94, Schedule 6, paragraph 1(d) of the Planning and Development Regulations 2001*, as amended, this section outlines a brief description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied for the Parkgate Street lands, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects. Please refer to **Appendix 2.1** for a selection of previous design iterations.

2.6.1 Alternative Locations

It is considered that this criterion does not apply in the case of this development as no other alternative location was part of the process of consideration. Under 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*".

2.6.2 Alternative Layouts considered in the Design Process.

It is considered that the proposed development and its massing, use and scale is very much a site specific response.

The following section outlines the evolution of the design development and how it took account of environmental considerations.

As part of the design development the client and design team reviewed various alternative design iterations for each of the key elements summarised below. The Reddy Architecture + Urbanism: Architectural Design Statement which accompanies the planning application deals with each of these elements in greater detail.

2.6.2.1 The Turret and River Wall

The initial design intent was to create large interventions in the river boundary wall with significant openings to allow visual and physical connection to the Liffey edge and to open up this concealed aspect of the site. In appraising the design approach to alternative treatment of the Turret, River wall and Square Tower a series of options for intervention and penetrations to the fabric of the protected structure were considered. These ranged from little or no intervention with repair and renewal, to minimal openings to connect the public space and give an awareness of the River and finally to more extensive openings which would allow a more unified connection between the new public open space, the River and the views to Heuston station beyond. In all options considered the key criteria of quality of public open space, aspect, percentage of sunlight hours and the integration of the architectural heritage within the new redevelopment were assessed.

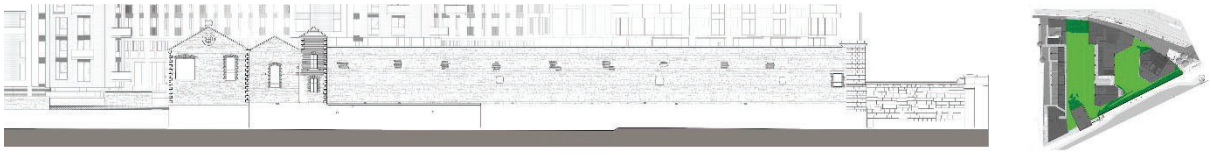

Figure 2.1: Wall Elevation Option 1

Option 1: Repairs and renewal of the existing fabric replacing the brick infills with stone and no additional intervention. The appraisal of sunlight hours within the public open space in this case is 80% well in excess of the required standard of 50% under the planning guidelines. While this option has little impact on the fabric of the protected structure it blocks the awareness and aspect from the public space to the river and Heuston station.

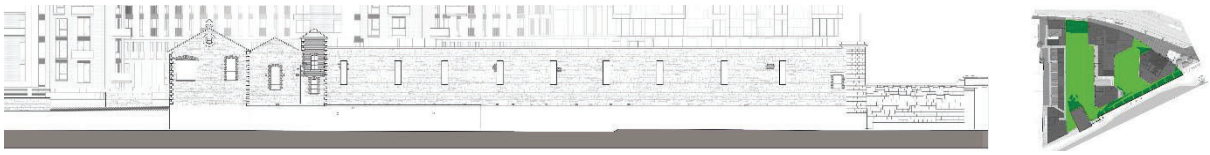

Figure 2.2: Wall Elevation Option 2

Option 2: Repairs to the wall with previous bricked areas opened up along the wall, increased in height and finished with dressed stone new reveals. The appraisal of sunlight hours within the public open space increases above 80%. This option gives an awareness of the river and provides glimpses of Heuston station from the new public space.

Figure 2.3: Wall Elevation Option 3

Option 3: Repairs to the wall with a series of new larger openings finished with dressed stone new reveals. The appraisal of sunlight hours within the public open space increases to 85%. This option gives a greater connection between the public plaza, the river and provides framed views of Heuston station.

Figure 2.4: Wall Elevation Option 4

Option 4: Removal of a section of the wall in front of the public plaza to reflect the treatment of the river edge elsewhere along the Quays of the Liffey and at Heuston Station with repair and renewal also. The appraisal of sunlight hours within the public open space increases to 90%. This option gives a unified connection between the public plaza, the river and provides views of Heuston station and up and down the river.

Figure 2.5: Wall Elevation Option 5

Option 5: Arising from reviews of the environmental impacts of the walkway and its physical structure on the riverside wall and discussions with DCC Planning Department and the City Conservation Officer, the approach evolved into a more considered and nuanced series of interventions.

Reasons for selecting Option 5

After considering the impacts arising within each of the various options it was considered that Option 5 was the optimum solution. This option respects the Architectural Heritage of the wall with the integration of the new build elements, providing views, access and daylight penetration for the scheme design based on the following:

- The large openings in the quay wall will flood the public courtyard with natural light;
- The stone removed to form the openings will be re-used within the development site;
- The existing Stone Tower will be refurbished for use as a viewing platform along the river walkway; and

- Existing cast iron frame elements within the Hickeys factory will be integrated into the design.

Consideration of Environmental Aspects

In selecting this option, consideration was given to the potential environmental effects of all options considered and the relative effect of each. The critical consideration was the potential architectural heritage effects.

The potential for effects on other environmental aspects were also considered. Potential effects on aspects such as noise, air quality and climate, waste, land and soils and water, for example, were all considered to be comparable across all options, with no significant effects considered likely.

The preferred option is considered to offer particular advantages however, with regard to:

- Increasing daylight to users of the river walkway.
- Enhancing amenity by opening up views across the river to Heuston and beyond.

The preferred option was seen as the optimum balance of these benefits and the potential effects on architectural heritage associated with the proposed interventions. The proposed design also provides an appropriate balance between the architectural heritage of the river wall and the Z9 Objective of the river walk creating 4 distinct experiences. The stone turret signals the gateway to the River walk along a colonnade behind the wall passing the café with framed views of the river. From here pedestrians arrive in the new public plaza where a section of the wall is lowered to embrace the opportunity to provide a unique public open space on the edge of the river within the city. The river walk continues along behind the wall once again with the square tower restored with gated access and an active use allowing people to walk in and view the structure from within and look across the river to Heuston Station through the existing window. To the west of the wall pedestrians move through the River Warehouse where the change in level is achieved with steps and a lift allowing the connection to continue along the river walk towards Island Bridge. The apex of the wall to the east terminates in a circular turret feature. The circular form only exists as part of the external wall. The new Z9 Riverwalk access point is provided at the junction of Sean Heuston bridge and Turret/River wall in the applicant's design proposals.

Final Design Option Summary

- Interventions in the wall are proposed where the penetrations are in line with existing window opes;
- The proposed design integrates elements of fabric retained from the steel structure of the existing warehouse; cast iron columns and beams; with the creation of a rampart walk which will give active use and interface between the protected structure and the public realm;

- The integration of a pedestrian walkway adjacent to the river, but located inboard of the riverside wall facilitates engagement with the stair tower (a retained element of the existing building which forms part of the river wall) and allows access through the renovated river warehouse building - a change in level is negotiated to allow connection to the existing walkway at the residences to the west of the site;
- The final design will remove previous unsympathetic construction works (block infills etc) to open up the ground floor level. These new interventions are deliberately contemporary and legible. These works are intended to provide an increase in natural light levels and to give a better connection to the river walk;
- The cast iron frame elements from the existing building that are to be removed and will be reused in the structure of the walkway resulting in a sympathetic & carefully considered intervention.
- The works retain the integrity of the structures and facilitate public access, in a manner that better protects the environmental features of the site. The proposals as they have evolved to the preferred solution also have a lesser impact on the receiving environment of the wall and the river.

Figure 2.6. Riverwalk Final Design Solution

2.6.2.2 Restoration of Stone Gateway Arch on Parkgate St.

Early iterations of the scheme onto Parkgate Street, in terms of massing and ground floor treatment sought to integrate the archway physically into the elevation. Glazed connections to the arch were envisaged to frame the element in a façade plane, see Figure 2.7 below.

Figure 2.7: Early Design Elevations around the Stone Gateway Arch

Whilst all the design proposals retained the Arch as an entrance, the treatment of the buildings above and around the arch differed and each had its own merits. Discussions with DCC Conservation and Planning departments led to an understanding that the Archway was considered to be of such significance that a set back of the proposed new buildings would be more appropriate. The receiving environment of the archway was a primary consideration in this regard. Interventions which enclosed the archway in a lightweight glass structure or which sought to incorporate the arch physically into the fabric of the elevation of new structures were by their nature more invasive were deemed to have impacted negatively on the environment of the archway.

Figure 2.8: Final Elevation of the Proposed Stone Gateway Arch

Figure 2.9: View of the Proposed Stone Gateway Arch from the internal courtyard of the proposed development

Consideration of Environmental Aspects

In choosing the preferred option, consideration was also given to the potential for significant effects on the environment, of all of the proposed options.

The primary consideration in design development with regard to this feature was in relation to preserving the architectural heritage of the stone gateway arch. In this respect, the preferred option was considered to have benefits over other options considered, retaining the arch and incorporating it in a meaningful way into its context.

The proposed option is also considered appropriate in terms of any potential landscape and visual effects with the character and experience of the archway is elevated in the composition of the elevation.

All of the options considered are likely to have similar effects on other environmental aspects, such as noise, air quality and climate, population and human health, biodiversity, land and soils and water. None of the potential effects on these aspects are likely to be significant.

Final Design Option Summary

The key features of the final design include:

- The archway is the primary residential gateway to the site. It is the focal point of the entrance colonnade that leads to the south facing private courtyard;
- From this space access is provided to the river Liffey and the river walk. The setting of the Arch is framed between the two residential wings with the café/retail entrance foyers on either side;
- The façade onto Parkgate Street is set back to and around the arch;
- The landscaping proposal integrates railings as interfaces with the existing and new gates to define the threshold between the street and the private realm of the proposal; and

- The east wing of the Arch will be restored to open the former round headed door arch as an out of hours point of entry.

Overall it is considered that this final design approach represents a more considered and appropriate treatment for the environmental setting of the arch and treats the structure with the primacy it deserves.

2.6.2.3 Ground plane mix and location of uses

A key design consideration has been the activation of the ground floor. Various retail, commercial and food/beverage options have been considered. Initial considerations were to create a vibrant use such as a food market, own door offices, co-working enterprise and convenience store at the ground floor, see Figure 2.10 below.

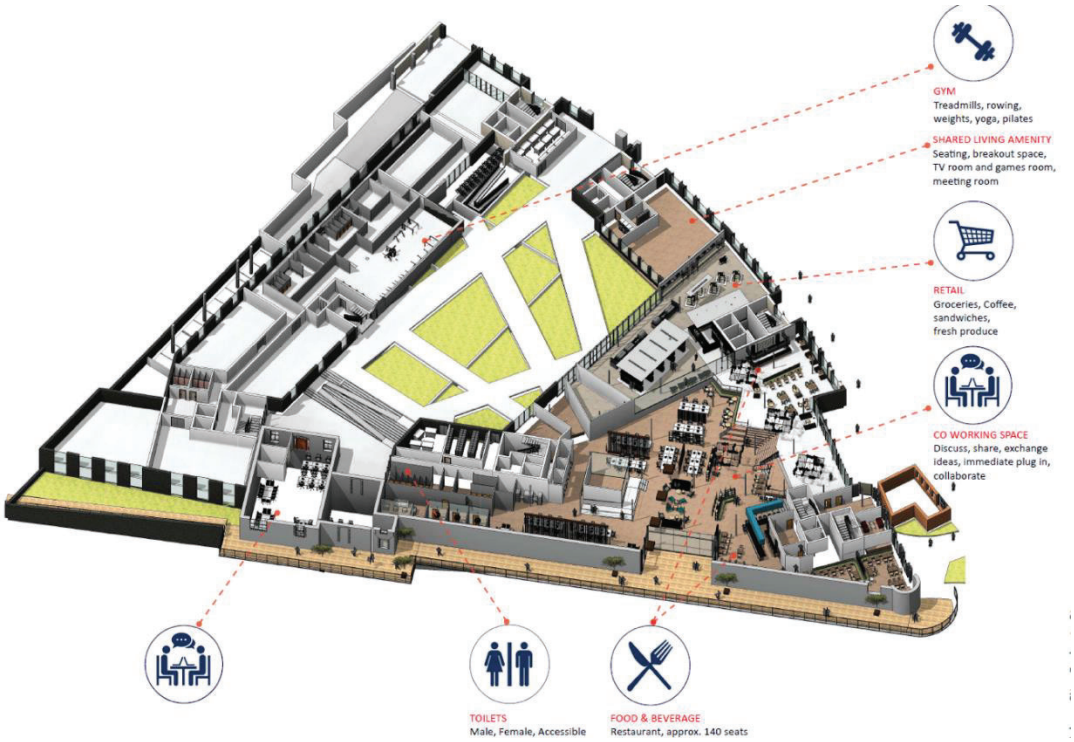

Figure 2.10: Early Design Option for the Ground Floor

Developing options saw the emergence of uses more contiguous and compatible to the residential mix tenure such as gym, café, commercial and amenity spaces. Interactions with the local authority and end users as proposed by the client resulted in a comprehensive series of options, scale and location of uses. A prime aspect of the strategy was the relationship between the uses and the landscape spaces in the scheme as well as maximising the access from public spaces. A cultural use is proposed both internally and externally in the scheme, with a dedicated, bookable internal space for community use or for exhibition and/or meetings. It is located off a public space at the river walk in block B, the external space proposed is the plaza itself which will contribute to the cultural context, providing a space for markets and outdoor entertainment, whilst simultaneously providing a place where the setting of one of the areas key landmarks, Heuston Station and the Guinness Lands can be framed in views.

Following input from DCC Planning Dept and Retail/Food and Beverage consultants the uses and scale were changed to the most sustainable option. This aligns directly with Objective 5 of SDRA 7, which requires *"…..the major uses of residential and office to be complemented by components of culture, retail and service elements."*

Figure 2.11: Cultural Use in the Plaza – Daytime Markets

Figure 2.12: Cultural Use in the Plaza – Evening Event

Consideration of Environmental Aspects

Cognisance was given throughout, in the consideration of the various design options, to the potential effects on the environment associated with these options. The primary consideration was the preservation of the architectural heritage of the site, while maximizing the amenity and public access aspects, associated with the proposed use.

The preferred option is considered to offer the most benefit in terms of increasing amenities and public uses at street level as well as activating the streetscape and new public spaces in a positive manner.

The waste management strategy for this scale of ground floor units ensures the potential negative effects of such uses on the environment are much less impactful on the environment than that of a larger scale retail offering which was considered in alternative solutions. It is considered that the current scale of units is less likely to result in negative impacts on the environment in terms of pollutants/nuisance or negative impacts on traffic movements arising from servicing and potential parking demands. All of the options considered are likely to have similar effects on other environmental aspects, such as noise, air quality and climate, biodiversity, land and soils and water. None of these effects are likely to be significant.

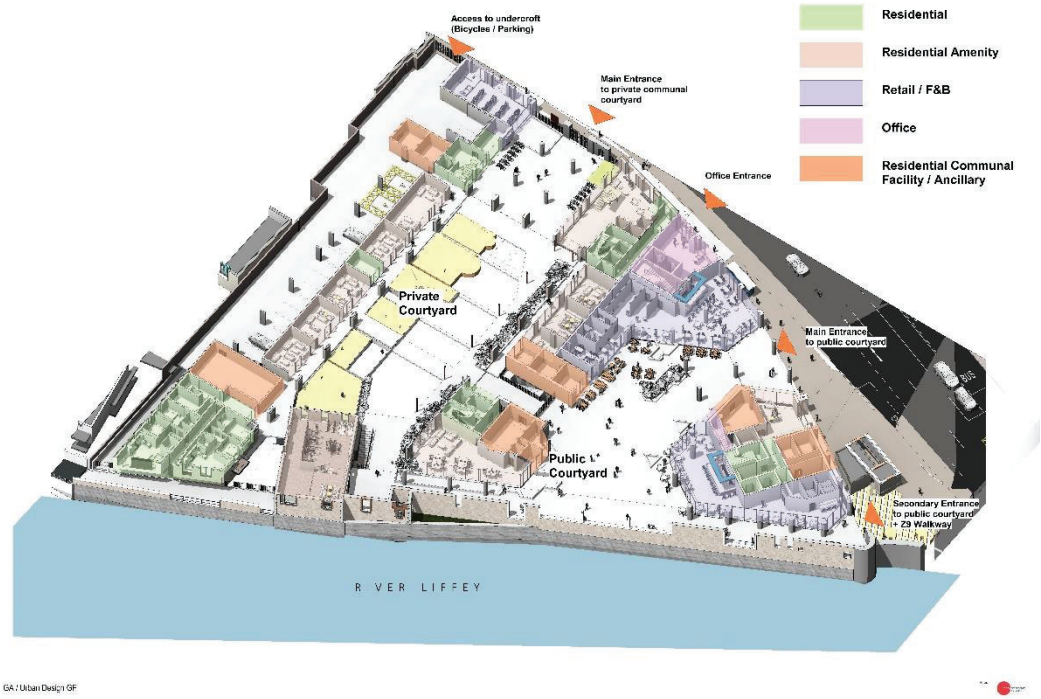

Figure 2.13: Ground Floor Active Uses

It is considered that the receiving environment of Parkgate Street and the viability of such uses were some of the core critical aspects considered which contributed to the selection of the final design solution. The final design concept ensures an active ground plane, with vibrant and sustainable uses which accord with the mixed-use zoning objectives and fulfils the objectives of the greater urban design ideals espoused as the Urban Development and Building Heights Guidelines for Planning Authorities. The uses are diverse and located appropriately to enliven and activate public realm and street edges. The proposed size of retail units and food and beverage offerings have been scaled to accord with the likely demand and that of proven successful retail units in the location.

Design Solution Summary

- A 208m^2 restaurant located with access from Parkgate street and the boardwalk with views onto the river at the most prominent and accessible location of the scheme to the east, west and south;
- A 236m^2 Food and Beverage unit located with views and frontage to the Public Plaza accessed from Parkgate Street;
- A 119m^2 co-working space located at grade with frontage to the river and access from the Public Plaza and boardwalk, this space is also to be made available for community / cultural events / activities, with bookings controlled through the management company.
- A 220m^2 gym space located in the former stone warehouse buildings;
- A 134m^2 Concierge incorporating Café onto Parkgate Street; and
- An 80m^2 retail unit on Parkgate Street.

2.6.2.4 Massing of buildings onto the river and Parkgate Street

The design approach from the very first sketch scheme sought to balance the prominence of the site with an appropriate blend of height, density, scale, architectural design and public realm. Dublin is a low-rise city by international standards for the most part. The tall structures which are traditionally visible on the skyline of the city are typically elements of a particular building typology - church spires, industrial buildings such as at Diageo/Guinness and Poolbeg chimney stacks as well as monuments – such as the Wellington Monument and the O'Connell Street Spire.

Figure 2.14: Guinness factory structure, Guinness Storehouse and Poolbeg Chimneys

These structures in themselves are reminders and visual representations of defined periods of social and economic change in the city. The Wellington Monument and Nelson's Column (now the Spire) were physical representations of military colonisation, Diageo's redbrick towers and chimneys are the embodiment of the industrial revolution and its effect on the landbank of Dublin 8.

The changing context of these structures is a reminder that a city is ever changing, socially, economically and physically. The original context of these structures is dramatically altered. The city grows around them. They have changed in nature and indeed use with time. The viewing centre at the Guinness Storehouse is an example of the reimagining of a structure to segue with its changing context. The history of the lands at Parkgate street are also that of change.

The site stands at a unique location that experiences significant movement in the city – the Liffey watercourse flows east and is tidal here, the Sean Heuston bridge caters for Luas and pedestrians north to south, the adjacent Frank Sherwin bridge caters for traffic moving north, the Quay roads parallel the Liffeys movement. Directly opposite and to the South lies Heuston Station, the largest transportation interchange hub in the city and a place of arrival and departure for thousands every day. The main Criminal Courts of Justice complex sits on Parkgate street at the entrance to Phoenix Park, the largest city park in Europe.

Figure 2.15: Site in city context

The lands present a triangular shaped plan form, with the Eastern apex facing down the axis of the River Liffey. The high relentless walled perimeter to the south terminates in a round turret like structure at this promontary location, which lends a breakwater effect to the buildings form.

Previously the lands were a walled demesne, which overtime saw the open space at the river evolve and change to an industrial warehouse type use. Steel, shells and drapery housed in equal measure overtime. Industrial use is a land hungry format, with a large floorplate eating into 2/3 of the sites footprint.

Permeability is impossible but for a handful of employees and access to the river is non-existent. The sites location, context and aspect on the River Liffey set it apart.

It is visually prominent, from its many vantage points – South Quays, Father Matthew bridge, James Joyce Bridge, Heuston Station, as one enters the city from the west, as one leaves the city up the south quays and as one views the city arriving and departing from Heuston Station.

The character of structures on the site such as the continuous cut stone wall to the southern boundary, the circular turret at the sites apex and the formal stone archway onto Parkgate Street also identify it as a development site of unique character in the city.

It is considered that the site is of such prominence that any development should contribute significantly to the City - in terms of place making, architectural quality and spatial amenity. A new public space and access to the river are considered a primary requisite to achieve this. The site has significant south facing frontage onto the river which is bounded currently by the high stone wall which has very few openings to facilitate daylight penetration. Many potential use types - Commercial Use (Office), Retail Use, Civic and Leisure, would all necessitate large floor plates at the lower floor and ground plane.

This would have the effect of replicating the existing use which dominates the site and is a physical barrier to any access visual or otherwise to the river. In addition, a deep floor plate of this type over six – seven storeys would create in effect a low massive building structure which is appropriate for the courts buildings which has an inherent defensive nature given its function. This form and massing would result in an impermeable building with limited north facing public realm. Consideration has been in this regard to SDRA 7 objectives 1 and 5 *"to incorporate mix-use in appropriate ratios in order to generate urban intensity and animation. This will require the major uses of residential and office to be complemented by components of culture, retail and service elements."* The vision for SRDA7 is expressed as follows:

"To create a coherent and vibrant quarter of the city that captures the public imagination with high quality services, development, design and public spaces that consolidate and improve the existing strengths of the area."

A mixed-use scheme as proposed aligns with this objective and affords the ability to have an active use at ground floor which is subservient to residential/commercial use above. The residential footprint is also smaller and more conducive to ensuring increased public realm at the ground plane. The site for the proposed development lies within Dublin City Council's Development Plan SDRA 7. In the text relating to SDRA 7 at Paragraph 7 it is stated that '*As a western counterpoint to the Docklands, the Heuston gateway potentially merits buildings above 50 m (16-storeys) in height in terms of civic hierarchy'*.

It is in this context that the Dublin City Council Development Plan has identified the area as suitable for a development of some considerable height.

Consideration of the Building Height Guidelines

The design for the scheme at Parkgate Street also addresses the *Urban Development and Building Heights Guidelines for Planning Authorities December 2018* which further establishes a context for a successful urban scheme with heights that are appropriate for their location – with specific reference to *Section 3.0 Building Height Guidelines.* The design criteria therein are relevant to the application of SPPR 3A of the Guidelines and in particular to the development management principles below which have been extracted here for reference in full (see italic text below). The section immediately following outlines how the scheme design has responded to these Development Management Principles.

Development Management Principles

1. 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.*

2. 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.*

3. At the scale of the site/building

- *The form, massing and height of proposed developments should be carefully modulated so as to maximise access to natural daylight, ventilation and views and minimise overshadowing and loss of light.*
- *Appropriate and reasonable regard should be taken of quantitative performance approaches to daylight provision outlined in guides like the Building Research Establishment's 'Site Layout Planning for Daylight and Sunlight' (2nd edition) or BS 8206-2: 2008 – 'Lighting for Buildings – Part 2:Code of Practice for Daylighting'.*
- *Where a proposal may not be able to fully meet all the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, in respect of which the planning authority or An Bord Pleanála should apply their discretion, having regard to local factors including specific site constraints and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution.*

How the scheme responds to Section 3.0 Building Height Guidelines, SPPR 3A Development Management Principles (as outlined above)

1. **<u>At the scale of the City of Dublin</u>**

The proposal positively addresses the key objective of developing compact growth in a key under-utilised brownfield site in the city centre. The site is well served by public transport with high capacity, frequent service and good links to other modes of public transport – it is adjacent to Heuston Station and the Red LUAS line, the 25,26,66/a/b,67 and 69 bus routes pass through Parkgate St, the 145 and 747 Airport Bus both terminate at Heuston and the 25a/b and 79/a pass along St. Johns Road West, just south of Heuston Station.

The development has regard to the fact that it lies within a designated conservation area. The works incorporate many of the existing structures and re imagine aspects of the site's heritage context to enable a vibrant accessible new community. It is intended to retain the larger of the two gabled buildings and the River façade of the smaller gabled building. The retention of these unlisted buildings will retain the historic Riverfront character of the site and must result in positive effects on the architectural heritage of the site and its surroundings. The opening up of views across the River from Heuston Station will provide a new dimension to the setting of Heuston Station. The proposed reuse of some of the cast iron work in the open spaces in the proposed development is a significant benefit to the sites architectural heritage. In addition to the above, appropriate repair works to buildings proposed for retention on the application site will give rise to positive effects on the surrounding architectural heritage. Further detail is provided in **Chapter 11,** Archaeology and Cultural Heritage.

The scheme design integrates with the topography of the site. It enables pedestrian access to the river edge and opens views to Heuston Station and the River Liffey. This is achieved in the scheme with careful consideration of the various changes of level on the lands.

It creates a new public plaza at this junction of gateway building and the confluence of road and river. Please refer to **Chapter 13**, Landscape and Visual that accompanies this application for further detail in this regard. The development includes a public plaza that will contribute to the cultural context, providing a space for markets and outdoor entertainment, whilst simultaneously providing a place where the setting of one of the areas key landmarks, Heuston Station and the Guinness Lands can be framed in views.

In terms of the protection of key views, the design process has examined the relationship of the proposal and the context of the Wellington Monument in view corridors as defined in the SDRA and Development Plan and demonstrates that there is no interference in views from the North Quays.

It also demonstrates that the view corridors on the South Quays are largely complementary and that only at close proximity on the south quays, at the area outside the Diageo Guinness Lands where there is restricted public movement due to the industrial nature of the location, does the proposed new development appear in front of the Wellington Monument.

However, at this juncture it is considered that any development (6-7 storeys) would similarly affect the setting and would appear in front of the Monument at this particular location. The development proposals have been subject to a detailed a landscape and visual assessment, undertaken by ARC and this is provided in **Chapter 13**, Landscape and Visual.

It is considered that this proposed development seeks to make a most positive contribution to place-making, improving dramatically the setting of Parkgate Street and proving a significant new public space, using massing and height to achieve an appropriate density through a collection of building forms with a variety in scale and form which responds to the scale of adjoining current and future developments and creating visual interest in the streetscape. Please refer to the Reddy Architecture + Urbanism: Architectural Design Statement for further detail, which accompanies the planning application.

2. <u>At the scale of district/ neighbourhood/ street</u>

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 that are well considered.

The proposal enhances the urban design context with a new public space and provides key thoroughfares to the River Liffey - an 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.

The proposal makes a positive contribution to the improvement of legibility through the site and wider Heuston urban area and integrates with Parkgate Street in a cohesive manner.

3. At the scale of the site/building

The proposal positively contributes to the mix of uses and dwelling typologies available in the neighbourhood. Development on the lands should facilitate excellent accessible open space. In doing so, the density required to deliver this public realm will only be realistically achieved through an increase in vertical stacking resulting in building heights which exceed that of the surrounding immediate context.

The locations of the new structures and the appropriate heights on the lands is a function of several criteria, arising from the visual assessment of the lands in the round from various vantage points in the city – including the City Quays, Montpellier Hill, Croppies Acre, the Phoenix Park, Chesterfield Avenue and St Johns Road (see Figure 2.16 below for viewpoints).

Figure 2.16: Locations from which the height has been assessed visually

A detailed visual impact assessment of the proposed development has been undertaken and is presented in **Chapter 13**, Landscape and Visual. Tall structures often appear as silhouettes from distance on the skyline. A function of slenderness ratio - the wider the footprint the greater the height required to appear proportionate.

A chimney or spire is an extension of a much more substantial mass below. More recent comparable high-rise structures in the city such as Capital Dock, Liberty Hall and Millennium tower are building forms rising from adjoining buildings 6-18 storeys in height.

The tower elements of these developments range from between 59 – 79m in height, are located on waterways which afford a viewing distance setting and embody a vital aspect which informs the slenderness ratio – the manner in which the vertical tower form is brought to ground.

However, most fail to provide a primary requisite of appropriate urban form which is a vital and engaging ground floor plane. The scheme for Parkgate Street purposefully and deliberately sets the concept of new pedestrian public realm facing South onto the Liffey and Heuston Station as a prime deliverable in the form, massing and site arrangement.

Figure 2.17: Capital Dock – 79m

Figure 2.18: Millennium Tower – 67m

Figure 2.19: Liberty Hall – 59m

The site at Parkgate Street was subject to extensive analysis (see section 2.6.4 of the Reddy Architecture + Urbanism Architectural Design Statement included in the planning application documents, as well as the particular criteria in the Dublin City Council Development Plan SDRA 7 and the Urban Development and Building Heights Guidelines for Planning Authorities December 2018 - Section 3).

The scheme has been reviewed for compliance with the criteria as set out in these documents in detail.

The legibility criteria for a tall building from distance are further assessed in terms of how the form can be most legible in its new massing context, so that views created do not adversely affect the defined view corridors in the Development Plan and ensuring the form manifests a slenderness ratio most effective on the skyline.

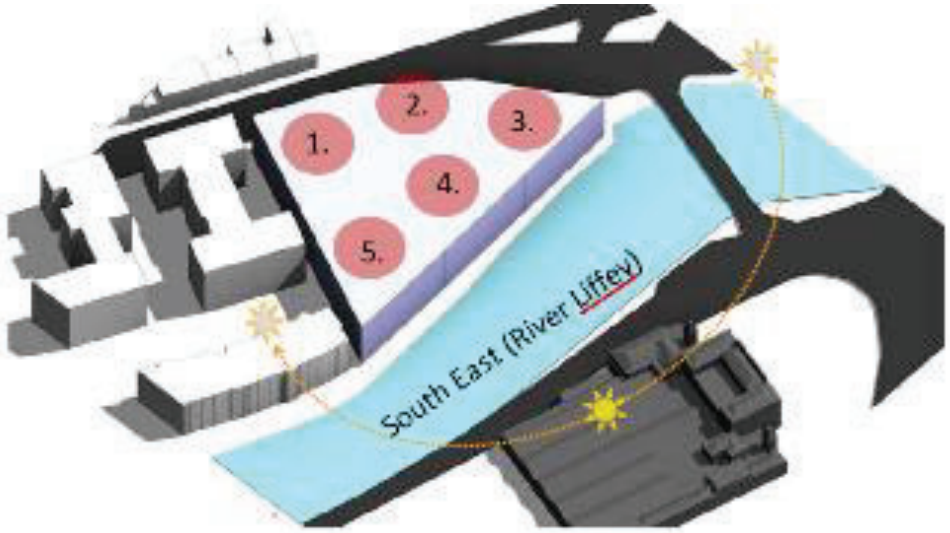

Figure 2.20: Locations numbered 1 – 5 were assessed for suitability for accommodating a structure of significant height on the lands

A structure of significant height to the north west of the site (Locations 1, 4 and 5 on Figure 2.20) obscures views of the Guinness Buildings as viewed from Chesterfield Avenue.

Figure 2.21: View to site from Chesterfield Avenue

(Height above 50m in locations 1, 4 and 5 obscure views to Guinness Structures)

A structure of significant height to the North of the site (Locations 1 and 2 in figure 2.20) obscures views of the Wellington Monument from the North Quays.

Figure 2.22: View to site from Father Matthew Bridge North Quays

(Height above 50m in locations 1 and 2 obscure views to Wellington Monument)

A structure of significant height to the south east of the site appears in views with the Wellington Monument from the south quays but does not obscure views until one is at the Guinness Lands' entry Gates close to Heuston Station. It is considered these views do not negatively impact the view of the Wellington Monument and structures could be deemed to be complementary. For further detailed analysis of the views from distance of the development please refer to **Chapter 13**, Landscape and Visual.

The optimum location for height was therefore deemed to be at the eastern apex of the lands on the basis of the above methodology and for the simple reason that this location on the site best meets the above criteria. An Architectural Design Statement by Reddy A+U (Rev 01) has been prepared to accompany this application and includes further detail in this regard. Further detail on the visual impact of the proposed development is provided in **Chapter 13**, Landscape and Visual.

High rise structures in engineering form demand a resilient base and typically are anchored visually to more substantial lower rise developments. The more successful typologies are not just visual landmarks but afford a public function – a viewing gallery at roof level, significant public realm at the base or public use – retail or civic.

A function of its location, the base of this tower will be subject to view from multiple movement corridors as outlined previously. It is deemed appropriate that the public realm is made visible therefore from the south and north to maximise its use and success in terms of placemaking. The quality of materials at the base of the tower reflects the civic function, with extensive glazing for retail/Food and Beverage, the provision of a southern aspect to the public realm, as well as hard and soft landscaping commensurate with the use intent.

Fiure 2.23 demonstrates how the creation of a building edge to the river from which vertical elements rise in vertical structures manages to increase scale across the site from the west to the eastern apex of the site. Modelling of daylight and sunlight analysis was undertaken to assess the impact of the various design options on daylight within the apartments and in the courtyards to determine how the scheme was performing. Following initial reviews of the daylight and sunlight studies, it was decided to reduce the heights of the perimeter buildings proposed at the river.

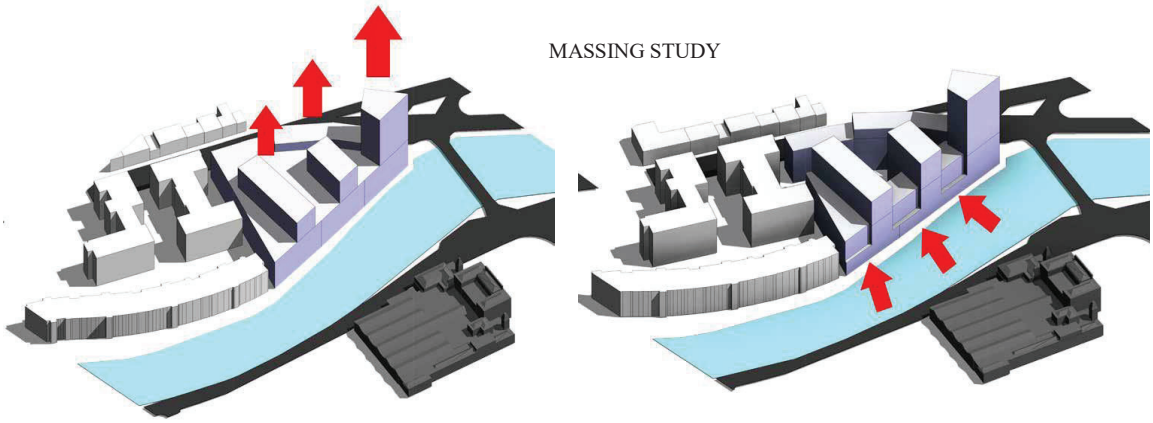

Figure 2.23: Massing Study

Figure 2.24 below demonstrates how the emerging design initially created public realm at the first floor as a podium deck located above the proposed market/food and beverage with views onto the river. Arising from consultation with Dublin City Council Planning department and taking on board the results of further daylight studies, the scheme was simplified with all public realm located at grade and accessed from Parkgate Street.

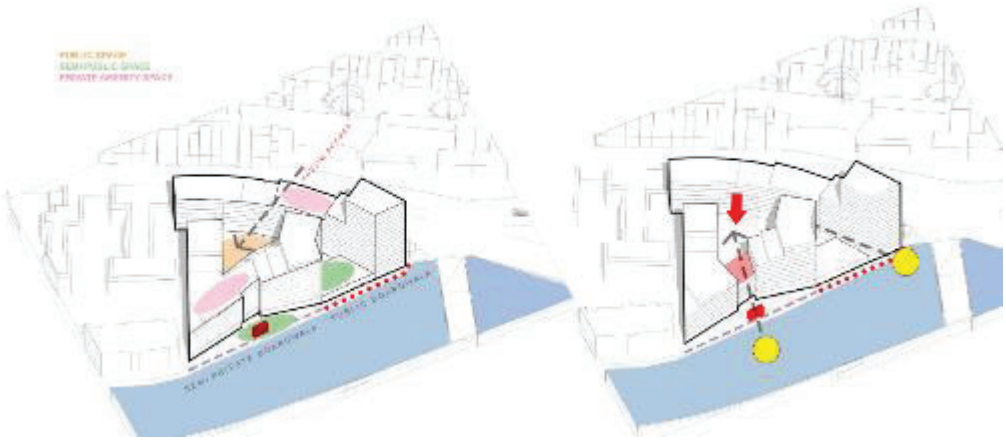

Figure 2.24: Locating Public Realm

The expert opinion of John Worthington and Dr. Lora Nicolau (in the report accompanying this application, *Parkgate, A Focus for Heuston Northern Quarter, Section 4*) has focused on the impact of tall buildings in understanding, viewing and navigating the city, with specific reference to the Wellington Monument and the role of the Parkgate St site in the emergence of Heuston Station district as a central Dublin destination.

In addition, at each stage of development, a comprehensive visual impact assessment was prepared to ascertain the impact on the skyline and in particular the impact on the strategic views within the Heuston Gateway strategic framework (2007). Through continuing assessment and review, each design option was amended in scale following consideration of the views from Chesterbridge Avenue.

The scale of the most prominent vertical element was subject to detailed review to improve the slenderness ratio – resulting in a reduction of the width of the tower from 9 units per floor to 6 units per core.

Continued visual assessment allowed the design to respond to the strategic views and place the new development carefully in relation to the Wellington Monument.

The views to the proposed buildings from the North Quays do not at any stage block the existing views of the Wellington Monument. It is considered that the views are enhanced by a signature slender vertical element at this important juncture of city, transport hub interchange and waterway.

It is considered that the setting of the tower and courtyard buildings as viewed from the South Quays creating a landmark quality focal point directing views towards the Wellington monument as you move through the city.

The lands as outlined previously have a singular location and height on the site would assist in understanding, viewing and navigating the city, with specific reference to the Wellington Monument and the role of the Parkgate St site in the emergence of Heuston Gateway as a central Dublin destination.

A detailed review of the site, its context, setting in the city and relationship with the River, informs the design strategy and proposed building heights within the site, including:

- The massing and setting of the buildings take into account the impact on the skyline
- The strategic views towards the Wellington Monument
- The views to the proposed buildings from the North Quays do not block the existing views of the Wellington Monument
- A comprehensive visual impact assessment was prepared to ascertain the impact on the skyline and in particular the impact on the strategic views within the Heuston Gateway strategic framework. Please refer to **Chapter 13**, Landscape and Visual.

- A series of specific assessments have been carried out as part of the design process and these reports accompany this EIAR.

In conclusion, the scheme as designed has taken considerable design review to ensure that the optimum location on the site has been chosen. The scheme has been rigorously designed to ensure it accords with the objectives of the SDRA 7 with well-designed public realm and permeability which previously was not possible.

The scale of the proposed development and its prominent location in the city will mean that its existence is likely to result in very substantial changes in the visual character of the immediate area surrounding the development. However it is addressing the objectives of the SDRA, the Development Plan and in particular the Department of Housing, Planning and Local Government Urban Development and Building Heights Guidelines for Planning Authorities (December 2018).

The requirement for height and public space is a stated objective of these guidelines. The daylight and sunlight studies indicate that the scheme accords with the proper design for the scheme and its context. It is considered that the use, massing and figure ground of the scheme for Parkgate Street is appropriate for this location and this site.

Figure 2.25: Final Massing Option

2.7 Consideration of the Previous Application

Hickey and Company Limited applied for permission on 21st June 2006 for a mixed use residential and commercial development, to include offices, retail, restaurant and creche facilities, including the following:

- The demolition of the existing structures onto Parkgate street, the relocation, refurbishment and repair of a stone archway (Protected Structure) from its

current position on Parkgate Street to a location south west of its current position within the site.

- Construction of office block with 6 floors
- 2 connecting residential blocks in an L shape fronting Parkgate Street and River Liffey – ranging in height from 7 - 9 floors to accommodate 139 no. residential units
- creche at ground floor level
- 2no. ground floor retail units
- restaurant cafe at ground floor and mezzanine level
- 4 no. own door duplex office units
- pedestrianised street from Parkgate Street to the River ending in an overhanging public plaza
- vehicular access from Parkgate Street to 159 no. basement car parking spaces and 215 no. bicycle spaces
- 2 no. ESB substations

Dublin City Council requested Further Information regarding ten items on 10th August 2006. Following a response to this on 22nd November 2006 the Planning Authority granted permission subject to thirty-four no. conditions on 19th December 2006. It is worth noting that this decision to grant permission provided for significant amendment works to the riverside wall including the following:

- Forming an ope in the existing Quay Wall of 26m wide x 6.2m high
- Extending the public plaza beyond the line of the existing Quay Wall where this ope occurs, cantilevering over the River Liffey below.

This decision was appealed by two 3rd parties and also by the first party applicant. An Bord Pleanála decided to overturn the decision of Dublin City Council and refuse permission, with two reasons for refusal (in italic text below). The reasons for refusal did not make any reference to the proposed interventions to the wall. These reasons for refusal have been addressed in the design response for the current application, as explained below.

a. *The application site lies within the Heuston Station and Environs Framework Development Area (FDA7) as designated in the current Dublin City Development Plan on a 'significant visual connection running from the City Quays to the Phoenix Park and Wellington Monument and in an area close to the key focal point of Heuston Station with 'famous views into and around the station environs' as identified in the Heuston Gateway Regeneration Strategy and Development framework plan.*

   Furthermore, the site is located within a conservation area, as designated in the development plan, wherein it is the stated policy of the planning authority to protect the character of the existing architecture of the existing architecture in design, materials and scale.

In addition, the site lies in close proximity to and affecting the setting of protected structures including Heuston Station to the south of the river and in a location of significant historic, amenity and tourism importance.

Having regard to the scale, massing and generalised design, which is bland and repetitive, it is considered that the proposed development would not reflect the pivotal and sensitive nature of the site and would interfere with views and prospects of special amenity in the environs of the site which it is necessary to preserve, would detract from the character and appearance of the conservation area at this point and would adversely affect the setting of protected structures in the vicinity. The proposed development would, therefore, seriously injure the amenities of the area and be contrary to the proper planning and sustainable development of the area.

b. *The proposed development includes proposals to demolish and relocate a protected structure (entrance stone arch) within the site. It is considered that there are no exceptional circumstances to warrant the removal of this protected archway from its historical position and that its removal would detract from the character and appearance of the conservation area where it is the policy of the planning authority to protect and enhance the character and historic fabric of such areas. The proposed development would, therefore, seriously injure the amenities of this conservation area and would be contrary to the proper planning and sustainable development of the area.*

The design of the proposed development has addressed these concerns, as detailed below.

2.7.1 How the Design addresses the First Reason for Refusal

The first reason for refusal above makes reference to the:

"..significant visual connection running from the City Quays to the Phoenix Park and Wellington Monument and in an area close to the key focal point of Heuston Station with 'famous views into and around the station environs' as identified in the Heuston Gateway Regeneration Strategy and Development framework plan the setting of protected structures including Heuston Station to the south of the river and in a location of significant historic, amenity and tourism importance.."

Heuston Station's setting as a transport interchange is a significant aspect of the proposal to locate a largely residential-led mixed use scheme development in close proximity. The site lies within Dublin City Council's Development Plan SDRA 7, a relatively large area with varying characteristics. In the text relating to SDRA 7 at Paragraph 7 it is stated that '*As a western counterpoint to the Docklands, the Heuston gateway potentially merits buildings above 50 m (16-storeys) in height in terms of civic hierarchy'*. It is inevitable that a building of 50 metres or more in height will have numerous visual connections with its surroundings, both local and at some distance, and it would appear to be the intention of the Planning Authority that buildings of this height within SDRA 7 would have a significant role in place making. As is stated in Section 1.2 of the

Development Plan: '*Place making is particularly important in the strategic development and regeneration areas'.*

It was important to consider what would be an appropriate contemporary use for this site, to fulfil its potential at this juncture in the city and to accord with the SDRA objectives.

It is considered that the site is of such prominence that any development should contribute significantly to the City - in terms of place making, architectural quality and spatial amenity as detailed below.

Spatial Amenity

A new public space and access to the river are considered a primary requisite to achieve this.

The site has significant south facing frontage onto the river which is bounded currently by the high stone wall which has very few openings to facilitate daylight penetration. Many potential use types - commercial use (office), retail use, civic and leisure, would all necessitate large floor plates at the lower floor and ground plane.

For this scheme design to consider utilising a commercial/retail/civic use at ground floor would essentially have the effect of replicating the existing use which dominates the site and is a physical barrier to any access visual or otherwise to the river. In addition, a deep floor plate of this type over six – seven storeys would create in effect a low massive building structure which is appropriate for the courts buildings which has an inherent defensive nature given its function.

This form and massing would result in an impermeable building with limited north facing public realm. A mixed-use scheme affords the ability to have an active use at ground floor which is subservient to residential/commercial use above. The residential footprint is also smaller and more conducive to ensuring increased public realm at the ground plane.

Architectural Quality

This encapsulates many aspects of design:

Legibility: Arrangement of the plan form and uses to be readily understood – conveying the different types of space – private and public.

Permeability: Levering the unique location for access to the river and views to Heuston Station and east towards the city.

Contribution to its environs – a conservation area: The civic nature of the immediate and wider context – buildings such as Dr Steeven's Hospital, Sean Heuston station and its forecourt, Phoenix Park, the Courts Building, Parkgate Street's urban grain, Collins barracks and the Croppy Acre – all contributors to the fabric of this area of the city and its heritage. Any development on the site will be visible from these locations.

Activation of ground floor into Parkgate Street – the public face: Currently one combined pedestrian and vehicular access provides relief in a continuous solid wall around the site. The elevation to Parkgate Street façade is a continuous painted brick colonnade with no glazing/windows or doors. The elevation onto the River Liffey contains several windows in the contiguous outbuilding's and some blocked up smaller window openings, otherwise it is a massive stone edifice facing south and onto Sean Heuston Station.

Iarnrod Éireann's own objectives for development of their lands – as in Connolly Station - would suggest that the context of Heuston Station will change in the medium to long term as is an objective of the SDRA 7. Section 15.1.1.10 therein refers – "*as a western counterpoint to the Docklands, the Heuston gateway potentially merits buildings above 50 m (16-storeys) in height in terms of civic hierarchy".*

The lands as outlined previously have a singular location and height on the site would assist possibly in understanding, viewing and navigating the city, with specific reference to the Wellington Monument and the role of the Parkgate St site in the emergence of Heuston Station district as a central Dublin destination.

A detailed review of the site, its context, setting in the city and relationship with the River, informs the design strategy and proposed building heights and locations within the site:

- The massing and setting of the buildings take into account the impact on the skyline.
- The strategic views towards the Wellington Monument.
- The views to the proposed buildings from the North Quays do not block the existing views of the Wellington Monument.
- A comprehensive visual impact assessment was prepared to ascertain the impact on the skyline and in particular the impact on the strategic views within the Heuston Gateway strategic framework.

It is considered that the use, massing and figure ground of the scheme for Parkgate Street is appropriate for this location and this site.

Please also refer **Chapter 13**, Landscape and Visual and the Reddy Architecture + Urbanism: Architectural Design Statement Rev 01

Again, under the first reason for refusal, reference was made to the need to:

"…reflect the pivotal and sensitive nature of the site, views and prospects of special amenity in the environs of the site, the character and appearance of the conservation area at this point and the setting of protected structures in the vicinity..".

The Dublin City Council Development Plan highlights the site as being within SDRA 7, a relatively large area with varying characteristics. In the text relating to SDRA 7 at Paragraph 7 it is stated that 'As a western counterpoint to the Docklands, the Heuston gateway potentially merits buildings above 50 m (16-storeys) in height in terms of civic hierarchy'.

It is inevitable that a building of 50 metres or more in height will have numerous visual connections with its surroundings, both local and at some distance, and it would appear to be the intention of the Planning Authority that buildings of this height within SDRA 7 would have a significant role in place making. As is stated in Section 1.2 of the Development Plan: 'Place making is particularly important in the strategic development and regeneration areas'.

It was important to consider what would be an appropriate contemporary use for this site, to fulfil its potential at this juncture in the city and to accord with the SDRA objectives.

It is considered that the site is of such prominence that any development should contribute significantly to the City - in terms of place making, architectural quality and spatial amenity. The massing and setting of the buildings have been carefully considered taking into account the impact on the skyline and the strategic views towards the Wellington Monument. The views to the proposed buildings from the North Quays do not block the existing views of the Wellington Monument. It is considered that the views are enhanced by a signature slender vertical element at this important juncture of city, transport hub interchange and waterway.

The setting of the tower and courtyard buildings as viewed from the South Quays creates a landmark quality focal point directing views towards the Wellington monument as you move through the city.

The proposal seeks to integrate the protected structures of significance into the project and they are primary focal points to the scheme as designed. Currently they are in state of neglect. Interventions in the boundary wall make it accessible and break the impermeable nature of the site to allow the location be visually active, accessible and meaningful to the city – this serves to add to the character of the area and improve the appearance of the elements of conservation significance.

The wall and turret are incorporated into the pedestrian walkway to the river and in the south facing public realm areas at the ground plane which face south and to Heuston Station.

The previous scheme as refused proposed demolishing the stone buildings which are located to the west of the boundary wall and face onto the river. The design proposal is to retain these structures insofar as possible and reimagine the spaces with active uses.

The archway on Parkgate street is prioritised as a new focal point for access from the street into the residential courtyard and the new buildings are set back to facilitate the prominence and significance of the archway to the heritage of the site.

The first reason for refusal also references the:

"…scale, massing and generalised design, which is bland and repetitive…"

The repetitive nature of apartment block elevations is avoided in the proposed scheme through careful elevation composition which breaks down the mass and

size of the buildings. Furthermore, the facades of the new development are articulated to create a lively / moving façade.

Materiality - elevational treatment:

Materials that resonate with the industrial and civic context – the brick of Diageo/Guinness, cut stone of Heuston Station and Collins Barracks and the render of Steevens Hospital should be considered and used where appropriate and will provide a modern interpretation with traditional materials.

The previous scheme as refused consisted of a linear monolithic block with a repetitive elevation design approach. The proposed scheme consists of a series of vertical elements which allow visual connection and enhance the pivotal nature of the site.

The second reason for refusal related to architectural heritage and conservation and was as follows:

"The proposed development includes proposals to demolish and relocate a protected structure (entrance stone arch) within the site. It is considered that there are no exceptional circumstances to warrant the removal of this protected archway from its historical position and that its removal would detract from the character and appearance of the conservation area where it is the policy of the planning authority to protect and enhance the character and historic fabric of such area. The proposed development would, therefore, seriously injure the amenities of this conservation area and would be contrary to the proper planning and sustainable development of the area".

This scheme proposes to clean and restore the stone arch and to use it as the primary residential gateway to the entrance colonnade that leads to the south facing communal courtyard.

The setting of the arch is prioritised as a new focal point for access from the street into the residential courtyard, and the new buildings are set back to facilitate the prominence and significance of the archway. A contemporary railing device to frame the archway and connect it to the new build elements onto Parkgate Street in a more measured manner became a focus with DCC conservation in the last review of the scheme proposals (November 10th 2019).

The scheme was amended to reflect a more integrated approach to the use of the Arch as a pedestrian entrance to the residential private space and a general pedestrian access to the new development.

2.8 Conclusions

The design of the proposed development has evolved over a number of iterations, responding to the site context, business need, planning policy constraints, and the requirement to deliver a coherent, attractive and sustainable use for the existing site.

In conclusion, the scheme as designed has taken considerable design review to ensure that the optimum location on the site has been chosen. The scheme has been rigorously designed to ensure it accords with the objectives of the SDRA 7 with well-designed public realm and permeability which previously was not possible.

The scale of the proposed development and its prominent location in the city will mean that its existence is likely to result in very substantial changes in the visual character of the immediate area surrounding the development. However, it is addressing the objectives of the SDRA, the Development Plan and in particular the Department of Housing, Planning and Local Government Urban Development and Building Heights Guidelines for Planning Authorities (December 2018). The requirement for height and public space is a stated objective of these guidelines.

The daylight and sunlight studies indicate that the scheme accords with the proper design requirements for the proper daylight and sunlight standards for the scheme and its context.

The planning history and previous development proposals for the site and the shortcomings which resulted in reasons for refusal have been considered in their entirety in this review. It is considered that the scheme as proposed now incorporates design responses which mitigate against the issues and concerns raised in that refusal. It is considered therefore that the use, massing and figure ground of the scheme for Parkgate Street is appropriate for this location and this site.

Each element of the scheme has been subject to peer review within the design team, and also pre-planning discussions with Dublin City Council and An Bord Pleanala to ensure that the development proposal will fully meet all the design objectives as set out in this chapter and has considered environment aspects, in particular architectural heritage and visual impact. For further information refer to the Reddy Architecture + Urbanism Architectural Design Statement Rev 01 which accompanies this application.

2.9 References

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- Department of Housing, Planning and Local Government, 2018. *Urban Development and Building Heights - Guidelines for Planning Authorities*. Dublin, Ireland.
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- John Worthington and Lora Nicolau. Parkgate. *A Focus for Heuston Northern Quarter*, expert opinion in support of planning submission to An Bord Pleanála.
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- Urban Projects for Dublin City Council, 2003. *Heuston Gateway - Regeneration Strategy and Development Framework Plan*. Dublin, Ireland.

3 Description of the Proposed Development

3.1 Introduction

This chapter describes the proposed development, as defined in **Chapter 1,** Introduction and Need for the Scheme. Specifically, this chapter describes the design, operation and decommissioning elements of the proposed development, whilst the construction aspects of the proposed development are described separately in **Chapter 4,** Construction Strategy.

This chapter of the EIAR has been prepared in compliance with Part 1 of Annex IV of the EIA Directive[1] and in accordance with the *Planning and Development Act 2000*[2], as amended and the *Planning and Development Regulations 2001*, as amended[3]. This chapter has also been prepared with due regard to the overarching EIA guidance as outlined in **Section 1.9.3**.

A description of the author's qualifications and experience is presented in **Appendix 1.1**.

3.2 Design of the Proposed Development

3.2.1 Introduction

This section provides a detailed description of the design of the proposed development. The characteristics of the proposed development relevant to the various environmental topics assessed in **Chapters 6 – 20** are further described within those EIAR chapters, as relevant.

3.2.2 Overview

The proposed development is a mixed-use residential and commercial scheme comprising 'Build to Rent' residential units with associated residential amenities and facilities, commercial office and café/restaurant floor space. A new public square will be provided, along with a public riverside walk and private amenity courtyard. The proposed development is located at the existing Hickey's site, 42A Parkgate Street, Dublin 8 (Refer to **Chapter 1,** Introduction and Need for the Scheme, for the location of the proposed development and description of the existing site).

The proposed development will facilitate the much-needed regeneration of a currently underutilised, brownfield site, and will provide complementary modern residential accommodation in a city centre location.

[1] EC, 2014. *Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment*.
[2] GoI, 2000. *Planning and Development Act 2000*, as amended.
[3] GoI, 2001. *Planning and Development Regulations 2001*, as amended.

The signature architectural element of the proposed development will be the 29-storey residential tower, which is sited at the eastern end of the proposed development site, near Heuston Bridge, where the site naturally angles. The tower building is accessed off Parkgate Street with a central core serving 29 floors of accommodation and a mezzanine.

The residential units will be served by amenity and management areas including a reception area, a post room, a quiet room, gym, business suites, lounge and TV rooms and other bookable rooms for amenity and cultural use. In addition to the above amenity facilities are miscellaneous support facilities including sub/switch room, refuse and waste management areas, electric meters, administrative areas and cycle parking areas.

At ground floor level the proposed development will largely consist of retail, café/ restaurant and amenity/ancillary facilities which will serve to activate the street level and new open spaces. An overview of the ground floor level of the proposed development is illustrated in Figure 3.1.

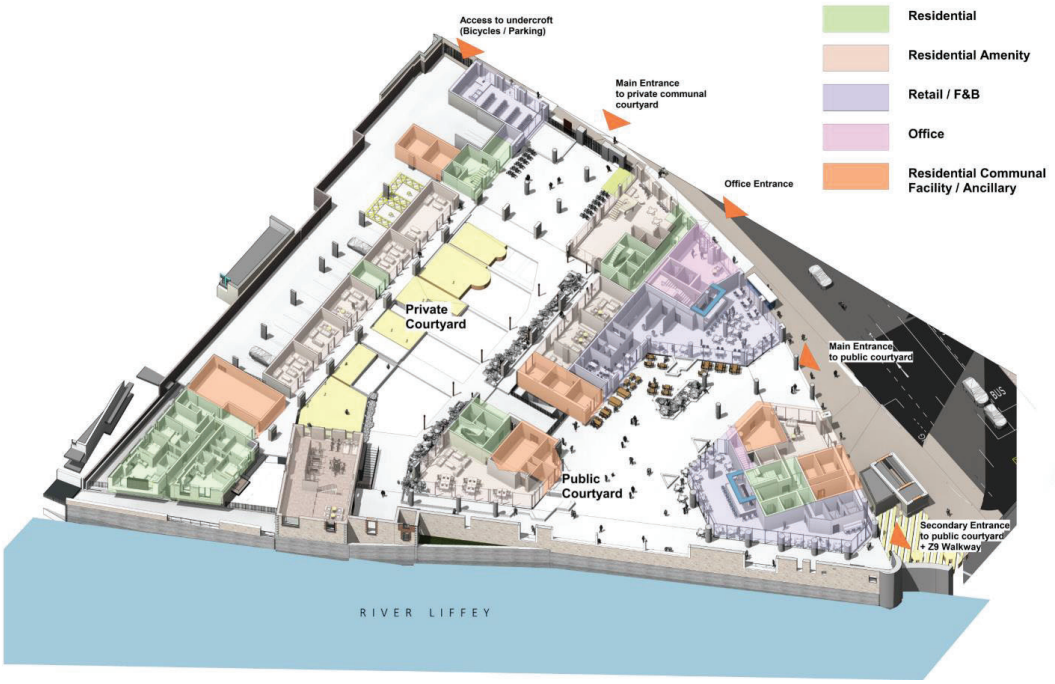

Figure 3.1: Overview of the Proposed Development- Ground Floor Use (orange triangles represent access points to the site)

External works comprise minor works along the south footpath on Parkgate Street, including:

- creating dished kerb at proposed vehicular entrance;
- relocation of recycling bins;
- relocation of 1 No. street light;
- creating of loading bay;
- relocation of Dublin Bikes Station No. 92,

- creating dropped kerbs for emergency access to the development, all subject to relevant permits and agreements.
- Surface water improvement works along the south kerb on Parkgate Street, subject to Local Authority agreement, comprising:
    - new manholes constructed in Parkgate Street pavement;
    - new sections of surface water concrete pipework installed to network new manholes and gullies;
    - connection into existing surface water outfall;
    - diversion of existing road gullies into new surface water sewer; and
    - construction of new trapped blockwork road gullies and connection into new surface water sewer.

3.2.3 Existing Buildings

To facilitate the proposed development, a number of structures on site will be demolished, including Parkgate House. All structures contained within the Record of Protected Structures will be retained, restored and adapted. This includes the riverside stone wall, the turret at the eastern end of the site, the square tower on the riverfront and the entrance stone arch on the Parkgate Street frontage.

In addition to retaining the protected structures, it is also proposed to retain the larger of the two gabled industrial buildings on the river front for use as the resident's gym and to retain part of the smaller gabled building.

All other structures are proposed for demolition. It is proposed to retain some of the large cast iron structural elements from the warehouse for use in the new development.

3.2.3.1 Turret and River Wall

The proposed development provides for some modifications to the existing fabric of the protected river wall structure, to allow a more unified connection between the new public open space, the River and the views to Heuston station beyond. A summary of the proposed modifications to the river wall include:

- Interventions to the river wall; where the penetrations are in line with existing windows opes;
- The integration of elements of fabric retained from the steel structure of the existing warehouse; cast iron columns and beams; with the creation of a rampart walk which will give active use and interface between the protected structure and the public realm;
- The integration of a pedestrian walkway adjacent to the river;
- The restoration of the square tower with gated access and an active use allowing people to walk in and view the structure from within and look across the river to Heuston Station through the existing window;

- Provision of pedestrian access to the River Warehouse where the change in level is achieved with steps and a lift allowing the connection to continue along the river walk towards Island Bridge;
- The removal previous unsympathetic construction works (block infills etc) to open up the ground floor level. These new interventions are deliberately contemporary and legible. These works are intended to provide an increase in natural light levels and to give a better connection to the river walk;
- The cast iron frame elements from the existing building that are to be removed and will be reused in the structure of the walkway resulting in a sympathetic & carefully considered intervention.

3.2.4 Residential Component

The proposed development will provide 481 apartments accommodating over 1,100 residents. The residential component of the proposed development will range in height from 8 to 29 storeys; oriented towards the river with a primarily south facing aspect, arranged around 2 open courtyards. The residential component of the proposed development consists of 5 separate blocks; Blocks A, B1, C1, C2 and Block C3, as illustrated in Figure 3.2. Each residential block has a separate core and entrance with ample amenity and open space (Refer to **Section 3.2.6**).

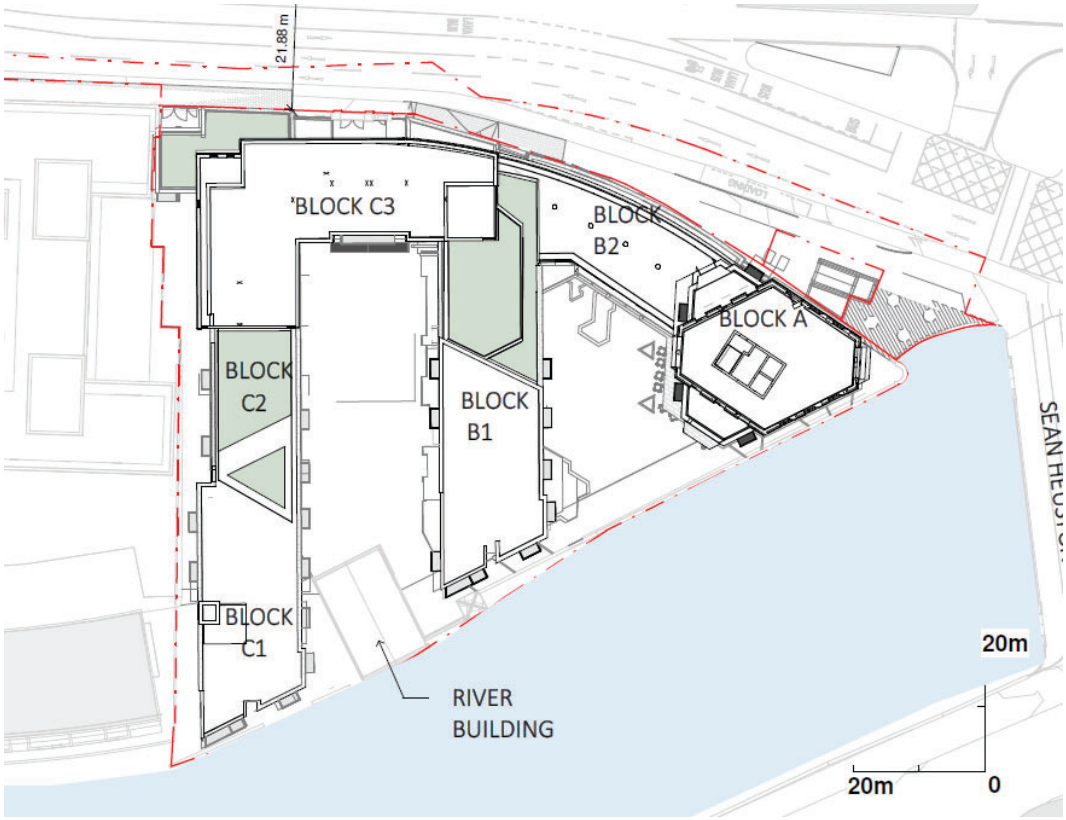

Figure 3.2: Proposed Residential Components

Each block in the proposed development is broken down as follows:

Block A: 29 Storeys. Comprising café/restaurant, retail and resident's amenity at ground floor and mezzanine level, 160 No. residential units from first floor to 27th floor inclusive, including:

- 24 No. Studio apartments
- 109 No. 1-Bed apartments
- 27 No. 2-Bed apartments
- Ancillary residential amenities
- Roof terrace

Block B1: 8 – 13 storeys. Comprising café/restaurant at ground floor level, resident's amenity areas and 141 No. residential units, from mezzanine level to 11th storey inclusive, including:

- 14 No. Studio apartments
- 96 No. 1-Bed apartments
- 27 No. 2-Bed apartments
- 4 No. 2-Bed (3 person) apartments
- Roof terraces

Block C1 / C2 and C3: 9-11 storeys. 180 No. residential units, from mezzanine level to 9th storey inclusive, including:

- 28 No. Studio apartments
- 93 No. 1-Bed apartments
- 51 No. 2-Bed apartments
- 8 No. 2-Bed (3 person apartments)
- Ancillary residential amenities
- Roof terraces

Table 3.1 contains a breakdown of the units proposed:

Table 3.1: Breakdown of Proposed Units

Build to Rent		
Unit Type	**No. of Units**	**As a %**
BTR Studio	66	14%
BTR 1-Bed	298	62%
BTR 2-Bed	105	22%
BTR 2-Bed (3 Person)	12	2%
Total BTR	**481**	**100%**

3.2.5 Commercial Component

Block A of the residential component (Refer **to Section 3.2.2**) adjoins a link block to **Block B** called **Block B2**, as illustrated in Figure 3.3. Block B2 comprises the commercial component of the proposed development, including 6 storeys of office, located above a 2 storey entrance foyer/mezzanine level.

There is an active restaurant use at ground floor and an entrance to the offices above. Figure 3.4 illustrates a typical floorplan of the proposed office building.

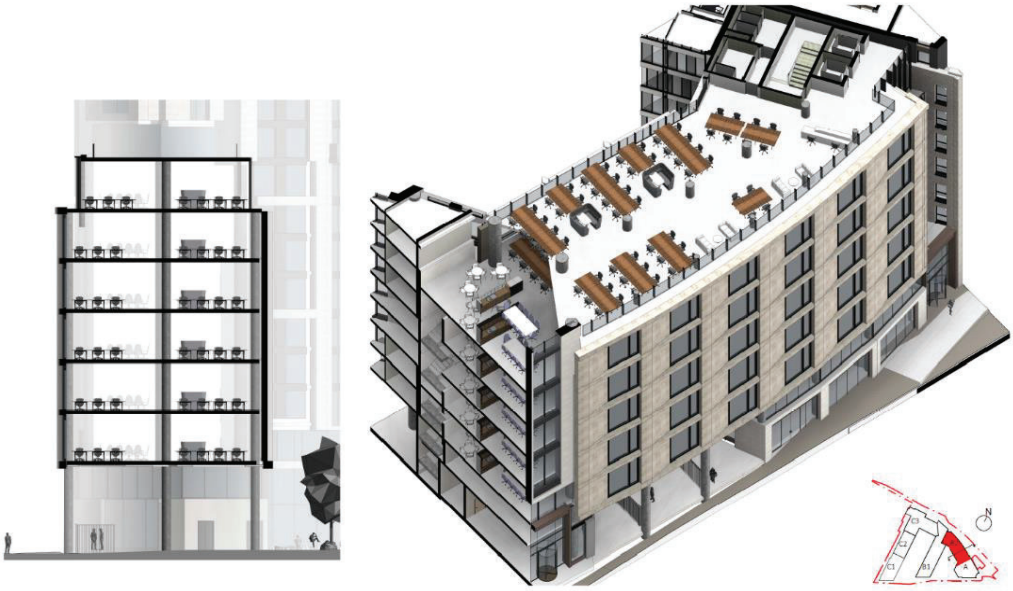

Figure 3.3: Commercial Component of the Proposed Development

Figure 3.4: Typical floorplan of commercial component

The business suites (co working areas) in the ground floor of Block B have flexible design and are able provide space for use by both the residents and the public.

The space could be used by various groups and examples of which (but not limited to are):

- External groups or individuals for meetings
- Temporary art gallery
- exhibitions

The Management Team will work with both residents and local community groups to ensure that the local character, heritage and culture are encompassed within the development. They will actively reach-out to local groups and manage the use and set-up of the rooms through the concierge desk.

3.2.6 Site Access

The proposed development provides two primary gateway entrances on Parkgate Street which will facilitate pedestrian access a private communal residential courtyard and a new public realm plaza to create new links to the river and a vista through to Heuston Station and environs. A third gateway is proposed at the South Eastern corner of the site allowing pedestrian access behind the Quay wall to the main public courtyard. Figure 3.5 illustrates the proposed site access (illustrated as red dots).

Additional active entrances are proposed as part of the new façade on Parkgate Street, which will lead to the proposed residential and commercial blocks.

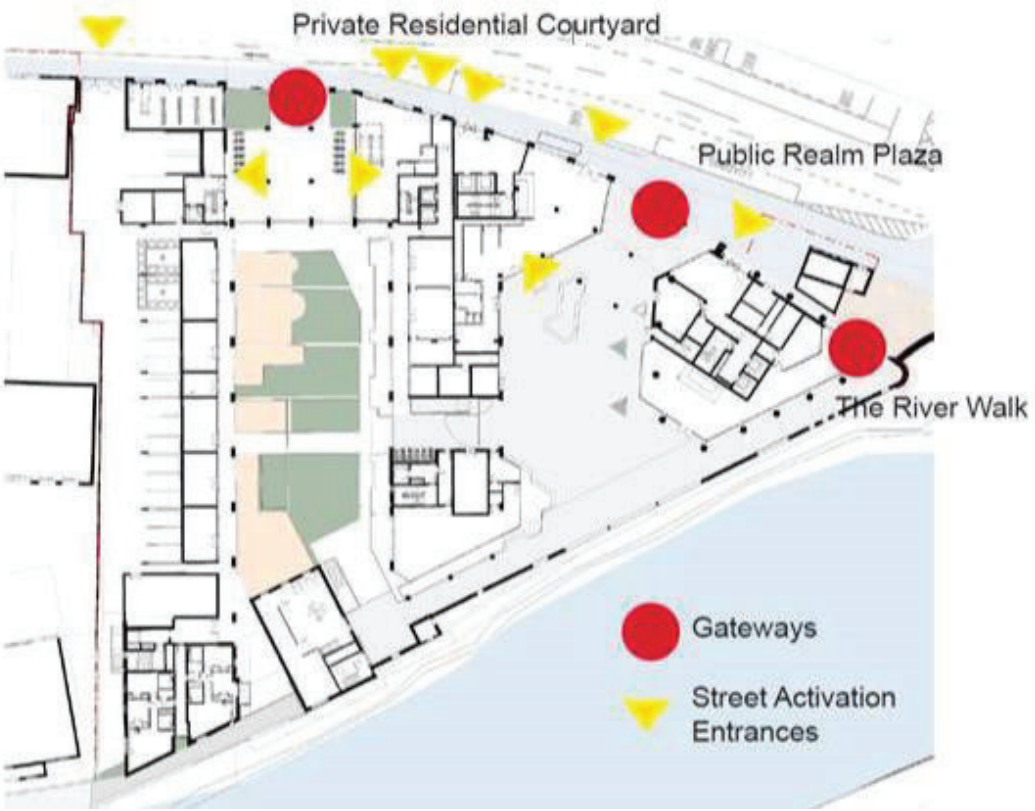

Figure 3.5: Site Access

Vehicles will access the site from Parkgate street at the most northern point of the site (Refer to Figure 3.5). This entrance will provide access to the car parking spaces at ground level and a double car lift which provides access to car parking in the basement.

3.2.7 Public Realm and Open Space

The proposed development provides for a high level of residential amenity. Residents will be provided with a private communal courtyard between Blocks B1 and C2, which will benefit from high quality landscaping. Many of the units will enjoy private balconies, while all will have access to a number of roof terraces which have been designed to afford excellent views and amenity.

Within the communal private courtyard, the entirety of the surrounding ground floor is dedicated to active shared residential use with a gym, co-working spaces and meeting rooms accessed off a continuous colonnade, which also provides covered walkways to the lift cores/front doors of each of the residential blocks.

A second public open space is proposed between Block B and Block A, providing a public connection from Parkgate Street to the river. The public plaza will extend along the river, providing a public internal river walkway.

It is envisaged that the creation of these high-quality spaces, with a mix of uses and active street frontage, will provide a catalyst for the further regeneration of the area by increasing footfall and enhancing the sense of community on Parkgate Street. The public open space will also benefit from passive surveillance from the residential blocks, providing security and safety to the public below. Table 3.2 outlines the proposed amenity and open space provided. Figure 3.6 illustrates the proposed public and private amenity space.

Table 3.2: Proposed amenity and open space

Amenity Space	Area
Internal Amenity	1839m^2
Communal Open Space	2727m^2
Balconies	650m^2
Total	**5216m^2**

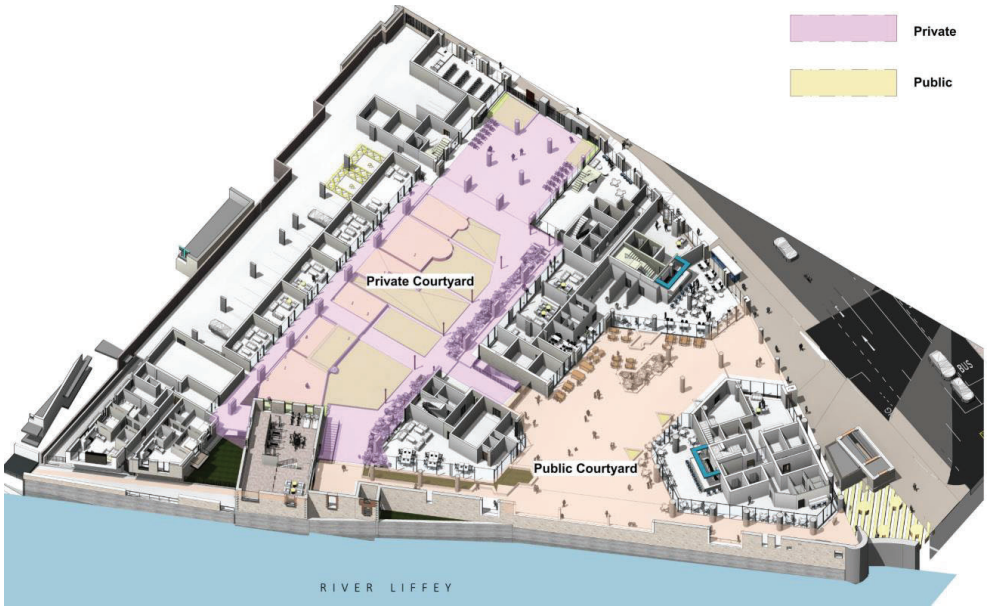

Figure 3.6: Proposed Amenity Areas

3.2.8 Car and Bicycle Facilities

The car parking provision for the development is accommodated in a combination of surface level and undercroft basement level car park directly below the development. An appropriate level of car parking is provided on site. The intention is that the majority of residents and others using the development would access the site by public transport, walking or cycling. The parking will be served by lift and stair access. Disabled car parking spaces are also provided at surface level (located beside a lift core and direct access to the private courtyard). Electrical power/charging points are also provided on certain parking spaces.

Car parking spaces are proposed as follows: 11 spaces at basement level, (1 of which is accessible), and 15 spaces at surface level (2 of which are accessible). Electrical power points are also proposed on certain parking spaces.

Cycle parking is accessed via safe dedicated stairwells with dedicated storage for bicycles at ground level, basement and in the gateway entrance spaces. As required by the *Dublin City Development Plan* [4]and in accordance with the sustainability objectives of the project, bicycle parking spaces for the office accommodation with appropriate changing shower and drying room facilities are also provided in the basement. A total of 551 bicycle parking spaces will be provided.

3.2.9 Materials

A process of design review and comparison of suitable materials took place to ascertain the optimum finish for the buildings onto Parkgate Street.

[4] DCC, 2016. Dublin City Development Plan 2016-2022.

The various blocks onto Parkgate St - Residential, Office and Retail are expressed with a material suitable to its particular use. A mixture of brick cladding and stone banding is preferred for the Tower and office building in this context, bridging the stone tower with the brick residential buildings of Block B/C along Parkgate St.

The subtle difference in tone and texture between the brick infill and stone banding creates interest and variance in the facade. This also used as an architectural device to create a unified building with differing elements presenting a coherent whole.

Three different brick finishes have been selected for the project to ensure that there is a contemporary pattern language for the Parkgate Street elevation that harmonises with the surrounding context.

The verticality of the tower is expressed in a bright limestone finish which will reflect light and aid the seamless appearance of the residential block at this location

The elevation onto the river and internal amenity courtyards have been designed to accentuate the vertical emphasis with a change in material in each building from brick to render.

Refer to Figure 3.7 for the proposed façade materials.

Figure 3.7: Proposed Façade Materials (south elevation and north elevation respectively)

3.2.10 Landscaping

The proposed development will include landscaped areas at ground floor level including a public plaza, a private communal courtyard for residents, and the

creation of a new publicly accessible internal riverside walkway, as described in **Section 3.2.7** Figure 3.8 illustrates the proposed landscaping.

Figure 3.8: Proposed Landscaping

The proposed private courtyard will provide a secure and safe outdoor setting. It will consist of an open grass plane, with a birch grove, structural planting, flowering, raingardens, seating and a play area for young children. Cast iron columns and beams from the original factory will be re-used as a pergola, modulated to fit with the proposed buildings facades. The arrangement of the residential blocks around the courtyard space allows for a communal garden that serves the residents, many of whom have a view over the space. The open space is conceived as a green space, in contrast to the public plaza.

The proposed public plaza consists of a significant area of public open space with the aim to bring vitality to the public realm. The public open space will be a paved public plaza between Block B1, B2 and Block A, connecting Parkgate Street with the river. The proposed hard-landscaping works will be designed as high-quality paving with stone detailing. Tree planting and a range of public seating is also proposed in the public plaza. The public open space will benefit from passive surveillance from the residential blocks, providing security and safety to the public below.

Four semi mature Lime trees are currently located outside the site to the eastern corner, within a railed space. It is intended, with the agreement of Dublin City Council Parks Department, to retain the trees and open this space as an internal public river walk towards the main plaza space.

Some residential units will have access to private open space in the form of balconies, although not all units will come with balconies. In the absence of

balconies, a series of external roof gardens and terrace with associated amenity spaces are located around the development.

The total communal open space including courtyard, rooftop amenities etc is 2727sqm. The total amenity space provided by balconies will be 650sqm and this will be further complemented with 1,839sqm of internal amenity space.

3.2.11 Ancillary works

A number of ancillary works will also be carried out as part of the proposed development, including the relocation of existing infrastructure on Parkgate Street, and the provision of a new drainage network.

A Dublin Bikes station (station 92) is located within the red line boundary of the proposed development site, within the land owned or controlled by DCC. Waste recycling bins are also located within the red line boundary of the proposed development site, within the land owned or controlled by DCC.

Refer to Figure 3.9 for the existing infrastructure on site.

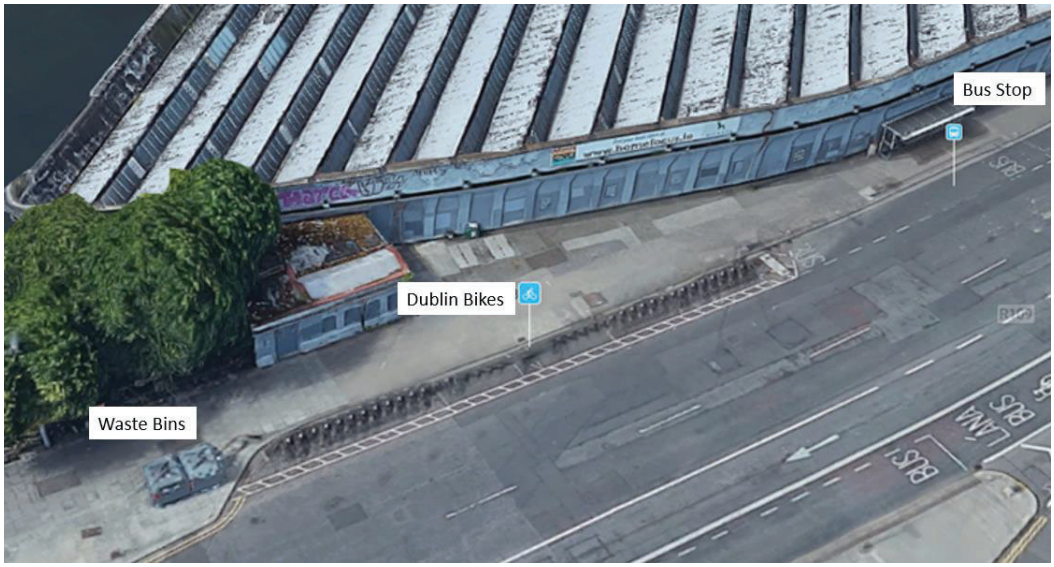

Figure 3.9: Existing Infrastructure

External works comprise minor works along the south footpath on Parkgate Street, including:

- creating dished kerb at proposed vehicular entrance;
- relocation of recycling bins;
- relocation of a street light;
- creating of loading bay;
- relocation of Dublin Bikes Station No. 92 (the new location for the Dublin Bikes Station will be confirmed by DCC), and;
- creating dropped kerbs for emergency access to the development, all subject to relevant permits and agreements.

- Surface water improvement works along the south kerb on Parkgate Street, subject to Local Authority agreement, comprising:
    - new manholes constructed in Parkgate Street pavement;
    - new sections of surface water concrete pipework installed to network new manholes and gullies;
    - connection into existing surface water outfall;
    - diversion of existing road gullies into new surface water sewer; and
    - construction of new trapped blockwork road gullies and connection into new surface water sewer.

The planning application includes for the possibility of placing a small group of telecommunications antennae/dish in the centre of the roof of Block B. These antennae/dish will consist of three small vertical poles grouped closely together each rising 2 metres in height above the parapet of Block B. Each pole will carry a 300-600mm diameter telecommunications dish near the top of the pole. The potential for the same to give rise to a visual impact is discussed in **Chapter 13**, Landscape and Visual.

Refer to C**hapter 4**, Construction Strategy and **Chapter 14**, Water for further detail on the proposed drainage works.

3.3 Operation of the Proposed Development

3.3.1 Introduction

This section provides a detailed description of the operation of the proposed development. The characteristics of the proposed development relevant to the various environmental topics assessed in **Chapters 6 – 20** are further described within those EIAR chapters.

3.3.2 Management

3.3.2.1 General Management Structure

Full-time building supervision, maintenance and management will be provided during the operational phase of the proposed development.

The development at Parkgate Street will be managed by an operational team, led by a property/building manager who is on-site during typical working hours. There will however be additional staff on site, whose hours will rotate to allow for a presence from 08.00 to 20.00 Monday to Friday and Saturday, 09.00 to 16.00[5]. A Sunday presence could be considered, especially during 'lease-up'. Security for the property can be accommodated by either a full-time presence or via an outsourced supplier, providing regular security patrols during the night.

[5] These opening hours are holding times, this will be finalised closer to the completion of the property.

The Building Manager will have key responsibility for day-to-day operations for the property and will ultimately be the customer-facing representative for the Operator.

The Building Manager will be supported by a team of leasing and maintenance staff. Albeit the exact quantum and mix of staff between the 'front of house' and 'back of house' teams to be confirmed. The Building Manager is overseen and supported by an Asset Management team based at a regional level.

Contact details of the key on-site management team will be shared on move-in, which include a centralised mobile phone number. It is intended that residents will also be able to communicate with the management team via a dedicated building website/portal, such as building link, which will be mobile device friendly.

This will encourage communication on events, maintenance alerts and other notifications.

The development will have a designated management office, this office will focus on management of the external/estate management with an emphasis on security, surveillance of basement/bicycle parking, pedestrian access, waste marshalling area, parcel deliveries, car share bookings etc.

The provision of a concierge, caretaker, security and building manager is an attainable level of on-site services and ensures ample 24/7 coverage across the site. The concierge would be able to deal with initial resident queries and direct as needed to the amenity spaces, security or the on-site management team.

The service would operate from the residential support facilities space provided at ground floor level. The concierge would be responsible for achieving a sense of community within the scheme and organising events in the residential amenity spaces provided for at ground floor, first floor and roof level.

There would also be a caretaker on site during the day time hours, who would have responsibility for ad hoc duties including checking entry points to the development, minor repairs and maintenance tasks. These tasks would be both common area and indeed day to day repairs required internally in each apartment e.g. repairs to taps, door handles etc. The caretaker would be fully supported by skilled third-party technicians who would be responsible for all equipment, electrical maintenance and life safety system maintenance. The caretaker would ensure prompt response time to all maintenance issues ensuring the development is maintained to an acceptable standard.

3.3.2.2 Management of Resident Services and Amenities

Residents Lounge & TV Room

The residents lounge will be fob controlled, with the on-site management team having ability to restrict access to individual fob holders as required.

The Lounge will be a relaxed environment where residents can meet neighbours, friends and get to know their fellow renters. The lounge will be available for normal day to day use but may also be utilised by the on-site Management Team

for “neighbourhood meets”, events and promotions solely for the benefit of the residents.

Gym

A purpose-built gym area will be available for residents to use, with organised classes and training sessions being arranged by the on-site management team. Use of the gym will be subject to completion of an induction class, and all classes/instruction will be carried out by qualified trainers/instructors.

Quiet Room

The concept of a Quiet Room is to ensure the provision of a space where residents can enjoy the company of other residents in a low noise, zero alcohol environment.

Quiet Rooms generally need to be managed and it is possible that an application process, denoting the rules of use, may have to be followed to gain access to the QuietRoom.

Bicycle Storage Facilities

The development includes provision for 551 cycle parking spaces, as described in **Section 3.2.8**. Shower and dry-room facilities will be provided to those in the commercial units assisting the development in meeting its sustainability objectives.

Residents Business Suites

It is estimated that 6% of the residents may choose to work from home, provision of a Residents Business Suite will ensure that those choosing to work from home, or those who have flexibility to work occasionally from home, can work in an environment within the development without distractions which can occur when working from home. The building manager would manage the suites and access to same would require a booking to ensure availability.

3.3.3 Employment and Service Provision

The proposed development provides for employment and services through its mix of commercial office enterprise, in addition to the employment generated from the concierge & operational nature of the facilities associated with the Build to Rent residential element (Refer to **Section 3.3.2** for information on the proposed management structure). The retail and commercial office units will both provide facilities for the residents of the proposed development as well as those of the surrounding areas.

The proposed development is estimated to give rise to approximately 550 jobs, during operation. The estimated employment generation associated with the proposed development is included in Table 3.3.

Table 3.3: Estimated Employment Generation

Employment Generating Use	Jobs Estimate
Office and Co-working	410 - 510

Retail unit	10
Restaurant unit	30
Operations Staff	10
Work from home	90
Total	**550 - 560**

Refer to **Chapter 4,** Construction Strategy for construction employment numbers.

3.3.4 Community and Housing

The proposed development will provide much needed residential opportunities in this prime city centre area, which will help cater for the considerable and consistent demand in housing in Dublin. Some 481 residential units will be provided as part of the proposed development.

Part V of the *Planning and Development Act as amended*[2], provides for social and affordable housing obligations for developers, in order to ensure the proper planning and sustainable development of the area. The proposed development will include the provision of 48 No. units under Part V, including a mix of apartment sizes.

In addition to new residents, the proposed development will improve the vibrancy and vitality of the area and will help to support existing community and social infrastructure. The proposal seeks to create a new dynamic gateway in the city connecting to existing zones of retail, commercial, hospitality, cultural and residential activity.

The proposed public courtyard will contribute to the cultural context, providing a space for markets and outdoor entertainment, whilst simultaneously providing a place where the setting of one of the areas key landmarks, Heuston Station and the Guinness Lands can be framed in views.

The creation of this high-quality quarter will provide a catalyst for the further regeneration of the area increasing footfall and a sense of local community with the introduction of cafes, food and beverage, commercial office and high quality residential uses along Parkgate Street.

The proposed mix of housing will ensure that, taken with the existing homes in the Island Bridge, Arbour Hill and Smithfield area, the overall mix in the neighbourhood is conducive to maintaining a healthy balanced community.

The development is designed to be inclusive for all users and will provide level access, a range of household sizes to cater for all users and ages, will present a positive aspect for all passers-by and will not present barriers for access.

Alongside making physical connections between the site and its surroundings, the proposed development will create visual connections between the scheme and neighbouring environment from the River Liffey and Phoenix Park to the Dublin mountains. The proposed development will provide a positive identity to the locality by providing a quality residential mixed-use development and a city

landmark which enhances the area and announces the Heuston Gateway to the city.

The proposed development provides a variety of dwelling types which will complement the stock of housing in the area.

The proposal will provide a positive addition to the area with a similar high-quality expression for the facades. The layout makes the most of the existing site and topography to create a memorable design.

3.3.5 Energy

An Energy Analysis assessment has been carried out by IN2 Engineering Design Partnership. The assessment was based on the current building regulations framework and the requirement to achieve a Nearly Zero Energy Building (NZEB) for all new developments.

NZEB includes a requirement for on-site renewable technology. Options considered suitable for the proposed development include Heat Pumps, Combined Heat and Power (CHP) and Photovoltaic (PV) panels. All three options considered for the proposed development will achieve NZEB compliance and are considered suitable options.

All three options considered rely on Heat Pump technology which uses the energy released from a phase change of the refrigerant to deliver more heating energy than inputted to the system. Although all options perform well with low associated CO_2 emissions the centralised solution is the optimal whole life cycle cost solution.

Table 3.4 summarises the results of the analysis of 3 No. possible options which could be considered suitable for the proposed development.

Table 3.4: Proposed Energy Options

Options	PV panels Required for NZEB	Annual CO2 Emissions Per Apartment
1 Ducted Air Source Heat Pump	0.7	1,300kg
2 Exhaust Air Heat Pump	0.7	1,300kg
3 Centralised Air Source Heat Pump	0.2	750kg

3.4 Decommissioning of the Proposed Development

Given the nature of the proposed development, there are no current plans for the future decommissioning of the same. The proposed development will provide for residential and commercial buildings which are envisaged to become permanent features of the city centre landscape.

A Building Life-Cycle Assessment Report has been prepared by Aramark and included in the planning application documents, which describes the building materials proposed for use in the construction of the proposed development, their expected lifecycle and the maintenance required for the same. The choice of high

quality and long-lasting materials such as brickwork, render and stone cladding, as well as both soft and hardscape in the public, semi-public and private realm will contribute to lower maintenance costs for future residents and occupiers.

3.5 References

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4 Construction Strategy

4.1 Introduction

This chapter describes the indicative construction strategy for the proposed development. The design and operation elements of the proposed development are described separately in **Chapter 3**.

This chapter of the EIAR has been prepared in accordance with Part 1 of Annex IV of the EIA Directive[1] and with article 94 and Schedule 6 of the Planning and Development Regulations, as amended ("the Regulations" hereafter. This section has therefore been structured to describe the following:

- Land use requirements to support the construction of the proposed development;
- Indicative duration and phasing during the construction period;
- Likely activities required to prepare the site and undertake the enabling works to support the construction of the proposed development;
- Indicative methodologies to undertake demolition and construction activities (including works to structures/buildings of architectural heritage value);
- Likely activities required to undertake final finishes and landscaping;
- An overview of anticipated employment numbers, hours of working, and construction safety measures which will be enforced during the construction of the proposed development (see **Appendix 4.1**); *and*
- An overview of employment and typical site and environmental management measures associated with the construction of the proposed development (see **Appendix 4.1**).

A Construction Environmental Management Plan (CEMP) has been prepared to provide minimum requirements that appointed Contractors will be required to implement (see **Appendix 4.1)** for the proposed development.

This chapter has been prepared with due regard to the overarching guidance on EIA as outlined in **Section 1.9.3**.

4.2 Land Use Requirements

The site of the proposed development is owned by the developer, Ruirside Developments Limited. No acquisition of land will be required during the construction phase of the proposed development. The development area will also include the portion of landscaped area east of the existing ESB substation on Parkgate Street, and an area of footpath and pavement along Parkgate Street.

[1] Council Directive (EC) 2014/52/EU of 16 May 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0052 Accessed: 03/11/18.

All areas outside the site ownership boundary but within the red line boundary are owned or controlled by Dublin City Council.

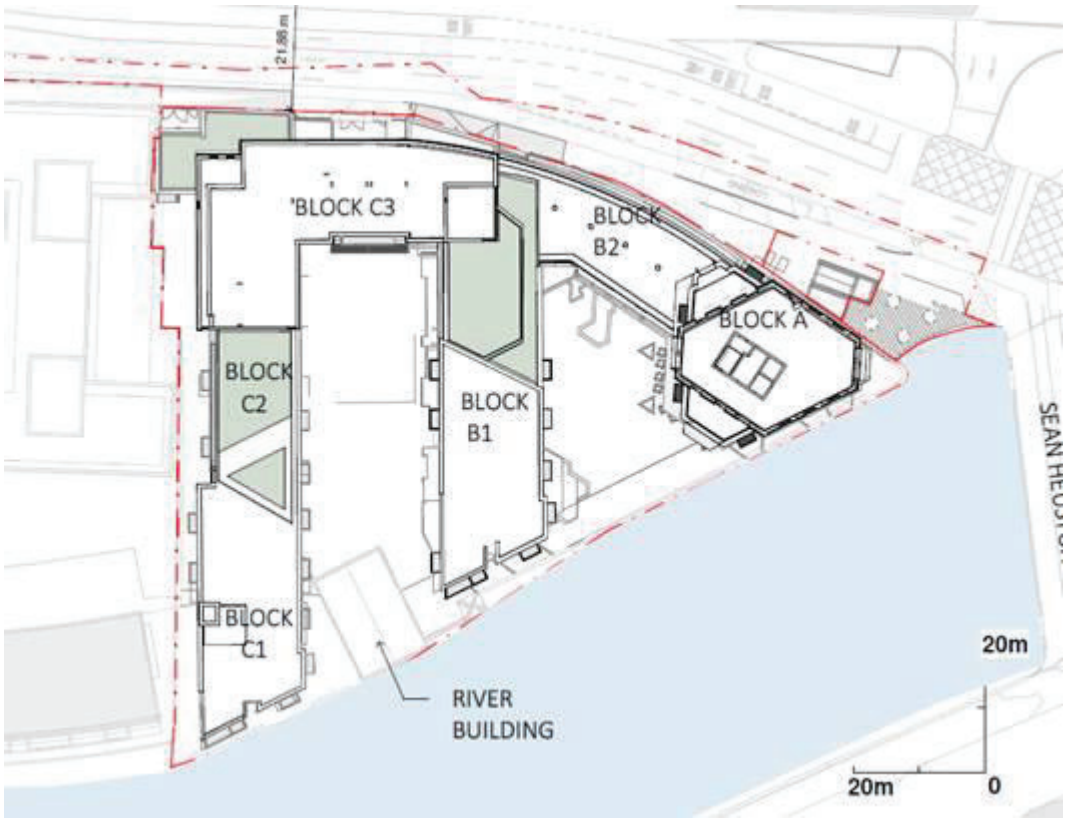


Figure 4.1: Proposed Development Area

The site is currently occupied by Hickeys fabric company and has been since the 1970s. As part of a leasing agreement, Hickeys will vacate the site in December 2019. These lands are currently in the control of Ruirside Developments Limited, so no change in land ownership is required.

The works to take place within the land owned or controlled by DCC (but within the red line planning boundary), for which the necessary licences and consents will be obtained, include:

- Minor works along the south footpath on Parkgate Street;
- Surface water improvement works along the south kerb on Parkgate Street;
- Foul drainage connection on Parkgate Street;
- Vegetation removal, repointing of existing stonework, and the construction of a surface water discharge point to the River Wall; and
- Set up of site offices on the south footway on Parkgate Street, adjacent to the existing ESB Substation.

4.2.1 Construction Compound

The construction compound will be located on site within the planning boundary for the duration of the project. On-site accommodation will consist of:

- Adequate materials drop-off and storage area;
- Set down areas for trucks;
- Site offices; and
- Staff welfare facilities (i.e. toilets etc.).

As construction progresses, it will be necessary to move the location of the construction compound within the site.

Figure 4.2 to 4.8 indicate the location of the construction compound in the context of the proposed development site.

The construction compound will be engineered with appropriate services and will be hoarded or fenced off for security purposes. The compound will be used as the primary location for the storage of materials, plant, and equipment, site offices (which may be two to three stories in height), and worker welfare facilities. An access control facility will be provided to restrict compound access to site personnel and authorised visitors only.

Materials to be stored on site will be stored in a safe manner and will minimise the risk of any negative environmental effects and will be managed on a 'just-in-time' basis. All fuel storage areas will be bunded in the compound and will be clearly marked. Fuel will be transported from the offsite compound to the plant and equipment, on the Parkgate Street worksite, in mobile units based on need. A dedicated fuel filling point will be set up on site with all plant brought to this point for filling.

Temporary toilets and wash facilities will be provided for construction workers. These facilities may require periodic waste pumping and waste offsite haulage, which will be carried out by an authorised sanitary waste contractor. Alternatively, the Contractor may utilise an existing foul drainage connection for site welfare facilities, subject to licence agreement with Irish Water.

Appropriate lighting will be provided as necessary at the construction compound. All lighting will be installed to minimise light spillage from the site and will be temporary, i.e. confined to use during construction only. The Contractor may utilise existing electrical ducting at the boundary, with connection to be agreed with ESB Networks.

No car parking is envisaged to be provided within the site. Staff and visitors to the site will be encouraged to utilise non-vehicular means. Otherwise, there is on-street Pay & Display public parking in the environs of the site.

4.3 Indicative Duration and Phasing

4.3.1 Construction Programme

This section describes the indicative construction strategy and associated programme. It is envisaged that construction of the proposed development will take approximately 34 months. It is envisaged that construction of the proposed development will take approximately 34 months. Phase 1 and phase 2 will run concurrently and are expected to take approximately 4 months. Phase 3 as the main construction works will take approximately 30 months. All construction works will be carried out during day time hours.

The Main Contractor(s)[2], once appointed, will ultimately be responsible for the sequencing and implementation of the works in a safe and secure manner, and in accordance with all statutory requirements and the mitigation measures described in the EIAR. However, the approach outlined below is considered to represent a worst-case scenario as to how the proposed development may be constructed in its entirety. Some flexibility is required in the sequencing of construction, as set out in this chapter, in case on-site problems be encountered.

4.3.2 Construction Phasing

It is anticipated that the construction works for the development of the former Hickey's site will be divided into three separate phases.

Figures 4.2 to 4.8 describe the indicative construction sequence for the development.

- **Phase 1**: Enabling Works and Demolition;
- **Phase 2**: Piling and Groundworks; and
- **Phase 3**: Main Contractor Construction Works.

There will be some overlap in phasing activities, as outlined in the sections below.

4.3.2.1 Phase 1 –Enabling Works and Demolition

Phase 1 will take approximately 4 months. The following is a list of the main activities that are planned to be undertaken in the first phase.

Enabling Works Site Set Up

- Site set up for the enabling works contract, including construction compound and erection of secure site hoarding and fencing along Parkgate Street and the neighbouring premises;
- Implementation of Contractor's Health & Safety Plan for the enabling works and demolition contract;

[2] *Note: It is envisaged that the contract for the construction works will be divided into separate contracts for each of the phases detailed below. Therefore, any reference to the 'Main Contractor' in this document refers to the Main Contractor for each of the individual phases*

- Identification and cut-off, as required, to existing services;
- Protection of existing site features to be retained (See **Section 4.5.3** for further information); and
- Removal and disposal of asbestos, based on survey and site investigations, and in accordance with statutory requirements (See **Chapter 17**, Resource and Waste Management, for greater detail on construction and demolition waste).

Demolitions and Site Preparation

- Undertaking of condition surveys of existing buildings/structures that will be retained (see structures highlighted in blue in Figure 4.2);
- Erection of temporary structures for retention of existing structures around protected archway and quay wall;
- Erection of permanent works for retention of proposed fill to back of existing quay wall and to interface with existing River Building;
- Demolition of existing structures (see structures highlighted in red in Figure 4.2), with the exception of those to be incorporated in the development;
- Excavation and removal of all substructures and foundations to an approximate depth of 1.8m below existing ground level;
- Removal of all underground tanks and other buried structures in advance of piling mat construction;
- Maintenance of protection measures to existing site features to be retained;
- Removal of waste materials off-site in accordance with statutory permitting requirements and retention of selected material for re-use on site as fill; and
- Possible re-use of some demolition waste material (subject to suitability testing) to be crushed and graded on site for re-use in building sub-bases and landscaping.

The Contractor shall coordinate the Works with the Archaeologist.

4.3.2.2 Phase 2 – Piling and Groundworks

The piling works undertaken in Phase 2 consist of the installation of all piles across the site. The works may also include the installation of temporary retention structures to facilitate bulk excavation. The works will run concurrently with Phase 1 and are expected to last approximately 4 months.

Piling

The Piling Specialist will liaise with the separate Phase 1 and Phase 3 Contractors to:

- Develop the preferred sequencing of the works;
- Conduct condition surveys of sensitive boundary structures and existing buildings that will be retained;

- Co-ordinate the design and installation of the temporary works required to implement the Main Contractor's preferred sequence of works;
- Relocate construction compound and welfare facilities within the site boundary; and
- Agree on the optimum location for stockpiling of material for re-use on site.

The Piling Specialist will also undertake the following list of activities:

- Installation, and later removal, of pile working platform (possible re-use of site won material);
- Construction of permanent piles across the site;
- Conduction of working load pile tests on a number of production piles;
- Conduction of integrity testing of all piles;
- Installation and removal of temporary piles; and
- Breaking down of piles within basement area.

Groundworks

The following is a list of the main groundworks activities that are planned to be undertaken in this phase:

- Bulk excavation for basement;
- Removal of surplus excavated material for off-site disposal;
- Stockpiling of site-won material (to be stockpiled for a maximum of 6 months) and appropriate temporary covering (refer to **Section 4.6** for further information); and
- Placement of site-won material in areas at grade for build-up in site levels and as backfill to basement substructure, if appropriate for re-use.

4.3.2.3 Phase 3 – Main Construction Works

The Phase 3 construction works include the construction of the new buildings, the refurbishment of the existing structures, and the external site works. The works will take approximately 30 months. The footpath will remain open throughout the construction phase, with the exception of short, localised road closure licences necessary to complete service tie-ins.

Site Set Up and Preparation

- Mobilisation and site set up for the main contract works, including the erection of the construction compound and secure site hoarding and fencing (note: possible retention and re-configuration of hoarding erected as part of Phase 1);
- Closure of the existing vehicular entrance and construction of a new site entrance between Building A and B for construction movements;
- Conduction of minor works along the south footpath on Parkgate Street, including:

  - Creation of a dished kerb at proposed vehicular entrance;
  - Relocation of recycling bins;
  - Relocation of street light;
  - Creation of loading bay;
  - Relocation of Dublin Bikes Station No. 92; and
  - Creation of dropped kerbs for emergency access to the development, all subject to relevant permits and agreements.
- Improvement works for surface water along the south kerb on Parkgate Street, subject to Local Authority agreement, comprising:
  - Installation of new manholes constructed in Parkgate Street pavement;
  - Installation of new sections of surface water concrete pipework to connect new manholes and gullies;
  - Connection into existing surface water outfall;
  - Diversion of existing road gullies into new surface water sewer; and
  - Construction of new trapped blockwork road gullies and connection into new surface water sewer.
- Protection of existing site features to be retained, including Protected Structures (See **Section 4.5.3** for details);
- Condition surveys of existing buildings and boundary structures that will be retained; and
- Preparation of site area for the construction of the new buildings.

Construction of New Development

It is envisaged that a number of construction activities will progress concurrently at the start of Phase 3 works, including:

- Installation of temporary structures, including tower cranes, needling, and stability measures to existing structures;
- Construction of pile-caps and piled raft foundations in areas at grade;
- Installation of radon barrier/damp proof membrane/waterproof membrane, where appropriate;
- Construction of basement substructure, including retaining walls;
- Construction of all new site services;
- Connection to new foul drainage infrastructure;
- Connection to surface water drainage for discharge to River Liffey;
- Connection to new site services, including Gas, Electricity Supply Board, and Telecoms; and
- Construction of reinforced concrete ground floor slabs.

The rising superstructure is likely to be concrete frame but will comprise different construction methods across the different buildings, as explained below. The various buildings shall be constructed at a similar rate, apart from the Building A

main stability core. The following is a list of the main activities that are planned to be undertaken in this phase.

- Building A main stability core to be slip-form or jump-form construction, meaning the core will be constructed for the full building height in advance of the rest of the superstructure;
- Building A superstructure to be cast-in situ reinforced concrete columns up to first floor. There shall be a thickened slab structure at Level 1 where columns shall change in profile and comprise either precast concrete or in situ reinforced concrete structural form for the remaining building height. The floor slabs shall be flat slab construction, which requires formwork and temporary propping, to roof level;
- Buildings B and C superstructure to be cast-in situ reinforced concrete columns and flat slab construction up to Level 2, which requires formwork and temporary propping;
- Buildings B and C superstructure to be precast concrete from Level 2 to roof, consisting of precast load-bearing stability and non-stability walls supporting precast floor panels with in situ concrete topping. Associated temporary propping to be provided as necessary;
- Installation of temporary works in area between Building A and Building B to maintain construction traffic movements during construction of superstructure overhead;
- Installation of precast construction stair flights and landings, with associated temporary propping as necessary;
- Installation of prefabricated bathroom ensuite pod units;
- Completion of external envelope to Buildings B and C once the concrete frame is near completion and the groundworks is clear. The façade comprises masonry construction with associated relieving angle and lintel supports to the external leaf. Scaffolding around the building exterior to be provided and to remain in place until completion of the façade;
- Completion of external envelope to Building A. The façade comprises either stone faced precast concrete panels or individual fixed stone, and erection will start once groundworks is clear;
- Installation of prefabricated balconies to fixing points cast into the concrete frame to Buildings B and C;
- Completion of reinforced concrete balconies to Building A, which shall comprise Special Finish to the soffit and include a drip check;
- External envelope insulation and detail to ensure air tightness in accordance with the Building Regulations;
- Installation of building services;
- Internal fit out, including partition walls, doors, joinery, and fire rated enclosures as required;

- Toilet and sanitary facilities installation, including disabled/accessible provision in accordance with the Building Regulations;
- Internal finishes (floors, walls, and ceilings) to various areas; and
- Fitted furniture installation.

Other site related works not listed above include:

- Provision of permanent lateral restraint to existing stonework wall along River Liffey upon completion of Level 1 of Building A, and removal of temporary retention structure;
- Construction of appropriate sub-base to non-trafficable and trafficable areas;
- Refurbishment and strengthening to existing structures retained on site;
- New substructure and internal superstructure to existing River Building at west end of river wall;
- Removal of vegetation, pointing repair to localised sections of stonework, and construction of a surface water outfall point to the existing quay wall; and
- Landscaping works, beginning at Building A and progressing westward.

Figure 4.2: Layout of existing structures (red reflects demolition; blue reflects to be retained)

Figure 4.3: Overall sequencing of Works (1 of 6)

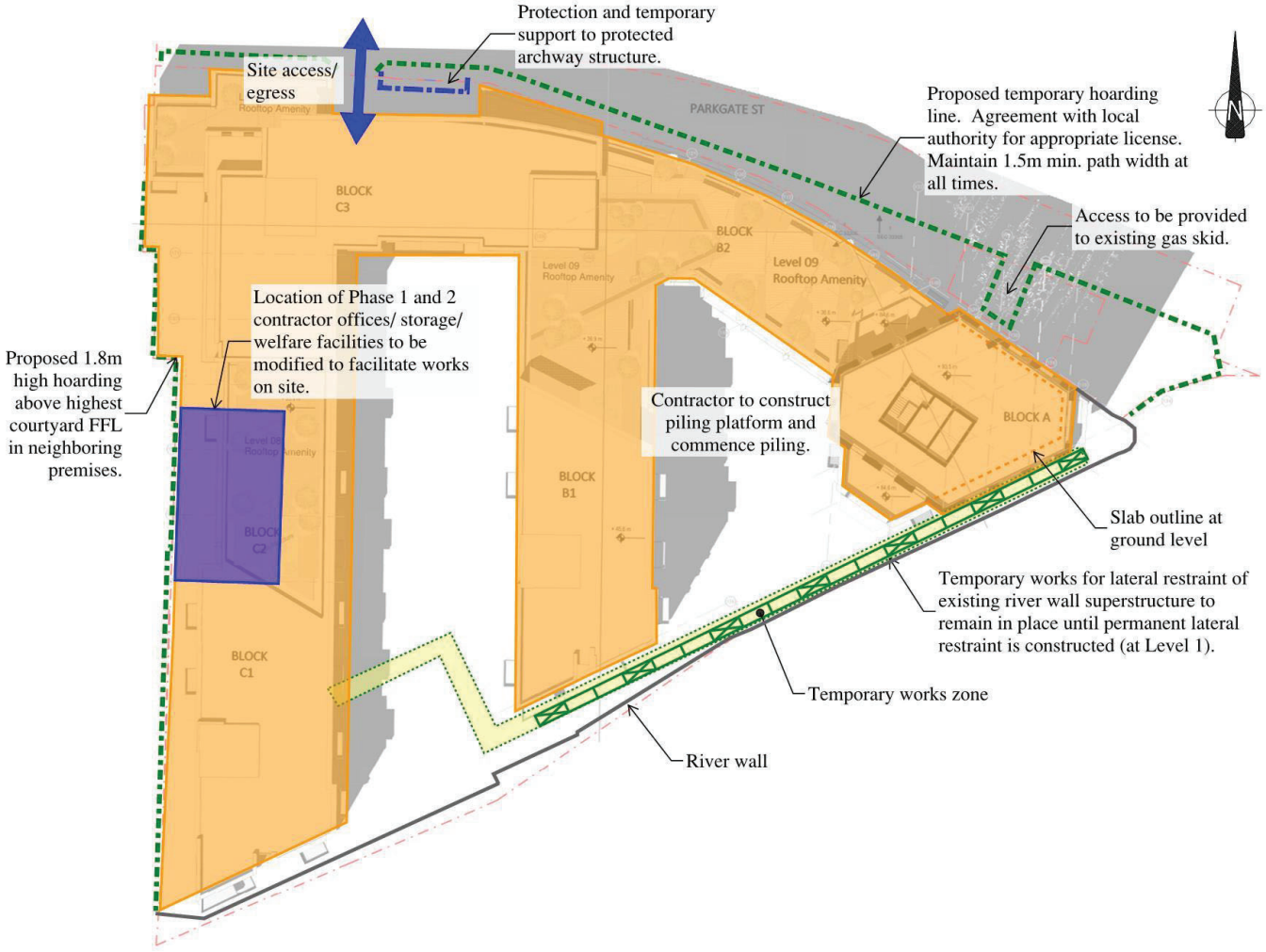


Figure 4.4: Overall sequencing of Works (2 of 6)

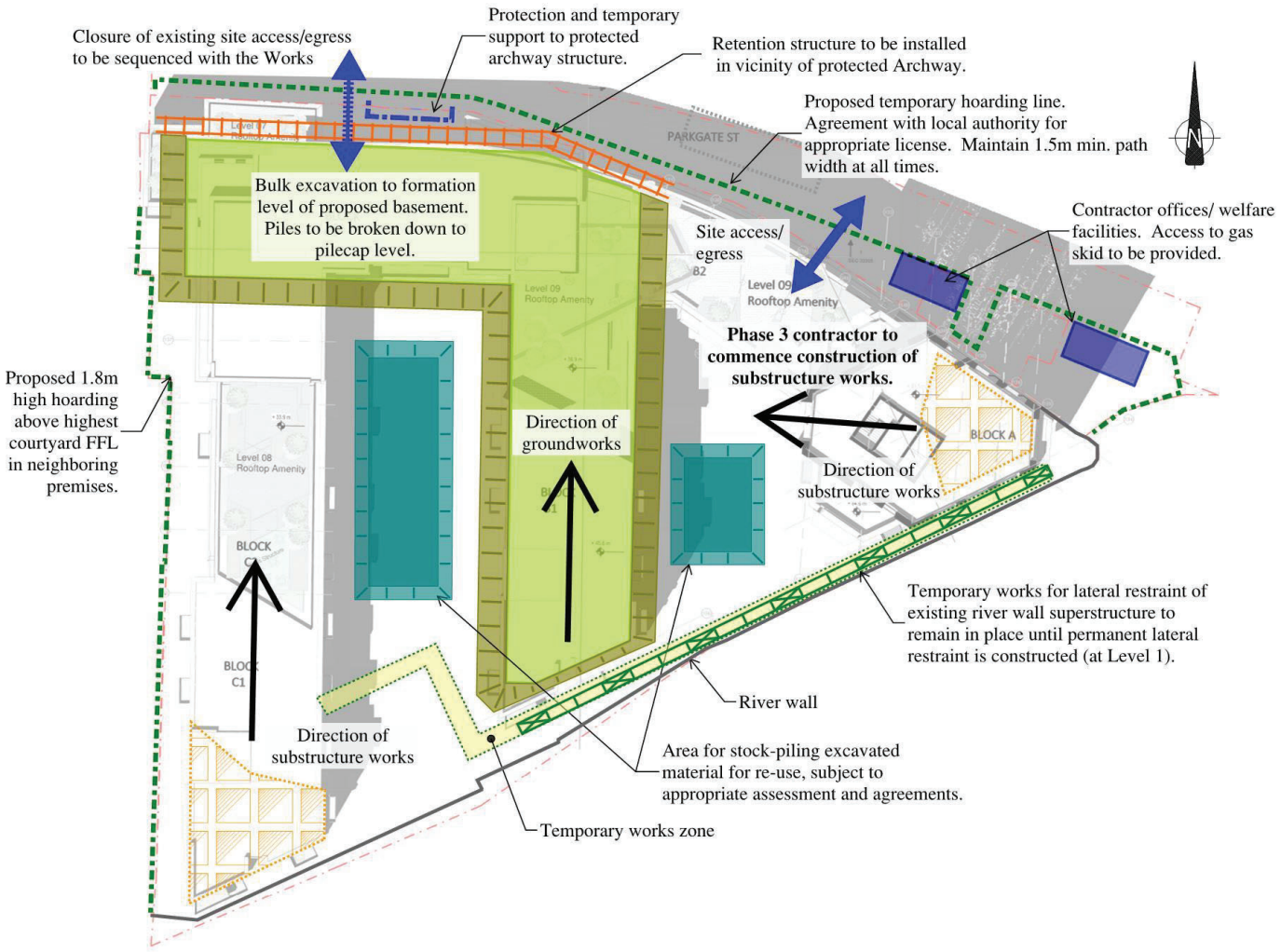


Figure 4.5: Overall sequencing of Works (3 of 6)

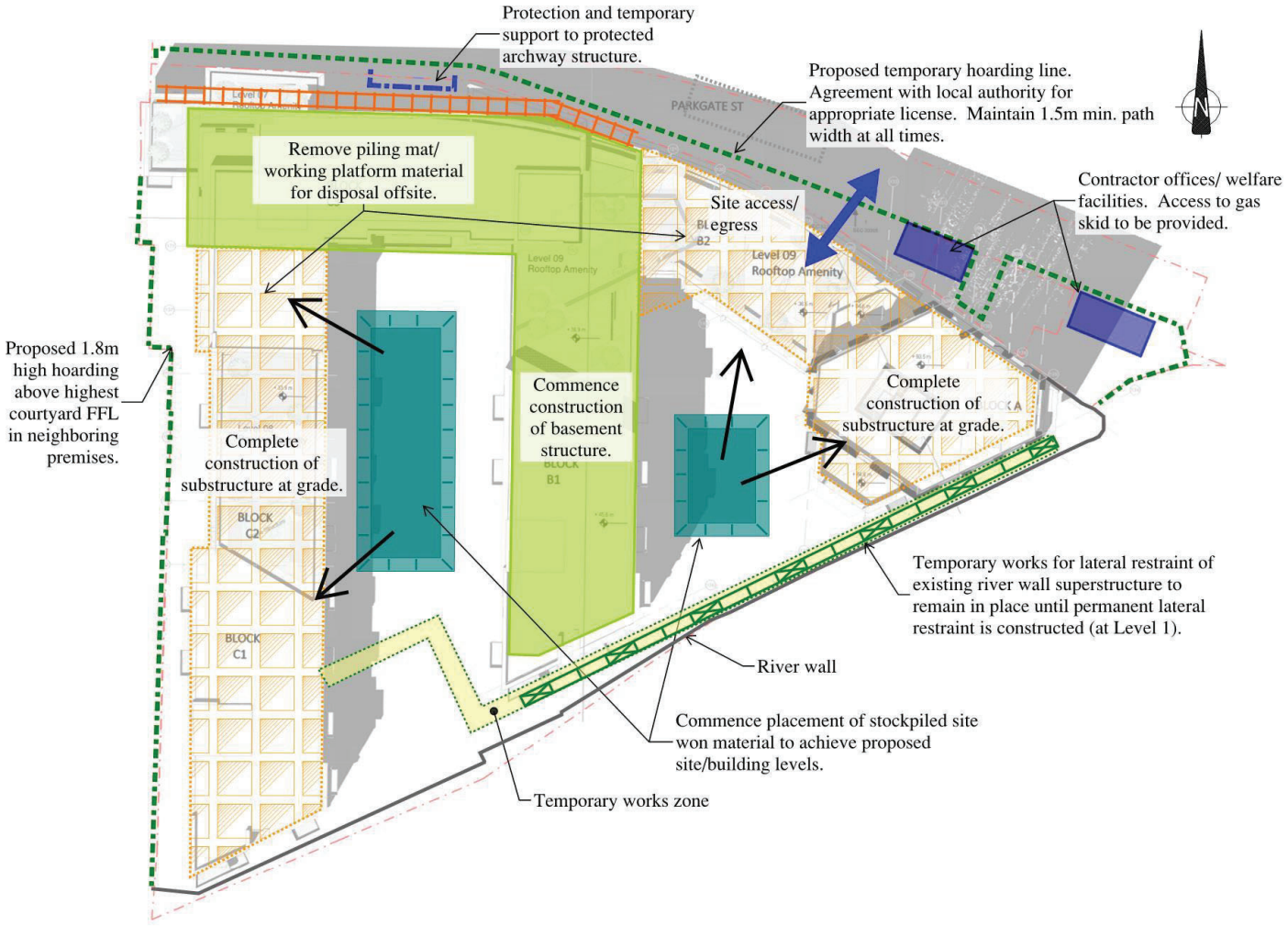


Figure 4.6: Overall sequencing of Works (4 of 6)

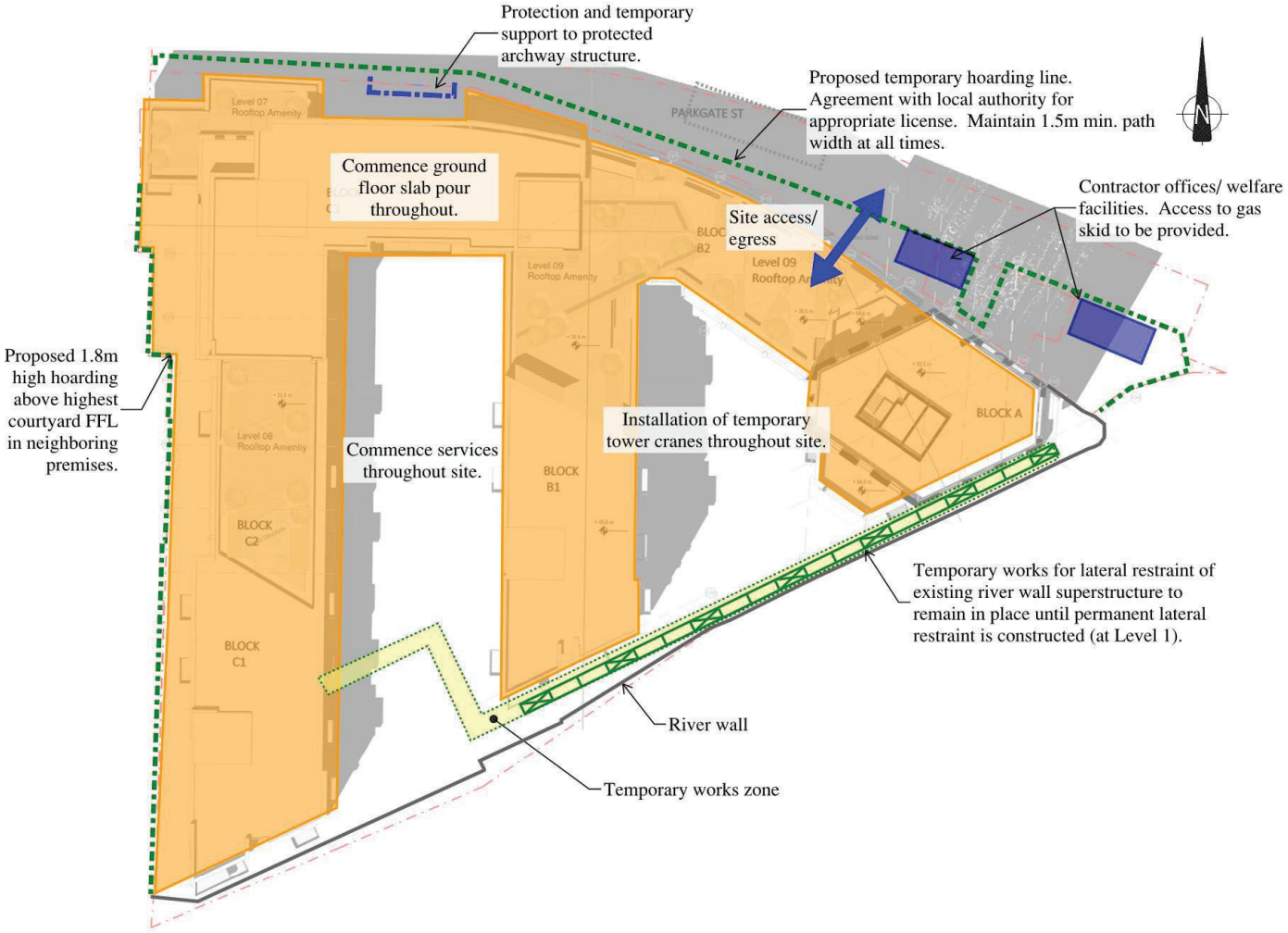


Figure 4.7: Overall sequencing of Works (5 of 6)

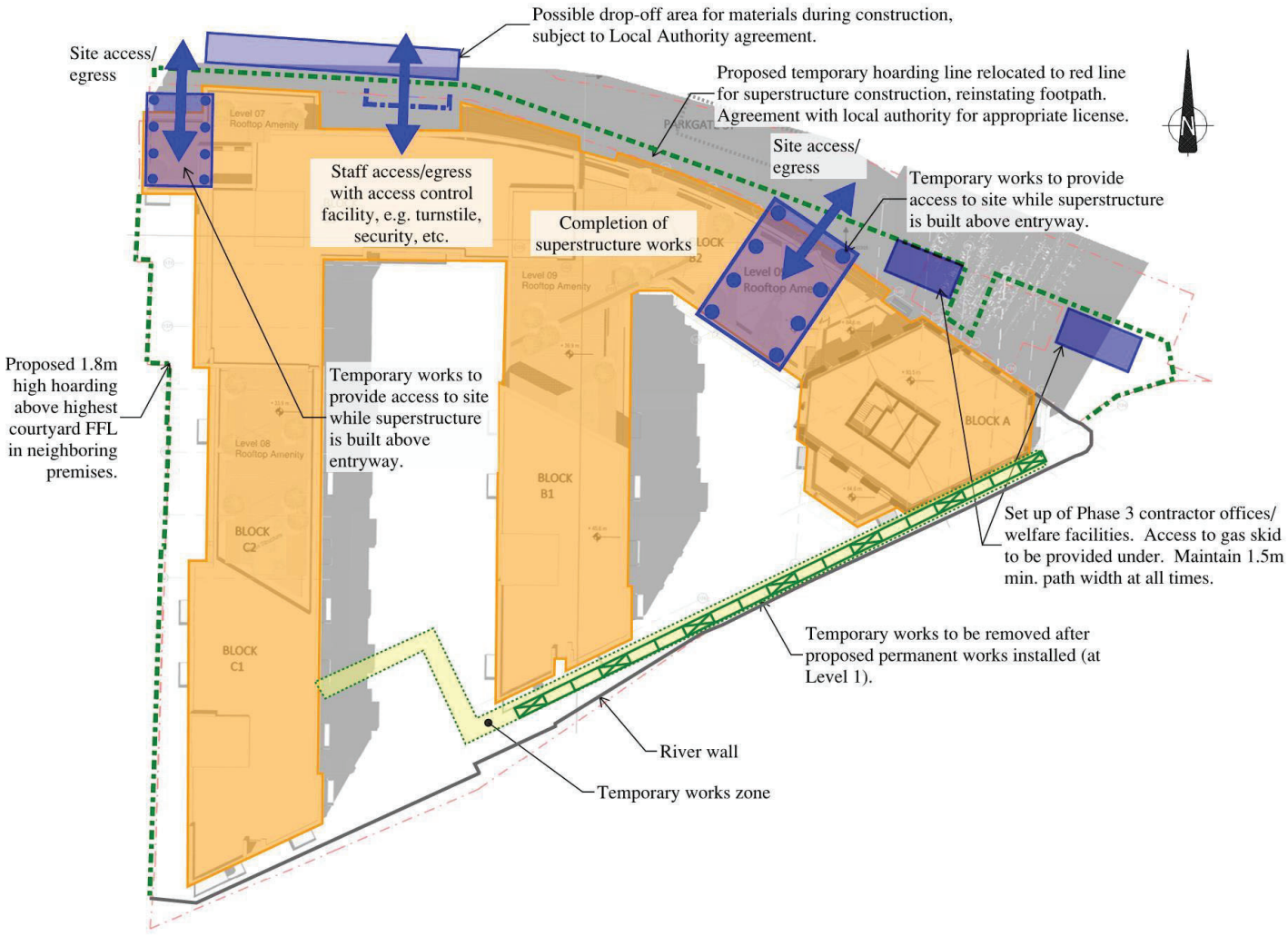


Figure 4.8: Overall sequencing of Works (6 of 6)

4.4 Construction Methods

The following sections outline the indicative construction methodology for the main construction elements.

4.4.1 Phase 1 –Enabling Works and Demolition

4.4.1.1 Preparation Works

A survey of the buildings and local surroundings will be carried out. This will identify the detail of the buildings' construction and all services on the site. Site investigation pits and boreholes will be taken to establish the soil condition.

Movement, vibration, and dust monitors will be put in place.

Refer to **Section 4.5** below for further information on site preparation works.

4.4.1.2 Service Disconnections and Diversions

Utilities such as ESB, Gas, IT, and Water will be disconnected, and the services terminated from entering the site. Disconnections will be phased corresponding to the proposed progress of demolition and construction works on site.

The existing sprinkler system within the Hickey's warehouse will be emptied with the water contained therein discharged to sewer at a controlled rate in agreement with Irish Water.

There are a number of above and under-ground fuel tanks located around the site. The tanks will be disconnected, and all associated pipework made defunct and stripped out during the demolition phase. Any fuel contained within the tanks and associated pipework will be emptied and disposed of appropriately.

The site is relatively free of services, with the services encountered within the site curtilage serving the buildings to be demolished. These services will be made defunct and stripped out during the demolition phase. Primary services and utilities are beneath the adjoining road network and not in direct proximity to the site.

Where the excavation strategy or temporary works require any temporary diversion of local services or utilities on the site perimeter, this would be undertaken with prior agreement of the relevant service provider.

The Contractor may seek agreement with Irish Water for a foul connection on Parkgate Street for the site compounds and welfare facilities. Alternatively, foul waste may be removed by tanker and disposed of off-site at an appropriately licenced facility.

4.4.1.3 Asbestos removal

An asbestos audit will be carried out on the buildings scheduled for demolition prior to demolition works.

Any asbestos discovered will be removed by a Specialist Contractor in accordance with *Safety, Health, and Welfare at Work (exposure to Asbestos) Regulations 2006/2013*[3], and disposed of by specialist contractors to an appropriately licenced facility. Traceable records of this activity, including the disposal licence, will be kept. Following the asbestos removal, a soft strip of the building will be carried out to remove wiring, ceiling tiles, electrical fittings, mechanical plant, fixtures, etc.

Construction and demolition waste is covered in greater detail in **Chapter 17**, Resource and Waste Management.

4.4.1.4 Erection of scaffolding along demolition perimeter

Scaffolding will be erected around each building to be demolished. This scaffolding will be clad in Monarflex to control dust, light debris, and light from the site.

There will be consultation with neighbouring stakeholders to agree measures along the western boundary and near the eastern boundary, where there may be certain requirements, e.g. type of netting to be used in lieu of Monarflex for visual impact.

4.4.1.5 Demolition of the existing structures

A detailed demolition plan will be developed in due course by the appointed specialist demolition contractor which will take account of any particular requirements of the planning permission. Detailed proposals will depend on the expertise and plant available to the demolition specialists selected to undertake the demolition and will be set out in the Demolition Specification during the project delivery phase. It is envisaged that existing structures will be demolished in the reverse order from how they were constructed.

Following a soft strip of the building comprising removal of finishes, electrical fittings, wiring, mechanical plant, fixtures, fittings, etc., the structural frame will be demolished. All substructures and foundations will be grubbed up to an approximate depth of 1.8m below existing ground level. Underground tanks and other buried structures shall be removed in advance of piling mat construction.

4.4.1.6 Demolition waste generation

Demolition waste is expected to comprise of concrete, masonry, stone, metals and glass. These wastes will be segregated where possible for reuse or recycling in accordance with the relevant legislation and guidelines. In addition, it is likely that some plastics, cabling, and mixed non-hazardous demolition waste will also be generated.

[3] GoI, 2013. Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013). Available at https://www.hsa.ie/eng/Legislation/New_Legislation/SI_291_2013.pdf. Accessed 29/10/19.

Construction and demolition waste is covered in greater detail in **Chapter 17**, Resource and Waste Management.

4.4.2 Phase 2 – Piling and Groundworks

Notwithstanding the works to be completed as part of Phase 1, the Contractor for subsequent phases shall carry out necessary residual works that may involve the following:

- Site preparation works (Refer to **Section 4.4.1.1** for further information); and
- Disconnection of services and diversions (Refer to **Section 4.4.1.2** for further information); and

4.4.2.1 Piling Mat

The piling mat will be formed at existing site levels and will comprise of a combination of imported granular material and site-won crushed concrete and rock material. The piling specialist shall clearly delineate the areas of pile mat constructed in the different sourced materials to enable appropriate removal in future.

Prior to construction of the pile mat, the formation shall be prepared, and a separation geotextile membrane installed. The pile mat material shall be appropriately compacted in layers in accordance with the Piling Specialist requirements.

4.4.2.2 Piling

The foundations are envisaged to be continuous flight auger (CFA) piles to Buildings B and C, and bored rock socketed piles to Building A. The piles shall support reinforced concrete pile caps and piled rafts under the stability cores. It is anticipated that the respective piling rig shall install piles from a pile mat datum close to existing ground level. Arisings from the pile installation shall be appropriately disposed off-site to a licenced facility. Construction and demolition waste is covered in greater detail in **Chapter 17**, Resource and Waste Management.

A temporary retention structure is required in the vicinity of the existing Protected Arch to facilitate the bulk excavation of the basement. This will comprise of either sheet piles or king-post construction and will be monitored for movement throughout the substructure works. The retention structure shall be removed upon achievement of the appropriate concrete strength in the ground floor slab construction.

Subsequent to the bulk excavation of the basement, the constructed piles in this area will be broken down to proposed foundation datum level using an excavator with hydraulic breaker attachment.

4.4.2.3 Groundworks

The outline Construction Waste Management Plan (CWMP) contains for more information regarding the minimising stockpiling of excavated material on site and remove the line Excavated material generated by the construction works shall be appropriately assessed for possible re-use on site, where possible, through various accommodation works. Surplus material will be immediately removed from site. Refer to **Chapter 17**, Resource and Waste Management, for further information. The groundworks external to the buildings will comprise installation of precast retaining walls along the existing River Liffey boundary to facilitate build-up of ground to proposed finished levels.

Refer to **Section 4.5.2.3** for information on vehicle movements during the bulk excavation.

Refer to **Section 4.6.1** for information on stockpiling of site site-won material.

4.4.2.4 Dewatering

Dewatering may be required for local excavations, such as pile cap or lift pit locations. Any local dewatering is to be discharged to the River Liffey by agreement with the subject to any necessary agreements or consents and will include necessary treatment as required, such as silt traps and settlement tanks. Alternatively, dewatering may be reinjected to the subsurface through a number of wells or injection points across the site. Similar treatment measures will be adopted prior to reinjection. Local dewatering is likely to be necessary for only a portion of the construction programme, approximately 20 weeks.

4.4.2.5 Surface Water Run-Off

Existing surface water drainage on the site discharges to the River Liffey. It is envisaged that one of the existing surface water discharge points shall be maintained for the duration of the works, subject to obtaining any necessary agreement/consent. All other existing surface water discharge points to the River Liffey shall be decommissioned.

Appropriate settlement tanks and silt traps shall be incorporated to capture any excess silt in the run-off. The Contractor shall employ measures to ensure surface water run-off from Parkgate Street does not enter the site. Refer to **Chapter 14**, Water for further information.

4.4.3 Phase 3 – Main Construction Works

Notwithstanding the works to be completed as part of Phases 1 and 2, the Contractor for Phase 3 shall carry out necessary residual works that may involve the following:

- Site preparation works (Refer to **Section 4.4.1.1** for further information);
- Disconnection of services and service diversions (Refer to **Section 4.4.1.2** for further information);

- Asbestos and soft strip (**Refer to Section 4.4.1.3** for further information);
- Groundworks (Refer to **Section 4.4.2.3** for further information);
- Dewatering (Refer to **Section 4.4.2.4** for further information); and
- Surface water run-off (Refer to **Section 4.4.2.5** for further information).

The following describes the construction activities required for the construction of the new development.

4.4.3.1 Substructure

The substructure generally consists of a reinforced concrete slab supported on reinforced concrete pile-caps. The stability core walls are supported on reinforced concrete piled raft foundations. The pile-caps and piled rafts for works at grade will be shuttered with formwork and the concrete cast. Upon removal of the formwork, the areas between the foundations will be built-up with site-won material.

In the basement area, the bulk dig datum will be the formation level of the foundations. This will mean the method of constructing the pile-caps and piled rafts in the basement will be similar to that at grade.

There will be an open dig to the basement area, with localised retention works at existing structures. The rising perimeter walls will be constructed with two-sided shutters, propped in position, and supported off the basement slab.

4.4.3.2 Superstructure

The superstructure of Building A is cast in-situ concrete. The stability core walls will be constructed by jump-formwork technique. Columns and slabs will be conventional reinforced concrete flat slab construction. The proposed external envelope comprises either prefabricated or precast panels, hence most of the fabrication will occur off-site at supplier premises.

The superstructures of Buildings B and C are in-situ concrete up to and including Level 1. Thereafter, the superstructure is precast concrete. The proposed façade comprises lightweight cold form steel sections to the inner leaf façade, with the external leaf constructed in masonry and supported from relieving angles and lintels. Scaffolding around the building exterior shall be necessary for construction of the masonry outer leaf and will remain in place until completion of the façade. Prefabricated balcony structures shall be lifted into position and fixed into cast-in connection points.

The precast elements are large components and require substantial vehicle movement on site for deliveries. Vehicles will be standard multi-axle flat back trucks delivering less than 40 tonnes each trip and typical for a building of this scale. There will be in-situ concrete work requiring regular deliveries of premixed concrete and formwork materials. The construction traffic routing is covered in detail in **Chapter 6**, Traffic and Transportation.

The construction works will require the use of tower cranes on site. The cranes will be required for the moving of building materials on site, such as formwork for concrete, reinforcement, precast concrete, steelwork, façade, plant, and general building materials. The use of mobile cranes may be adopted to assist in the installation of the façade and plant.

4.4.3.3 Existing Structures

The following structures are included in the Record of Protected Structures (RPS 6320) and are to be retained as part of the new development: riverside stone wall; turret at eastern end of site; square tower on the riverfront; and entrance stone arch on the Parkgate Street frontage. The River Liffey Building (not a protected structure) to the west of the River Liffey wall is also to be retained and adapted for re-use within the scheme.

The majority of the works to the River Liffey wall will be land based. However, some works from the River Liffey may be necessary, such as vegetation removal and repointing of mortar. The Contractor will obtain a Foreshore Licence for temporary scaffolding erection in the River Liffey to facilitate the works, should this be necessary, and the associated Stakeholder engagement shall include liaison with Inland Fisheries Ireland (IFI). The Foreshore Application will involve submission of a Method Statement for the works, which will be prepared with input from a suitably qualified Ecologist.

Entrance Stone Arch

The existing arch is a stonework arch structure. Refurbishment works will comprise stonework repair and repointing of mortar. In some instances, the stonework is delaminating at the surface and localised replacement will be necessary. All superfluous embedded metal work shall be removed, and the substrate made good with matching stonework and mortar.

Scaffolding shall be erected to all sides of the arch to facilitate refurbishment works.

Turret

The existing turret is a stonework structure. All vegetation growth will be removed. Refurbishment works will comprise local stonework repair and repointing of mortar. In some instances, the stonework will require local stitching with helical ties. All superfluous embedded metal work shall be removed, and the substrate made good with matching stonework and mortar. Some of the capping at parapet level may need replacement.

Square Tower

The existing tower structure comprises stonework construction at lower level and brickwork at upper level. All vegetation growth will be removed. Refurbishment works will comprise local structural fabric repair and repointing of mortar. In some instances, the structural fabric is delaminating at the surface and localised replacement will be necessary. All superfluous embedded metal work shall be removed, and the substrate made good with matching stonework and mortar.

The internal metal work to be retained shall be shot blasted insitu and a new protective paint finish applied. The existing timber roof structure shall be retained, subject to condition assessment, but new roof finishes shall be installed.

Riverside Stone Wall

The existing riverside stone wall comprises stonework above high-tide level, and colloidal concrete below. The foundations of the river wall are also comprised of stonework. There is a separate internal brick wall that constitutes part of the adjacent Warehouse structure to the north of the riverside stone wall; this separate wall being shorter than the riverside stone wall and stopping short of its eastern end.

The quay wall supports timber rafters from the edge of the roof of the adjacent warehouse building, which span from the adjacent internal Warehouse brick wall described above.

The existing riverside stone wall will be fully propped by temporary works, which will be removed upon installation of the permanent lateral restraint (after the Level 1 slab construction has been cast). The build-up in ground levels will result in new retaining structures installed at the north side of the riverside stone wall.

The proposed elevation of the wall comprises new opening modifications, which will be either broken-out or saw-cut. Some re-building of the openings will be necessary, and the openings will be redressed and strengthened as required with new structural framing to align with the final design features described in the Alternative Chapter of the EIAR which accompanies this planning application.

All vegetation growth on the River Liffey side will be removed. In some instances, the stonework will require local stitching with helical ties. All superfluous embedded metal work shall be removed, and the substrate made good with matching stonework and mortar. Some of the capping at parapet level may need replacement.

A new surface water discharge point for the development will be constructed in the wall. The proposed surface water management measures have been agreed with Dublin City Council (DCC) Drainage Division, with various SuDS measures incorporated to satisfy their drainage requirements for a minimum two-stage treatment train approach. The majority of the works to the wall will be land based.

Gabled Industrial Buildings on the River Front

The existing gabled industrial buildings on the River front are double height structure comprising a combination of stonework and brickwork walls. It is intended to retain the larger of the two gabled buildings and the River façade of the smaller gabled building In the larger gabled building there is a mezzanine floor at differing levels. The original mezzanine structure over part of the building consists of concrete floors supported by steel and cast iron beams. It appears that the remaining mezzanine was infilled with timber construction at a later date. The roof finishes are supported on timber sarking boards, which are supported by ironwork trusses. Window and door heads are generally supported by concrete lintels, but some comprise of steel or cast-iron beams. Modifications to the existing structural

fabric for larger openings have been formed by a combination of wrought iron and steelwork members, depending on the time of interventions.

The works to the larger gabled building will comprise the removal of the existing roof finishes, demolition of mezzanine structures, removal of most internal walls and removal of the existing ground bearing concrete floor slab. Any made ground below the slab will be removed and new fill material placed and compacted for supporting a new ground bearing concrete slab. New lightweight mezzanine structures comprising timber floor construction supported on steelwork will be installed. The existing ironwork roof trusses will be refurbished in-situ (shot blast and new paint protection applied), with new roof finishes also installed. There will be minor modifications to the structural fabric to form new openings and widen existing openings. Temporary pinning of the walls will be necessary for the installation of new supporting beams and padstones.

All vegetation growth to the exterior walls will be removed, in particular the gable wall facing the River Liffey. In some instances, the walls will require local stitching with helical ties. All superfluous embedded metal work shall be removed, and the substrate made good with matching stonework and mortar. Some of the capping at parapet level may need replacement.

The works to the gabled industrial buildings on the River front will provide an improved setting that opens the building up to both the river walk and the residential courtyard. The design will remove previous unsympathetic work to open the ground floor level to the residential community behind. These works are intended to provide an increase in natural light levels, to give a better connection to the River walk as a though route.

The Large Main Warehouse at the east of the Site

Most of the eastern half of the site is occupied by a large single storey warehouse. It is proposed to demolish this large warehouse including its curving north wall, which runs along Parkgate Street. However, the large cast-iron elements within the warehouse, including columns and beams, are to be removed for re-use as advised by the Conservative Specialist.

4.4.3.4 Parkgate Street Interfaces

Works along the south footpath on Parkgate Street will be carried out in phases. Refer to **Section 4.3.2.3** for proposed activities. The Contractor will obtain road closure licences on at least two occasions for the Works. The first will be at the start of Phase 3 to facilitate construction arrangements, and later licences will be necessary for minor reconfigurations of the south footpath on Parkgate Street.

Works associated with the surface water improvement works will take place on public property, including public roads and footpaths. The scheme will be installed by trench excavations. Approximately 20m of trenching will be open at any one time. Installation of pipework shall be carried out under traffic management at night, with all traffic lanes returned to traffic each morning. Manholes shall be constructed under traffic management at weekends. Gullies and local pavement resurfacing works may be completed under lane restriction during daytime hours.

The duration of the proposed works will be approximately five weeks and will commence in Q4 2020. Excavated material will be removed off site to a registered waste facility. There will be no storage of chemicals on lands outside of the ownership boundary, and refuelling will take place at the Contractor's base compound. Refer to **Chapter 17**, Resource and Waste Management, for further information.

4.5 Site Management

4.5.1 Site Hoarding

The Demolition and Enabling Works Contractor will establish a site boundary with the provision of appropriate signage, construction of hoarding, and welfare facilities, site office, and establishment of appropriate access and egress.

The site hoarding (or fencing where appropriate) will be established around the work area before any significant construction activity commences.

Construction site hoarding is used to provide a secure site boundary to what can be a dangerous environment for people who have not received the proper training and are unfamiliar with construction operations. Site hoarding also performs an important function in relation to minimising some of the potential environmental impacts associated with construction, namely:

- Noise;
- Visual impact; and
- Dust.

The Contractor will be required to ensure at all times a clear demarcation with a safe and secure enclosure between areas in use as public facilities and areas of the construction site. Where possible, hoarding and fencing will be retained and re-configured from the Phase 1 works, and re-used for subsequent work phases.

The extent of compound and facilities required by the Contractor will vary throughout the duration of the works. The Contractor will likely require a small-scale compound and facilities located within the site compound. It is proposed that the hoarding line will incorporate part of the footpath during the works along Parkgate Street, where the appropriate licences will be obtained from the Local Authority in advance of the works.

The footpath will be closed for short periods to facilitate service connections, where minor diversion for pedestrians shall be provided along the carriageway of the road immediately adjacent to the footpath, closing off one lane of traffic to westbound vehicles.

Controlled access points to the site, in the form of gates or doors, will be kept locked for any time that these areas are not monitored (e.g. outside working hours).

The hoarding will be well maintained and painted and may contain graphics portraying project information.

4.5.2 Access Arrangements

4.5.2.1 Pedestrian access

During the construction phase, connectivity will be maintained for members of the public and adjoining landowners.

However, it may be necessary in some instances to alter arrangements depending on the construction activities being undertaken at particular times. Should this be necessary, the appropriate licence will be required from the Local Authority and safe alternative routes will be made available. Construction traffic will be carefully managed to mitigate conflicts at all times during all phases of the works.

4.5.2.2 Construction Traffic Routing

It is anticipated that all construction vehicles accessing and egressing the site will do so from a construction access point on Parkgate Street. Construction traffic travelling to and from the site will do so via the Conyngham Road, South Circular Road, and Con Colbert Road/Chapelizod Bypass from where they will access the M50 and the national road network. This will keep trucks to an established HGV route, minimising their impact on residential areas. A temporary lay-by may be required for truck set down for management of deliveries to site. Further details of the access routes will be outlined in the Construction Environmental Management Plan (CEMP).

The construction traffic routing is covered in detail in **Chapter 6**, Traffic and Transportation.

4.5.2.3 Vehicle Movements and access during Construction

It is anticipated that, subject to the grant of planning permission, construction will commence in Q4 2020.

Phase 3 will require closure of the existing vehicular entrance and construction of a new site entrance between Building A and B for access and egress construction movements. This will require some alteration of the Dublin Bike Station No. 92.

No car parking is envisaged to be provided within the site. Staff and visitors to the site will be encouraged to utilise non-vehicular means. Otherwise, there is on-street Pay & Display public parking in the environs of the site. Construction activities

The most onerous construction period with regards to traffic generation is expected to be the excavation stage, which will include the removal of excavated material away from the site. The volumes of traffic generated during this period are unlikely to be in excess of approximately 28 trucks per day over the 2-month period. This equates to less than 2.5 trucks per hour on average. During peak construction periods this number could double to 5 trucks per hour.

4.5.2.3.1 Minimise Construction Vehicle Movements

Construction vehicle movements will be minimised through:

- Consolidation of delivery loads to/from the site and management of large deliveries on site to occur outside of peak periods;
- Use of precast/prefabricated materials where possible;

- Assessment of 'cut' material generated by the construction works for possible re-use on site through various accommodation works. This will reduce the amount of material for removal offsite. Information on the quantities of material to be re-used and removed offsite are outlined in **Chapter 17**, Resource and Waste Management;
- Provision of adequate storage space on site;
- Development of a strategy to minimise construction material quantities as much as possible; and
- Minimisation of construction staff vehicle movements by offering Travel to Work Scheme benefits to encourage car sharing and public transport use.

4.5.2.3.2 Construction Phase - Mobility Management Measures

The Contractor will be required as part of the contract to introduce a Mobility Management Plan for its workforce to encourage access to the site by means other than private car. The following section identifies some of the measures the Contractor will provide as part of the Mobility Management Plan. The Mobility Management Plan will form part of the Construction Management Plan and will be agreed with Dublin City Council prior to works beginning on site.

There is good connectivity between the site and public transport links.

There are buses within walking distance including Parkgate Street, Heuston Station, and St. John's Road West. The Luas Red-Line stop at Heuston Station is also within walking distance. The Contractor will issue an information leaflet to all staff as part of their induction on site highlighting the location of the various public transport services in the vicinity of the construction site.

Cycle parking spaces will be provided on the site for construction staff. In addition, lockers will be provided to allow cyclists store their cycling clothes. There are several Dublin Bike stations in the vicinity, on Parkgate Street and near Heuston Station.

Car sharing among the construction staff should be encouraged, especially from areas where construction staff may be clustered. The Contractor will aim to organise shifts in accordance with staff origins, thereby enabling higher levels of car sharing. Such a measure offers a significant opportunity to reduce the proportion of construction staff driving to the wider site area and will minimise the potential traffic impact on the road network surrounding this facility.

To oversee and implement the Mobility Management Plan for the construction works, the following mechanisms will be put in place:

- The appointment of a Mobility Manager to implement the Plan; and
- The establishment of a group to oversee the implementation and ongoing implementation of the Plan.

4.5.2.4 Removal of Materials from Site

Demolition of existing buildings and bulk excavation arisings will be the most intensive periods for removal of materials off site. Removal of materials off site will be managed effectively to ensure that there will be no queuing of trucks on the public roadways around the site. All trucks will have a built-in tarpaulin that will cover the excavated material as it is being hauled off site, and wheel wash facilities will be provided at all site egress points.

4.5.2.5 Deliveries to Site

Deliveries of materials will be planned and programmed to ensure that the materials are delivered only as they are required on site. Works requiring multiple vehicle deliveries to site, such as concrete pours, will be planned to ensure there will be no queuing on the public roadways around the site. For further detail refer to **Chapter 6**, Traffic and Transportation.

4.5.3 Protection of Sensitive Structures

The Contractor will carry out condition surveys of all neighbouring structures and Protected Structures on the site and will erect protective hoarding to the existing Arch on Parkgate Street and the Turret at the eastern corner of the site. Temporary works will be put in place to protect sensitive structures, and a cordoned off zone of influence will be maintained at all times, in particular to the River Wall, Arch, Turret, and Tower. The Contractor(s) of subsequent construction phases will keep all protection measures in good order for the duration of the works.

The Contractor's Demolition and Construction Management Plan shall include a section on the Luas interface, dealing with and mitigating the specific risks to Luas infrastructure and operational services. All works shall be carried out in strict accordance with *Code of Practice for Works on, Near or Adjacent to the Luas Light Rail System* which is available to download from https://luas.ie/work-safety-permits.html. The Demolition and Construction Management Plan shall demonstrate compliance with the code of engineering practice, and particularly:

- Working safely in the vicinity of the Overhead Conducting System danger zone and the general Luas corridor;
- Demonstrating settlement and vibration remains within the limits set in the code of practice;
- Ensuring the Demolition and Construction Traffic Management Plan does not impact Luas operations, and;
- Compliance with the requirements of the Transdev (Luas operators) permit system for works in the area.

Further, all requirements of the Irish Aviation Authority (IIA) with regards to lighting, crane operation etc. will be fully complied with.

4.6 Materials Management

4.6.1 Excavated Materials

Excavated materials as part of the construction works will generally consist of:

- Service yard and ground floor slab (i.e. asphalt and concrete);
- Topsoil and soil;
- Made ground; and
- Underground structures of various materials.

It is estimated that c. 14,400m³ of bulk excavation will result from the works, including 220m³ of excavation outside the ownership boundary for the proposed surface water improvement works. It is estimated that c. 6,100m³ of fill material will be required, assuming some re-use of excavated materials will be allowed. Refer to **Chapter 17**, Resource and Waste Management, for further information.

4.6.2 Demolition Materials

Materials will arise from the demolition and refurbishment of structures on the site. These will include concrete, steel, timber, and other materials that typically arise from the demolition of structures – refer to **Chapter 17**, Resource and Waste Management, for further details.

Any stockpiles of demolition material shall be temporarily stored on impermeable surfaces and covered using tarpaulin to avoid any contaminated run off entering the surface water system. Silt traps shall be placed in gullies to capture any excess silt in the run-off. All silos shall be bunded appropriately. Construction activities will have regard to CIRIA Good Practice Guidelines (C543 – Control of Water Pollution from Construction Sites).

The potential impacts arising from waste generation during the construction phase are assessed in **Chapter 17**, Resource and Waste Management. The Main Contractor(s) will be required to establish and implement a detailed Construction and Demolition Waste Management Plan as part of their Quality Assurance System. Further detail of this requirement is also set out in **Chapter 17**.

4.6.3 Construction Materials Requirements

The proposed development will have a requirement for imported materials, primarily stone concrete, and steel for the new proposed construction.

It is estimated that the following approximate quantities of the main construction materials will be imported during the construction works:

- Concrete In-Situ (superstructure only)– 15,100m³;
- Concrete Precast (superstructure and landscape paving)- 51,700m^3
- Concrete (Substructure only)- 5,100m^3

- Reinforcing Steel – 4,700 tonnes;
- Façade Glazing – 11,500m²;
- Solid Façade – 13,100m²; and
- Brickwork – 6,200m².

4.7 References

Council Directive (EC) 2014/52/EU of 16 May 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0052. Accessed 03/11/18.

Government of Ireland, 2013. Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013). Available at https://www.hsa.ie/eng/Legislation/New_Legislation/SI_291_2013.pdf. Accessed 29/10/19.

5 Planning and Policy

5.1 Introduction

This chapter provides a summary of the hierarchy of national, regional and local planning and development policies in the context of the proposed development, as described in **Chapter 3**, Description. A detailed Planning Application Report and Statement of Consistency has been included in the planning application documents.

This chapter has been prepared with regard to the overarching guidance on EIA as outlined in **Section 1.9.3**.

5.2 National Policy Guidance

5.2.1 National Planning Framework - Ireland 2040 (2018)

The National Planning Framework[1] (NPF) is:

"the Government's high-level strategic plan for shaping the future growth and development of our country out to the year 2040".

It sets a direction for the consolidation of Dublin's development and growth within the M50 and canal ring to create a more compact urban form. Nationally the NPF seeks for 40% of all new homes to be located within the already built up area of existing settlements.

The NPF marks a shift away from urban sprawl towards brownfield and infill urban developments. It focuses on integrated investment in quality public transport-oriented development and other essential services, to deliver a denser and sustainable compact urban form.

This means encouraging more people, jobs and activity generally within our existing urban areas, rather than 'greenfield' development and requires a change in previous development patterns. In particular, it promotes well-designed, high quality development that can encourage more people, and generate more jobs and activity within existing cities, towns and villages.

This requires that development meets appropriate design standards to achieve targeted levels of growth. It also requires active management of land and sites in urban areas.

National Policy Objective 3b seeks to deliver at least half (50%) of all new homes that are targeted in the five cities to be built within their existing built-up footprints.

[1] DHPLG, 2018. *National Planning Framework*.

National Policy Objective 35 requires an increase in residential density in settlements to be achieved through a range of measures, including infill development schemes and increased building heights.

The key objectives for Dublin are to:

- Identify large scale regeneration projects within the city and metropolitan area for the provision of new houses;
- Progress the development of strategic greenfield developments, particularly ones proximate to public transport; and
- Deliver the key rail projects set out in the Transport Strategy for the Greater Dublin Area including Metro Link, DART expansion and the LUAS green line link to Metro Link.
- The development of an improved bus-based system, with better orbital connectivity and integration with other transport networks.

The proposed development is compliant with the NPF. A detailed Planning Application Report and Statement of Consistency has been included with the planning application documents.

5.2.2 National Development Plan (2018)

The National Development Plan[2] (NDP) sets out the investment priorities that will underpin the implementation of the NPF. This will guide national, regional and local planning and investment decisions in Ireland until 2040 in order to cater for an increasing population. The plan sets out the government's commitment to invest €116 billion over this period.

Ten National Strategic Outcomes are outlined in the NPF. In alignment with the NPF, the NDP sets out the new configuration for public capital investment over the next ten years to secure the realisation of each of the National Strategic Outcomes. This is to improve the way public capital investment is planned and co-ordinated in a modern and growing society, leading to improved public services and quality of life. The ten National Strategic Outcomes of the NPF and NDP are:

1. Compact growth.
2. Enhanced regional accessibility;
3. Strengthened rural economies and communities;
4. Sustainable mobility;
5. A strong economy, supported by enterprise, innovation and skills;
6. High-quality international connectivity;
7. Enhanced amenity and heritage;
8. Transition to a low carbon and climate resilient society;

[2] DPER, 2018. *National Development Plan.*

9. Sustainable management of water and other environmental resources; and
10. Access to quality childcare, education and health services.

Of the ten National Strategic Outcomes, the most relevant to the proposed development are Compact Growth, Sustainable mobility and enhanced amenity and heritage.

Compact growth aims to secure the sustainable growth of more compact urban and rural settlements supported by jobs, houses, services and amenities, rather than continued sprawl and unplanned, uneconomic growth. This requires streamlined and co-ordinated investment in urban, rural and regional infrastructure by public authorities to realise the potential of infill development areas within our cities, towns and villages. This will give scope for greater development densities in areas that are centrally located.

To help achieve compact growth the government is establishing an Urban Regeneration and Development Fund, aimed at, among other things, docklands and quays regeneration, city centre renewal and brownfield development facilitation.

To achieve the National Strategic Outcome of Sustainable Mobility, the NDP envisages investment of €8.6 billion in key transport projects up until 2027. Included in these transport projects are Metro Link Dublin, Bus Connects Dublin and the electrification and expansion of the DART.

To help achieve the National Strategic Outcome of Enhanced Amenity and Heritage, the NDP plans for the investment of €1.4 billion, benefitting numerous national cultural institutions, natural heritage and amenity infrastructure.

A high density scheme at this location, as proposed, would be supported by the NDP objective for Compact Growth. Enhanced Amenity and Heritage would also be delivered as the project respectfully integrates the site's built heritage, including protected structures and cultural associations. It enhances public accessibility to the river, thereby potentially giving rise to greater appreciation of these features that contribute to the unique identity of the city. It would also be supported by the objective for Sustainable Mobility, in that it is served by excellent public transport, cycle and pedestrian infrastructure.

5.2.3 Rebuilding Ireland: Action Plan for Housing and Homelessness (2016)

The overarching aim of this Action Plan[3] is to ramp up delivery of housing from its current undersupply across all tenures to help individuals and families meet their housing needs. It sets ambitious targets to double the annual level of residential construction to 25,000 homes and deliver 47,000 units of social housing in the period to 2021, while at the same time making the best use of the existing housing stock and laying the foundations for a more vibrant and responsive private rented sector.

[3] DHPLG, 2016. *Rebuilding Ireland: Action Plan for Housing and Homelessness.*

The proposed development will comply with the policies and objectives of this plan. A detailed Planning Application Report and Statement of Consistency has been included with the planning application documents.

5.2.4 Sustainable Residential Guidelines in Urban Areas (Cities, Towns, Villages) (2009)

The aim of these guidelines is to set out the key planning principles which should be reflected in development plans and local area plans, and which should guide the preparation and assessment of planning applications for residential development in urban areas.

Chapter 5 of the guidelines generally sets out the design standards which should be adhered to with regards to development in larger towns and cities. The guidelines state that planning authorities should promote increased residential densities in appropriate locations and the objective should be the achievement of an efficient use of land appropriate to its context, while avoiding the problems of over-development. They promote higher densities on brownfield sites which are served by public transport.

The proposed development will comply with the policies and objectives of these Guidelines. A detailed Planning Application Report and Statement of Consistency has been included with the planning application documents.

5.2.5 Urban Design Manual - A Best Practice Guide (2009)

The *Urban Design Manual*[4] Sets out 12 criteria that encapsulate the range of design considerations that must be taken into consideration for residential developments. This design manual accompanies the *Sustainable Residential Development in Urban Areas Guidelines*[5], with the two documents intended to be read in conjunction with each other.

The proposed development will adhere to the 12 criteria set out in these Guidelines. A detailed Planning Application Report, Statement of Consistency and Architectural Design Statement have been included with the planning application documents.

5.2.6 Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities (2018)

These guidelines[6] contain a number of Specific Planning Policy Requirements (SPPR) which provide minimum standards for apartment design. The policy requirements in these guidelines take precedence over policies and objectives of development plans and local area plans.

[4] DEHLG, 2009. *Urban Design Manual: A Best Practice Guide, a companion document to the Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas.*
[5] DEHLG, 2009. *Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (Cities, Towns & Villages).*
[6] DHPLG, 2018. *Design Standards for New Apartments – Guidelines for Planning Authorities.*

The unit mix and minimum apartment floor sizes of the proposed development would not all be in compliance with the *Dublin City Development Plan 2016-2022*[7]. However, they would be compliant with these guidelines, which as noted above, take precedence.

The proposed residential development is a declared 'Build to Rent' apartment scheme and thus SPPR 2 is not relevant as it deals with small scale building refurbishment and small sites of up to 0.25ha in size. SPPR 9 is not relevant to this scheme as 'shared living' accommodation is not proposed.

SPPR 3, SPPR 4, SPPR 5, SPPR 7, SPPR 8 deal with design standards for 'Build to Rent' apartment schemes which apply in this instance. The proposed development would comply with these SPPRs. SPPR 8 confirms that the design parameters under SPPR 1 and SPPR 6 do not apply to 'Build To Rent' schemes.

The proposed development will comply with the Specific Planning Policy Requirements which are set out in these Guidelines. A detailed Planning Application Report and Statement of Consistency has been included with the planning application documents.

5.2.7 Urban Development and Building Heights, Guidelines for Planning Authorities (2018)

These guidelines[8] were prepared in order to achieve the objective of the NPF which amongst other things, requires increased density, scale and height of development in our town and city cores, creating compact urban growth.

The guidelines acknowledge that a key objective of the NPF is therefore to promote an increase in building heights and overall density. Increased building height and development density are not only facilitated, but actively sought out and brought forward by the planning process.

SPPR 1, SPPR 2 and SPPR 4 relate to Planning Authority's functions and deal with areas where increased building height will be actively pursued, use mix, development on greenfield sites and edge of city/town locations. SPPR 3 deals with the pursuance of increased building heights and the requirement for specific assessments and is relevant in this instance. The proposed development would comply with SPPR 3.

The proposed development will comply with the policies and objectives of these Guidelines. A detailed Planning Application Report and Statement of Consistency has been included with the planning application documents.

[7] DCC, 2016. *Dublin City Development Plan 2016-2022.*
[8] DHPLG, 2018. *Urban Development and Building Heights – Guidelines for Planning Authorities.*

5.2.8 The Planning System and Flood Risk Management - Guidelines for Local Authorities (2009)

The proposed development will comply with the policies and objectives of these Guidelines[9]. For further details, please refer to the Flood Risk Assessment, **Appendix 14.1**.

5.2.9 Design Manual for Urban Roads and Streets (2013)

The proposed development will comply with the policies and objectives of these guidelines[10]. For further details, please refer to **Chapter 6**, Traffic and Transportation and the Statement of Consistency which has been included in the planning application documents.

5.2.10 Childcare Facilities, Guidelines for Planning Authorities (2001)

These guidelines[11] set out general standards for land use planning issues related to childcare provision in Ireland. They outline that crèche provision should be made on the basis of 20no. childcare spaces for every 75no. dwellings permitted in a scheme. The *Design Standards for New Apartments: Guidelines for Planning Authorities published in 2018*[6] provides further clarification with regards to childcare provision:

"One-bedroom or studio type units should not generally be considered to contribute to a requirement for any childcare provision and subject to location, this may also apply in part or whole, to units with two or more bedrooms."

It is not proposed to provide a crèche as part of this development. This is based on an assessment of the availability and demand for childcare in this area, as informed by a Childcare Needs Assessment, see **Appendix 18.1**.

It therefore submitted that the proposed development will comply with the policies and objectives of these Guidelines. A detailed Planning Application Report, Statement of Consistency, Community Infrastructure and Childcare Audit has been included with the planning application documents.

5.2.11 Smarter Travel - A Sustainable Transport Future, A new Transport Policy for Ireland 2009-2020 (2009)

This document represents a new transport policy for Ireland for the period from 2009 – 2020. Overall the transport policy document has the following aims:

- to reduce overall travel demand;
- to maximise the efficiency of the transport network;

[9] OPW, 2009. *The Planning System and Flood Risk Management – Guidelines for Planning Authorities.*
[10] DHPLG, 2019. *Design Manual for Urban Roads and Streets.*
[11] DELG, 2001. *Childcare Facilities – Guidelines for Planning Authorities.*

- to reduce reliance on fossil fuels; and
- to reduce transport emissions.

To improve accessibility to transport, the Policy recognises progress made under the *National Spatial Strategy* (now superseded by the National Planning Framework[1]) and the *Regional Planning Guidelines* (now superseded by the Regional Spatial and Economic Strategies) in promoting integrated transport and spatial planning. These strategies recognise the need for more compact, walkable urban areas that support investment in good quality public transport under Transport 21[12].

This policy document will support the proposed development. A detailed Planning Application Report and Statement of Consistency has been included with the planning application documents.

5.3 Regional Policy Guidance

5.3.1 Eastern and Midlands Regional Spatial and Economic Strategy (2019)

The *Eastern and Midlands Regional Spatial and Economic Strategy (RSES)*[13] came into effect on 28 June 2019. The RSES includes the *Dublin Metropolitan Area Strategic Plan (MASP).* This provides regional level strategic planning policy for the eastern and midland region, and Dublin, in line with the NPF. Dublin comprises Dublin City and Metropolitan Area.

The RSES contains the following elements:

- Spatial Strategy - to manage future growth and ensure the creation of healthy and attractive places to live, work, study, visit and invest in;
- Economic Strategy – that builds on the region's strengths to sustain a strong economy and support the creation of quality jobs that ensure a good living standard for all;
- Metropolitan Plan – to ensure a supply of strategic development areas for the sustainable growth and continued success and competitiveness of the Dublin Metropolitan Area;
- Investment Framework – to prioritise the delivery of key enabling infrastructure and services by government and state agencies; and
- Climate Action Strategy – to accelerate climate action, ensure a clean and healthy environment and to promote sustainable transport and strategic green infrastructure.

[12] Transport 21 was the Irish Government Infrastructure and Capital Investment Programme (2006-2010) which aimed to significantly expand Ireland's transport network.
[13] EMRA, 2019. *Eastern and Midlands Regional Assembly - Regional Spatial and Economic Strategy 2019-2031.*

The RSES identifies that 50% of all new homes are to be delivered within the existing built up area of Dublin City and suburbs in tandem with the delivery of key infrastructure, to achieve the NPF growth targets. It contains Regional Policy Objectives (RPO).

RPO 4.3 is of particular note and promotes the consolidation and re-intensification of development at infill, brownfield and underutilised lands.

RPO 5.43 states that future development in the Dublin Metropolitan Area shall be planned and designed in a manner to facilitate sustainable travel patterns. This is relevant to the proposed development's immediate accessibility to high capacity public transport services.

The proposed development will comply with the policies and objectives of these Guidelines. A detailed Planning Application Report and Statement of Consistency has been included with the planning application documents.

5.3.2 Transport Strategy for the Greater Dublin Area 2016-2035 (2016)

This strategy[14] has been prepared by the National Transport Authority (NTA). The vision of this strategy is for Dublin to be a competitive, sustainable city-region with a good quality of life for all by 2030. The Strategy includes five overarching objectives to achieve the vision which are as follows:

- build and strengthen communities;
- improve economic competitiveness;
- improve the built environment;
- respect and sustain the natural environment; and
- reduce personal stress.

The Strategy sets out measures to achieve the vision and objectives for the Greater Dublin Area (GDA). These include better integration of land use planning and transportation, consolidating growth in identified centres, providing more intensive development in designated town and district centres and controlling parking supply. A key element of the strategy is the DART expansion programme service including the provision of a new DART Underground which is an underground rail link through the City Centre, allowing DART services to operate on the Kildare line and travel through the tunnel, enabling passengers to connect with DART services on the other three rail lines.

The proposed development which provides for a rejuvenation of a strategically located brownfield site adjacent to good quality public transport will be entirely consistent with the vision and objectives of the Transport Strategy for the GDA.

[14] NTA, 2016. *Greater Dublin Area Transport Strategy 2016-2035.*

5.4 Local Policy Guidance

5.4.1 Dublin City Development Plan (2016)

The *Dublin City Development Plan 2016 – 2022*[7] (hereafter referred to as the development plan) came into effect on the 21 October 2016 and is the statutory land-use plan governing the subject lands at this time. The development plan's policies and objectives provide the direction for the future development of the city and have been taken into consideration in the preparation of this application.

Compliance with the development plan is outlined in **Sections 5.4.1.1**, **5.4.1.2**, **5.4.1.3**, **5.4.1.4**, **5.4.1.5** and **5.4.1.6** below. A detailed Planning Application Report and Statement of Consistency has been included with the planning application documents.

5.4.1.1 Core Strategy

Dublin City Council's proposed development strategy for Dublin is to promote:

- a compact, quality, green, well-connected city;
- a smart city facilitating economic activity; and
- a city of good neighbourhoods and socially inclusive communities.

The Core Strategy states that Dublin City is the 'gateway core' for high-intensity clusters, brownfield development, urban renewal and regeneration. The development plan places an emphasis on quality compact urban neighbourhoods near public transport corridors, with the intention of bringing about a modal shift from private cars to more sustainable modes of transport such as walking, cycling and public transport.

The proposed development will comply with the core strategy.

5.4.1.2 Land Use Zoning

Under the development plan, the majority of the site is subject to the zoning objective, 'Z5 – City Centre', as are most of the lands in the immediate vicinity of the site. The strip of land along the southern part of the site which bounds the River Liffey is zoned 'Z9 – Amenity/Open Space Lands/ Green Network'.

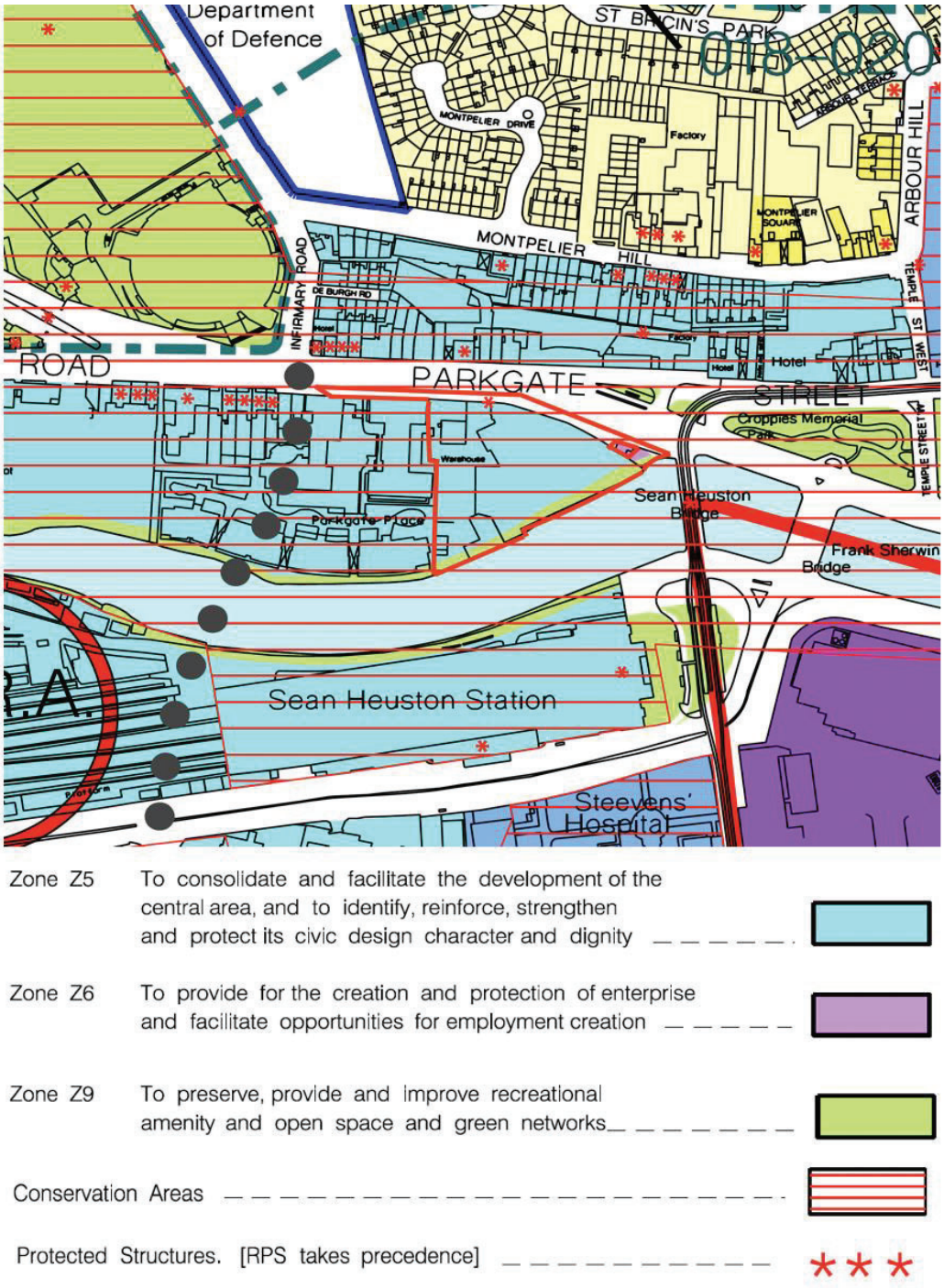


Figure 5.1: Dublin City Development Plan 2016-2022, Zoning with approximate site boundary in red (SLA overlay)

The majority of the subject site is zoned 'Z5 - City Centre'. The land-use objective for the Z5 zoning seeks:

"To consolidate and facilitate the development of the central area, and to identify, reinforce, strengthen and protect its civic design character and dignity".

The development plan indicates that a wide range of accommodation is to be provided in this zoning area which is sustainable and within easy reach of services, open space, facilities and public transport.

The Z9 portion of the site along its southern boundary has the objective:

"To preserve, provide and improve recreational amenity and open space and green networks."

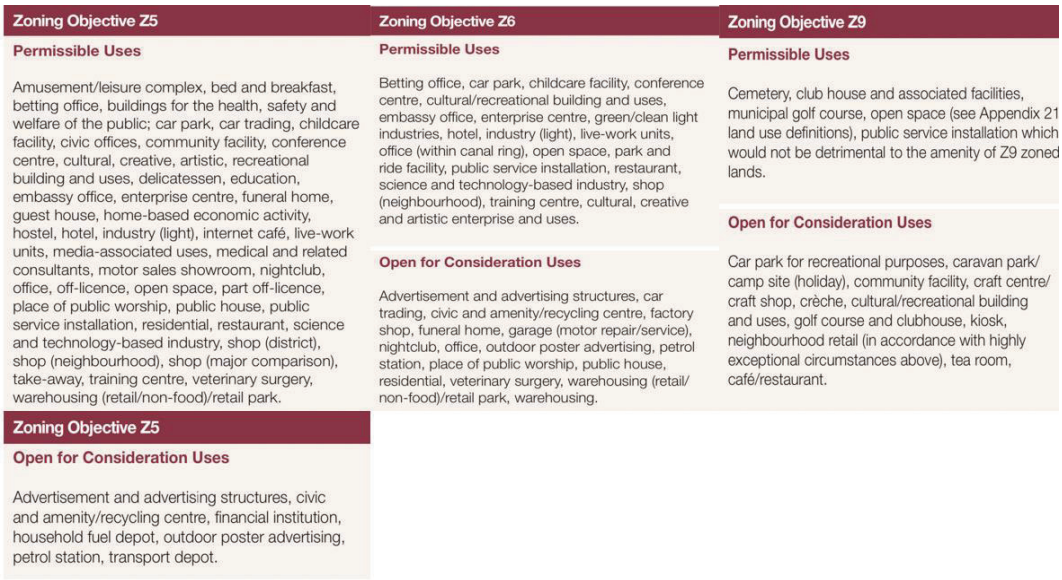
"This zoning includes all amenity open space[15] lands which can be divided into three broad categories as follows: public open space, private open space, sports facilities in private ownership."

The proposed conservation works and development of a riverside amenity walk along the southern boundary at the river edge are permissible in principal on these Z9 lands.

The Z6 portion of the site along its north eastern boundary has the objective:

"*To provide for the creation and protection of enterprise and facilitate opportunities for employment creation*."

The development plan lists a range of 'permissible uses' and uses that are 'open for consideration' (see below). Under **Section 16.4** of the development plan, any proposed use not listed will be assessed under the overall policies and objectives of the plan.



Zoning Objective Z5

Permissible Uses

Amusement/leisure complex, bed and breakfast, betting office, buildings for the health, safety and welfare of the public; car park, car trading, childcare facility, civic offices, community facility, conference centre, cultural, creative, artistic, recreational building and uses, delicatessen, education, embassy office, enterprise centre, funeral home, guest house, home-based economic activity, hostel, hotel, industry (light), internet café, live-work units, media-associated uses, medical and related consultants, motor sales showroom, nightclub, office, off-licence, open space, part off-licence, place of public worship, public house, public service installation, residential, restaurant, science and technology-based industry, shop (district), shop (neighbourhood), shop (major comparison), take-away, training centre, veterinary surgery, warehousing (retail/non-food)/retail park.

Zoning Objective Z5

Open for Consideration Uses

Advertisement and advertising structures, civic and amenity/recycling centre, financial institution, household fuel depot, outdoor poster advertising, petrol station, transport depot.

Zoning Objective Z6

Permissible Uses

Betting office, car park, childcare facility, conference centre, cultural/recreational building and uses, embassy office, enterprise centre, green/clean light industries, hotel, industry (light), live-work units, office (within canal ring), open space, park and ride facility, public service installation, restaurant, science and technology-based industry, shop (neighbourhood), training centre, cultural, creative and artistic enterprise and uses.

Open for Consideration Uses

Advertisement and advertising structures, car trading, civic and amenity/recycling centre, factory shop, funeral home, garage (motor repair/service), nightclub, office, outdoor poster advertising, petrol station, place of public worship, public house, residential, veterinary surgery, warehousing (retail/non-food)/retail park, warehousing.

Zoning Objective Z9

Permissible Uses

Cemetery, club house and associated facilities, municipal golf course, open space (see Appendix 21 land use definitions), public service installation which would not be detrimental to the amenity of Z9 zoned lands.

Open for Consideration Uses

Car park for recreational purposes, caravan park/ camp site (holiday), community facility, craft centre/ craft shop, crèche, cultural/recreational building and uses, golf course and clubhouse, kiosk, neighbourhood retail (in accordance with highly exceptional circumstances above), tea room, café/restaurant.

Figure 5.2: Dublin City Development Plan 2016-2022, Zoning Objectives

A small parcel of land at the eastern apex of the site, is zoned Objective Z6 – Employment/Enterprise.

[15] Open space is any land (active or passive use), including water, whether enclosed or not, on which there are no buildings (or not more than 5% is covered with buildings), and the remainder of which is laid out as a garden/ community garden or for the purposes of recreation, or lies vacant, waste or unoccupied. It also includes school playing fields, playgrounds, urban farms, forests, allotments, and outdoor civic spaces.

It currently accommodates an existing electricity sub-station building and part of a railed off open space supporting a number of trees. The existing electricity sub-station building lies outside the boundary of the application site, however a small parcel to the east of the sub-station lies inside the application site, where it is proposed to undertake landscaping works to provide pedestrian access along the southern river edge. This will necessitate access through the Z6 lands, including the removal of existing railings. No substantive works, beyond landscape enhancement works, are proposed within that part of the application site which encroaches the Z6 lands. For further details of these works, please refer to the Landscape Masterplan prepared by Mitchell and Associates Landscape Architects.

It is worth noting that it has been proposed[16] to re-zone this small parcel of Z6 zoned land to 'Z5 – City Centre' as part of a proposed variation of the Dublin City Development Plan 2016 - 2022. This would ultimately consolidate the overall Z5 zoning at this location.

The proposed development, which includes residential, office, retail, café/ restaurant and public open space, will comply with the Z5, Z6 and Z9 zoning objectives. A detailed Planning Application Report and Statement of Consistency has been included with the planning application documents.

5.4.1.3 Building Height

The development plan designates the Heuston area of the city as being an appropriate location for buildings in excess of 50m. See Figure 5.3 below, which is extracted from the development plan.

[16] Report No. 311/2019 – Report of the Assistant Chief Executive, Update on Industrial Lands Study and Proposed Draft Variation of the Dublin City Development Plan 2016-2022.

Category	Area	Height (m)
Low-rise (relates to the prevailing local height and context)	Inner City	Up to 28 (commercial) Up to 24m (residential)
	Rail hubs (See 3)	Up to 24m (commercial and residential)
	Outer City	Up to 16 m (commercial and residential)
Mid-rise	Digital Hub	Up to 50 m
	St Teresa's Gardens	
	North Fringe	
	Clonshaugh Industrial Estate	
	Ballymun	
	Pelletstown	
	Park West/Cherry Orchard	
	Naas Road	
	Oscar Traynor Road	
	National Concert Hall Quarter	
High-rise	Docklands Cluster	50m +
	Connolly	
	Heuston	
	George's Quay	

Figure 5.3: Dublin City Development Plan 2016-2022, Building Heights

The height of the proposed development will therefore be consistent with the building height policy of the development plan.

5.4.1.4 Strategic Development and Regeneration Area No. 7 (Heuston and Environs)

The site lies within the Heuston and Environs Strategic Development Regeneration Area (SRDA 7). The vision for the area set out in this study is:

"To create a coherent and vibrant quarter of the city that captures the public imagination with high quality services, development, design and public spaces that consolidate and improve the existing strengths of the area."

Heuston and Environs is one of a number of SDRAs to be designated under the *Dublin City Development Plan, 2016 – 2022*. These areas have been identified as being capable of delivering a significant quantum of housing and employment in the city, through the regeneration of existing built areas.

Most SDRAs are zoned Z14 and focus on residential and employment/enterprise uses. The subject site is zoned predominantly Z5 with the river-edge area being zoned Z9 (and the small portion of land abutting the north eastern corner being currently zoned Z6[17]).

[17] Refer to **Section 5.4.1.2** above.

Under the development plan, the Planning Authority is to take an active role in community and stakeholder engagement, and to encourage development of SDRA sites through 'Active Land Management'.

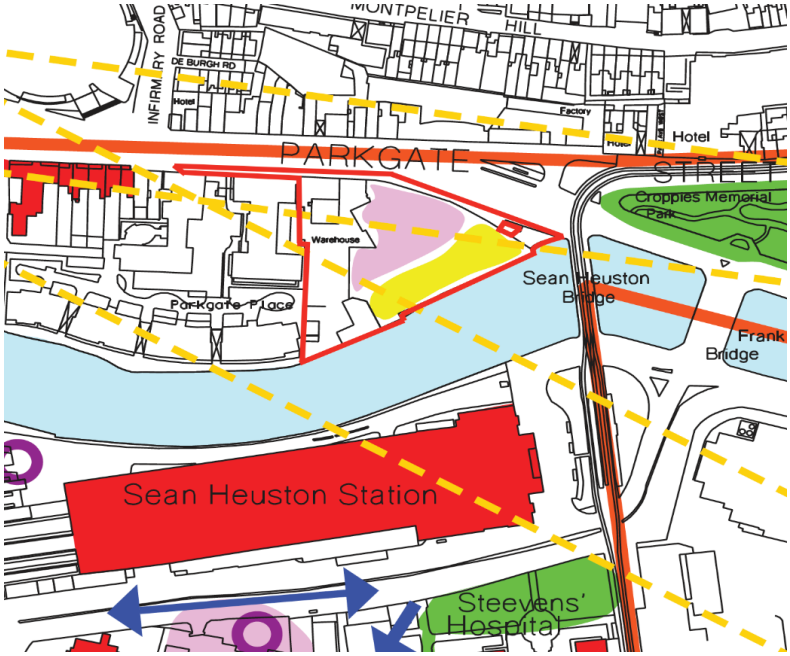


Figure 5.4: SDRA 7 - Heuston and Environs with approximate site boundary in red (SLA overlay)

The SDRAs have a series of development principles set out in the development plan. In this case, the SDRA covers a very wide area, including Heuston Station, Clancy Quay/Barracks and Heuston South Quarter, as well as the Hickey's lands.

- A coherent and legible urban structure within major development sites
- A prioritisation on the provision of public space
- A successful interconnection between the development site and the adjacent urban structure

4. To protect the fabric and setting of the numerous protected structures and national monuments, many of which are major national cultural institutions.
5. To incorporate mixed-use in appropriate ratios in order to generate urban intensity and animation. This will require the major uses of residential and office to be complemented by components of culture, retail and service elements.
6. To improve pedestrian and cycle linkages throughout the area and through key sites, with a particular focus on seeking the following new linkages/improvements: along St John's Road West; from St John's Road to the Royal Hospital Kilmainham via Heuston South Quarter, subject to agreement with the OPW/RHK, on the nature of the proposed linkage; from Dr Steevens' Hospital to IMMA, with consideration give to a new path along the banks of the river Camac.
7. As a western counterpoint to the Docklands, the Heuston gateway potentially merits buildings above 50 m (16-storeys) in height in terms of civic hierarchy. Sites particularly suited for tall buildings include:
   - OPW building: corner site on OPW lands adjacent to Dr Steevens' Hospital and Park, and opposite the south façade of the station building.
   - CIE building: site to the north of the station building on the river relating to the West Terrace and River Terrace. Any new mid or high-rise buildings must provide a coherent skyline and not disrupt key vistas and views.
8. The 'cone of vision', as set out in the 2003 Heuston Framework Plan, represents a significant view between, the Royal Hospital Kilmainham and the Phoenix Park extending from the west corner of the north range of the Royal Hospital Kilmainham, and the north-east corner of the Deputy Master's House to the western side of the Magazine Fort and east edge of the main elevation of the Irish Army Headquarters (former Royal Military Infirmary) respectively. Any new developments within this 'cone' shall not adversely affect this view. A visual impact analysis shall be submitted with planning applications to demonstrate this view is not undermined.
9. Other important visual connections to be respected include Chesterfield Avenue to Guinness Lands and from key parts of the City Quays to the Phoenix Park (Wellington Monument).

1. To develop a new urban gateway character area focused on the transport node of Heuston Station with world class public transport interchange facilities, vibrant economic activities, a high-quality destination to live, work and socialise in, a public realm and architectural designs of exceptional high standard and a gateway to major historic, cultural and recreational attractions of Dublin City.
2. To incorporate sustainable densities in a quality contemporary architecture and urban form which forges dynamic relationships with the national cultural institutions in the Heuston environs.
3. To ensure the application of best practice urban design principles to achieve:

Figure 5.5: SDRA 7 - Development Principles

Item 7 on the list above is significant in the context of building height. This identifies that as a gateway, the location merits buildings above 50m in places. Whilst the development site is not one of the two listed here, the implication is that other suitable locations for tall buildings exist within the SDRA lands.

The proposed development will comply with the principles of the SDRA 7. A detailed Planning Application Report and Statement of Consistency has been included with the planning application documents.

5.4.1.5 Bicycle Parking

Table 16.2 of the development plan (extract below) sets out the Minimum Bicycle Parking standards for all new development in the city:

Land-Use	Zone	Car Spaces
Enterprise and Employment/Offices/ General Industry (inc warehousing)	1 2 3	1 per 400 sq.m GFA (Gross floor area) 1 per 200 sq.m GFA 1 per 100 sq.m GFA
Retail Supermarkets exceeding 1,000sq.m GFA	1 2 3	None 1 per 100 sq.m GFA[1] 1 per 30 sq.m GFA[1]
Other Retail and Main Street, Financial Offices (excl. retail warehouse)	1 2 3	1 per 350 sq.m GFA 1 per 275 sq.m GFA 1 per 75 sq.m GFA
Industry	1 2 3	1 per 400 sq.m GFA 1 per 200 sq.m GFA 1 per 75 sq.m GFA
Warehouse Retail (non-food)	1 2 3	1 per 300 sq.m GFA 1 per 200 sq.m GFA 1 per 35 sq.m GFA
Warehouse	1 and 2 3	1 per 450 sq.m GFA 1 per 200 sq.m GFA
Residential	1 and 2 3	1 per dwelling 1.5 per dwelling
Elderly Persons Dwellings/ Warden-Supervised Dwellings/ Sheltered Housing	1 2 and 3	1 per 4 dwellings 1 per 2 dwellings
Youth Hostel	1 2 3	None 1 per 30 bed-spaces 1 per 15 bed-spaces
Student Hostel/Student Accommodation	1 2 3	None (see section 16.10.7 for requirements) 1 per 20 bed-spaces 1 per 10 bed-spaces
Residential Institution	1 2 3	None 1 per 20 bed-spaces 1 per 10 bed-spaces
Hotels and Guest Houses	1 2 3	1 per 4 rooms 1 per 3 rooms 1 per 1 room
Clinics and Group Practices	1 2 and 3	1 per consulting room 2 per consulting room
Churches, Theatres, Cinemas and Auditoriums	1 2 3	1 per 100 seats 1 per 25 seats 1 per 10 seats
Restaurants, Cafés and Take-aways	1 2 and 3	None 1 per 150 sq.m seating area

Figure 5.6: Dublin City Development Plan 2016-2022, Bicycle Parking Standards

A total of 551 no. bicycle parking spaces is proposed as part of the development.

The proposed development will therefore comply with the development plan standards for bicycle parking. A detailed Planning Application Report and Statement of Consistency has been included with the planning application documents.

5.4.1.6 Car Parking

Table 16.1 of the development plan outlines the car parking standards, which are given as maximums. The site is located within car parking zone 1.

Land-Use	Zone	Cycle Spaces
Enterprise and employment	1 and 2 3	1 per 100 sq.m 1 per 150 sq.m
Shops and Main Street Financial Offices	1 and 2 3	1 per 150 sq.m 1 per 200 sq.m
Residential (houses and apartments)	All zones	1 per unit (*Additional requirements for larger units and visitor parking will be decided on a case by case basis)*
Hotels	1 2 3	Under 50 bedrooms – 1 per 6 bedrooms Over 50 bedrooms – 1 per 10 bedrooms (Minimum of 10 cycle spaces) 1 per 12 bedrooms 1 per 15 bedrooms
Clinic and Group Medical Practices	1 and 2 3	1 per 2 consulting rooms 1 per 4 consulting rooms
Churches, Theatres, Halls, Cinemas, Multiplex Cinemas	1 and 2 3	5 per 100 seats 3 per 100 seats
Restaurants and Cafés	1 and 2 3	1 per 150 sq.m 1 per 200 sq.m
Public Houses	1 and 2 3	1 per 150 sq.m 1 per 200 sq.m
Primary Schools	All zones	1 per 3 pupils
Student Accommodation	All zones	1 per 2 pupils
Other Educational Buildings	All zones	1 per 3 pupils/students
Funeral Homes	All zones	As required
Hospitals	1 2 3	1 space/4 hospital beds 1 space/5 hospital beds 1 space/6 hospital beds
Cultural and Recreational Buildings	1 2 3	1 per 100 sq.m 1 per 150 sq.m 1 per 200 sq.m

Figure 5.7: Dublin City Development Plan 2016-2022, Car Parking Standards

A total of 26no. car parking spaces is proposed as part of the development.

The proposed development will therefore comply with the development plan standards for car parking. A detailed Planning Application Report and Statement of Consistency has been included with the planning application documents.

5.5 Non-Statutory Planning Policy

5.5.1 Managing Intensification and Change (2000)

The Duffy Ely Giffone Worthington (DEWG) study *Managing Intensification and Change: A Strategy for Dublin Building Height (2000)*[18] identified Heuston Station and its environs as a suitable location for tall buildings. This study identifies character areas in Dublin City and then maps areas according to their condition for change, in order to define potential for increased density and increased building height. This study argues that Dublin should aim to retain its character through a policy of incremental change, whilst allowing for large scale growth of building form at certain strategic locations.

[18] DEGW London Limited, 2000. *Managing Intensification and Change: A Strategy for Dublin Building Height.*

The study identifies Parkgate Street as a 'Converging point of road structure' and therefore is suitable for a tall building (see figure 5.8 below).

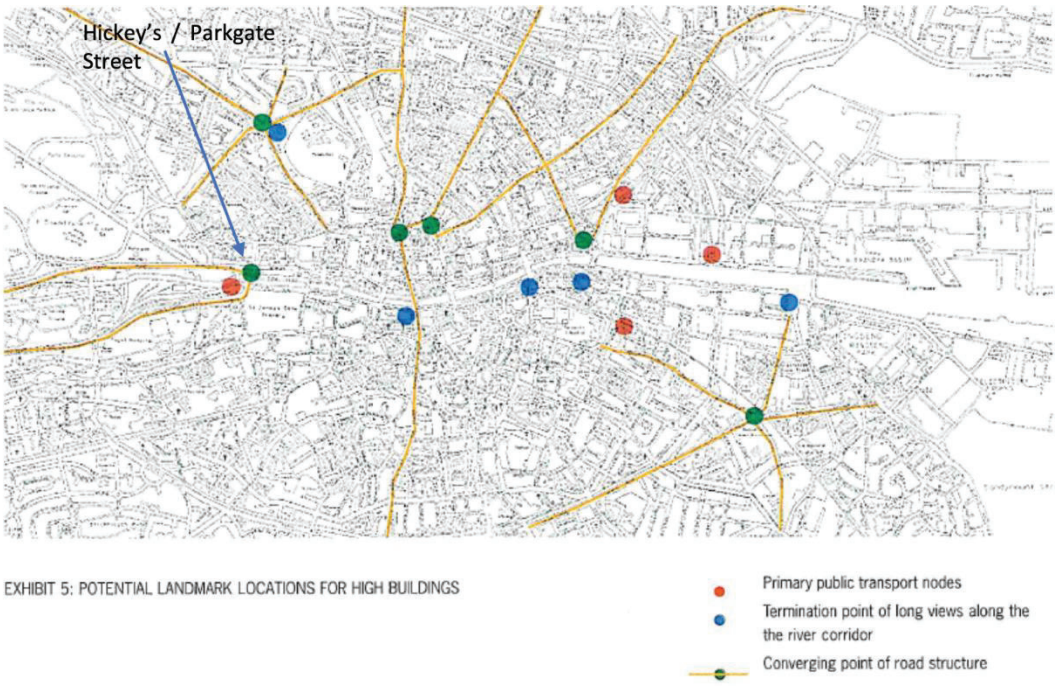


Figure 5.8: Exhibit 5 from DEWG Study

The proposed development will be supported by the conclusions of this study. A detailed Planning Application Report and Statement of Consistency has been included with the planning application documents.

5.5.2 Heuston Gateway: Regeneration Strategy and Development Framework Plan (2003)

This planning document[19] describes the development framework proposals for the subject site. The document highlights that the subject site has excellent development potential due to its positioning at the gateway to the city beside the river and Heuston Station, the accessibility of the site and the views to and from the city centre.

The proposed development will comply with this plan. A detailed Planning Application Report and Statement of Consistency has been included with the planning application documents.

5.6 Conclusion

The proposed development is representative of compact vibrant mixed-use regeneration at a strategically located and underutilised site.

[19] Urban Projects, 2003. *Heuston Gateway Regeneration Strategy and Development Framework Plan.*

The proposed development will provide higher density residential development, with viable employment and local amenity uses at ground levels, at a strategic transport hub (Heuston Station) in the City Centre.

It will deliver cultural and recreational amenity gains in the form of heritage conservation through adaptive reuse of neglected historic structures and public amenity with the provision of an enhanced street edge and new public open space and local amenities, including the opening up of the river edge as part of a proposed river walk.

The proposed development delivers its own commercial uses and services, and is also proximate to existing city centre amenities and services. The site is very well connected by foot, bicycle and public transport links to the city and other employment, retail and leisure facilities in the surrounding area.

As outlined in this chapter, the proposed development aligns with current national, regional and local planning and development policy, and consequently with the proper planning and sustainable development of the area from a policy perspective. Assessment of the potential environmental impact of the physical design of the proposed development is addressed in other chapters of this EIAR.

5.7 References

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6 Traffic and Transportation

6.1 Introduction

This section describes the likely significant effects of the proposed development in relation to traffic and transportation. **Chapter 3** provides a description of the proposed development whilst **Chapter 4** describes the construction strategy. The following aspects are particularly relevant to the traffic and transportation assessment:

- Design
  - Throughout the design development for the proposed development, consideration has been given to the movement of pedestrians, cyclists, vehicles and construction vehicles to and through the site.
- Construction
  - During the construction of the proposed development, there will be additional traffic generated to facilitate the required works. This is assessed in this chapter.
- Operation
  - During operation, there will be some additional traffic generated by the development due to the inclusion of car parking spaces on the ground floor and in the basement. The additional traffic will have a negligible effect on the network, so no traffic impact assessment is required to be carried out for the proposed development.

This chapter presents details of the traffic inputs required for other assessments contained within this EIAR.

This assessment was undertaken by Tiago Oliveira of Arup. Refer to **Appendix 1.1** for details on relevant qualifications and experience.

6.2 Assessment Methodology

6.2.1 General

This chapter assesses the impact of the proposed development on the road network during both the construction and operational stages. The following sections present the methodology for specific elements of this assessment.

For the purposes of a robust assessment, the traffic which is generated by the existing uses on site have not been considered in the traffic assessment. This is noted to be minimal in any case.

6.2.1.1 Construction Traffic Trip Generation

The volume of traffic generated by the construction of the proposed development has been estimated from first principles based upon the likely construction programme with each of the different types of trips generated (i.e. staff, excavation, deliveries etc.) described separately within the assessment.

Traffic generation associated with construction activities has been calculated based on the estimated material quantities and construction programme across all activities on the site.

Based on this, a peak construction period has been identified and the impact assessment has been undertaken for this period.

6.2.1.2 Construction Traffic Distribution

The distribution of traffic generated by the construction of the proposed development has been assumed based on the likely origin and destination of staff and construction materials. This traffic is then assigned to the network in order to determine the increase in traffic associated with the construction works.

6.2.2 Operational Traffic Impact Assessment

The proposed development is located in an area with excellent conditions for sustainable travel. Because of this, only 26 car parking spaces are proposed. The majority of these are to be part of a car club and therefore it is anticipated that the proposed development will generate very few peak hour vehicular trips. There will therefore be a negligible effect on traffic during the operational stage of the development. For this reason, a full operational traffic impact assessment was not required to be undertaken.

6.2.3 Guidance and Legislation

This EIAR has been prepared with due regard to the following overarching guidance on EIA as outlined in **Section 1.9.3**.

The assessment in this chapter has been undertaken in line with the guidance in Transport Infrastructure Ireland (2014) *Traffic and Transport Assessment Guidelines*.[1]

6.2.4 Study Area

For the purposes of this assessment, the study area has been defined as the road network in the immediate vicinity of the site. This includes Parkgate Street, Conyngham Road, Infirmary Road, Wolfe Tone Quay, Frank Sherwin Bridge, and Victoria Quay, as well as any impacts on the Luas that may arise.

The extent of the study area is presented in Figure 6.1.

[1] TII, 2014. Traffic and Transport Assessment Guidelines. Available at https://www.tii.ie/tii-library/land-use-planning/Transport-Assessment-GuidelinesMay2014.pdf. Accessed: 21/10/19.

Figure 6.1: Site Location and Study Area

6.2.5 Site Visits

A number of informal site visits were undertaken in 2019 to understand the existing road infrastructure in the area and to observe existing traffic conditions.

6.2.6 Consultation

A meeting was held on 1st March 2019 with Dublin City Council (DCC) during the pre-planning process. A number of issues were raised, such as car parking, cycle parking, service and emergency access and in particular the design and configuration of 42A Parkgate Street. These were discussed and subsequently addressed during the design development process.

The need or otherwise for a full traffic impact assessment was also discussed. In light of the relatively small amount of car parking proposed, it was agreed in principle that a full assessment would not be required.

A subsequent meeting was held on 16th October 2019 in DCC, where the updated scheme was presented and the requirements for planning were discussed, with particular focus on minor works required outside the area within the applicant's ownership on Parkgate Street, and whether or not these should be included as part of the application. These works were considered relevant to the application and were therefore included.

6.2.7 Categorisation of the Baseline Environment

Desk-based research was undertaken using google maps and street view as part of this project to understand the existing layout of the area, in conjunction with informal site visits to Parkgate Street.

A topographical survey was procured in order to understand the levels of the site and the surrounding area, particularly to address issues pertaining to ramps and pedestrian access to the development. A pedestrian survey was undertaken in December 2019 in order to understand the volume of pedestrians using the Sean Heuston bridge throughout an average day.

6.2.8 Impact Assessment Methodology

As noted in **Section 6.2.2**, the proposed development includes 26 car parking spaces. The additional traffic likely to be generated in this case, will have a negligible effect on the network during the operational stage, so no traffic impact assessment has been undertaken for the operational phase of the proposed development, as agreed with DCC.

The predicted traffic impact associated with the construction of the proposed development has been determined by estimating the expected peak hour construction traffic trips based on the quantities of material to be imported and exported to the site, robustly assuming that both excavation and importing of materials occur during the same period.

6.3 Baseline Conditions

6.3.1 Site Location

The site of the proposed development is located in the west of Dublin City Centre and occupies 0.82 hectares of land along the north bank of the River Liffey.

The site is bounded by Parkgate Street to the north, Parkgate Business Centre to the west, and the River Liffey to the south. Heuston Station lies directly across the river to the south, and the main entrance to Phoenix Park lies approximately 230m to the west of the site.

The present planning application also includes areas outside the applicant's ownership, which relate to necessary drainage works on Parkgate Street and also incorporate minor works kerbside uses (provision of a dropped kerb and new loading bay). The red line boundary includes these areas and the necessary consent from Dublin City Council has been received to allow the planning application to proceed.

6.3.2 Local Road Network

The existing road network in the vicinity of the site is illustrated in Figure 6.2 and described below.

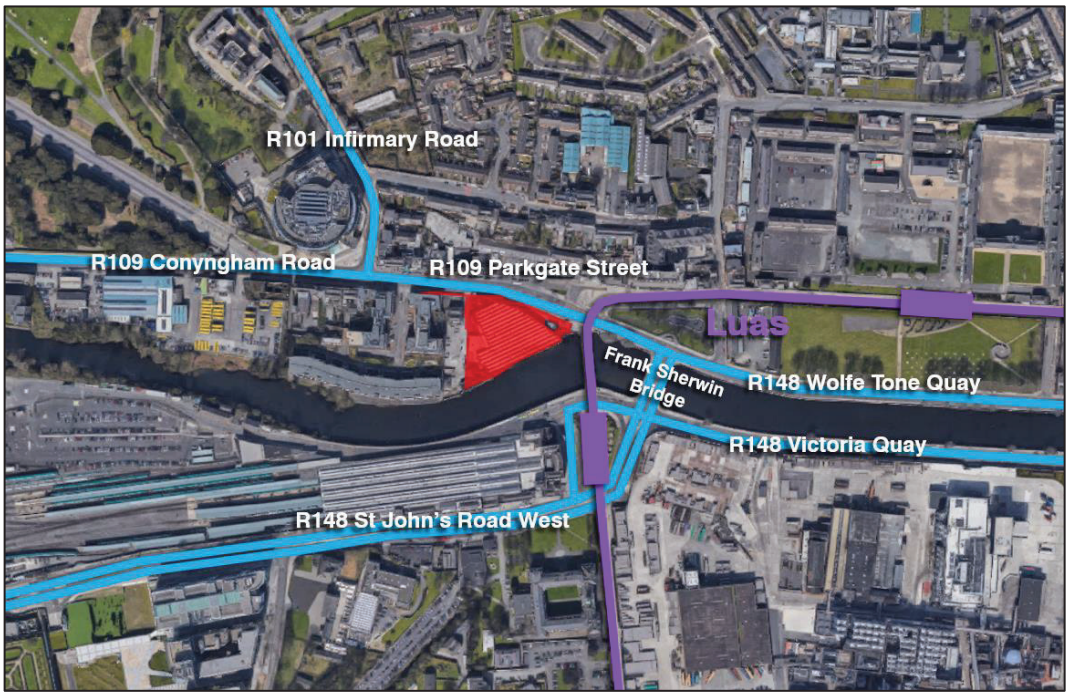

Figure 6.2: Road Network

The site is located on the R109 Parkgate Street, which is an important link into, and out of, Dublin City. It links to Conyngham Road which runs along the southern edge of Phoenix Park to Islandbridge and Chapelizod to the west. To the north, Infirmary Road provides a link to the North Circular Road and the northern areas of the city.

To the east Parkgate Street connects to Wolfe Tone Quay which runs along the northern edge of the River Liffey providing a link to the city. Frank Sherwin Bridge provides a link to Victoria Quay which runs along the southern edge of the River Liffey, and St Johns Road West which provides a link to Kilmainham and the Con Colbert Road, providing a link to the M50.

6.3.3 Pedestrian Facilities

A pedestrian footpath runs along Parkgate Street to the north of the site connecting to Phoenix Park and Conyngham Road to the west, and along the northern bank of the River Liffey into Dublin City Centre to the east. Sean Heuston Luas Bridge provides a connection across the River Liffey to Heuston Station and Heuston South Quarter to the southwest.

A pedestrian survey was undertaken along the Sean Heuston Bridge in December 2019, in over to determine the volume of pedestrian usage across the day. The survey results show that 1,065 pedestrians use Sean Heuston Bridge between 9.00 and 10.00 in the morning and 1,181 between 18.00 and 19.00 in the evening, equating to about 18 and 20 movements per minute on average, respectively.

6.3.4 Cyclist Facilities

There are no cycle facilities immediately adjacent to the site along Parkgate street. To the west, an advisory cycle lane is provided on the westbound side of Conyngham Road, starting at the entrance to Phoenix Park, with cycle facilities provided within the bus lane for the eastbound direction. Mandatory cycle lanes are provided along both sides of Chesterfield Avenue within Phoenix park. To the east, an advisory cycle lane is provided within the bus lane along Wolfe Tone Quay on the northern side of the River Liffey. To the south, advisory cycle lanes are provided on St John's Road West in both directions.

This site lies along primary route '5' in the GDA Cycle Network Plan[2], which runs from Blanchardstown through Castleknock, along Chesterfield Avenue through Phoenix park, and along the River Liffey as far as the East Link Bridge. The recently announced plans for the Liffey Cycle Route propose to create segregated cycle facilities on either side of the Liffey along the entirety of the River from Heuston Station/Parkgate Street to the East Link Bridge.

Figure 6.3 presents the cycle network in the vicinity of the site.

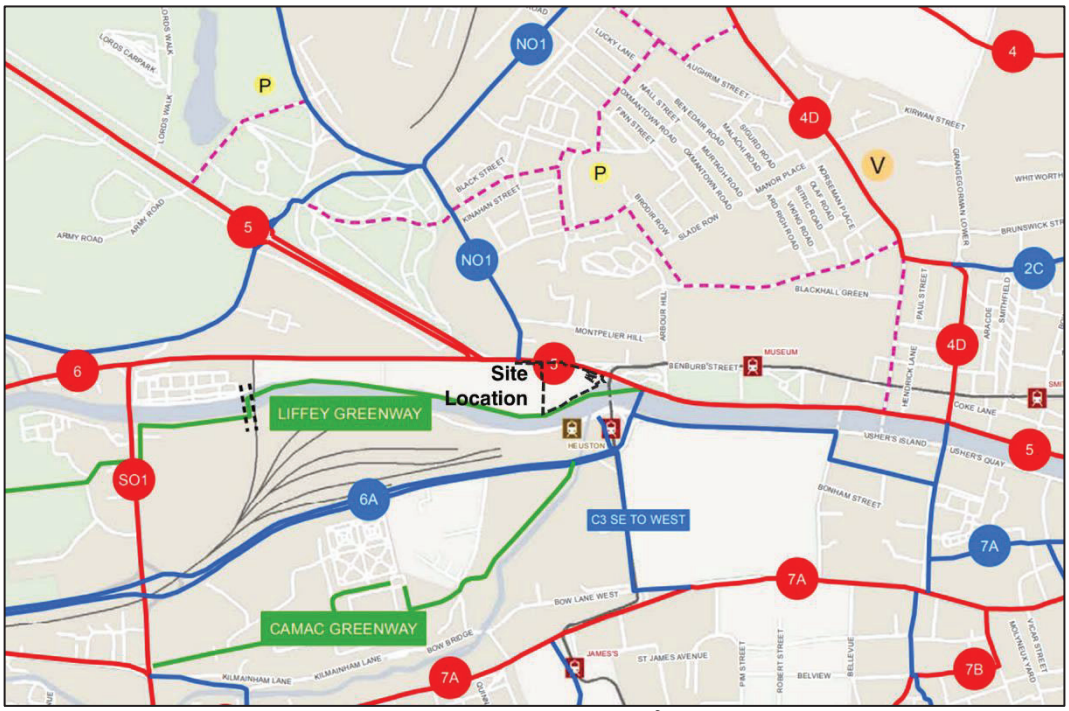

Figure 6.3: Extract from the GDA Cycle Network Plan[2]

There are a number of Dublin Bikes stands in the vicinity of the proposed development. Station no. 92 lies directly in front of the site along Parkgate St, with Station no. 86 directly across the road. Station no. 100 is located at Heuston Station, just across the Sean Heuston Bridge. In addition, there are five other stations within 600m of the site. The site location in the context of nearby bike stations is presented in Figure 6.4.

[2] NTA, 2013. GDA Cycle Network Plan. Available at https://www.nationaltransport.ie/publications/strategic-planning/gda-cycle-network-plan/. Accessed 04/12/2019.

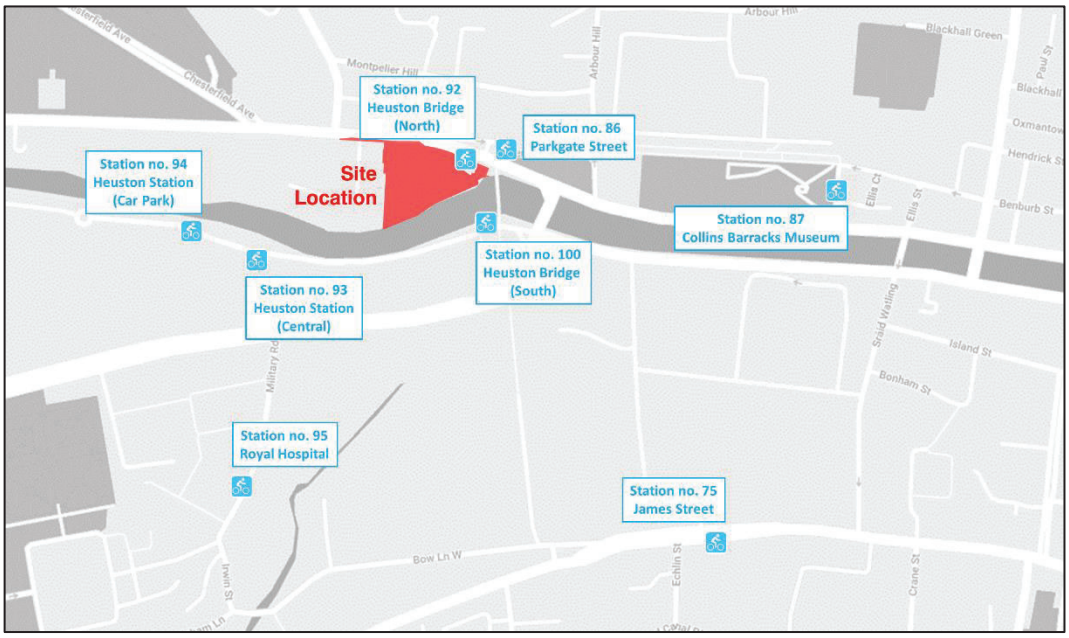

Figure 6.4: Nearby Dublin Bikes Stations[3]

6.3.5 Public Transport Facilities

This site is very well served by public transport. Heuston Station lies directly across the River Liffey to the south, which provides regional rail connections to the west and south. The area in front of the station acts as a transport hub, with a Luas red line station, a number of local and regional bus route stops, and a Dublin Bikes stand all located in this area.

The Luas red line provides connections to Tallaght and Saggart in the west, and Connolly and The Point to the east.

The 25, 26, 66/a/b, 67, and 69 bus routes all pass through Parkgate street, with the westbound bus stop located directly in front of the site, and the eastbound stop located across the road. The 25a/b and the 79/a pass along St Johns Rd West with stops just south of Heuston Station. The 145 and the 747 Airport Bus both terminate at Heuston station.

The public transport routes in the vicinity of the site are shown in Figure 6.5.

[3] DCC, 2019. Dublin Bikes Station Map. Available at http://www.dublinbikes.ie/All-Stations/Station-map. Accessed 04/12/19.

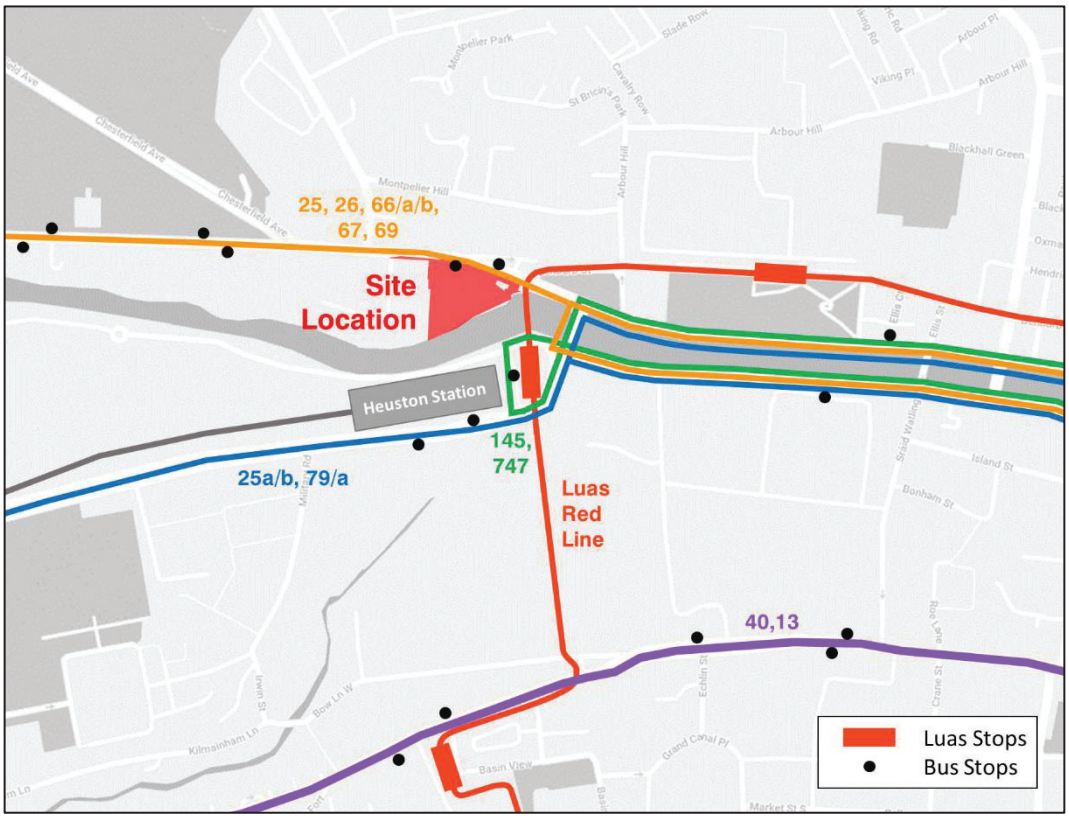

Figure 6.5: Public Transport Options in the Vicinity of the Site

Under the draft Dublin Area Revised Bus Network proposals as part of BusConnects, Heuston Station will act as a major transport interchange and terminus for a number of key routes.

The inner orbital 'O', which would run in both directions in a loop around the North Circular Road and the South Circular Road would have its terminus located at Heuston Station. The N2 northern orbital would run from Heuston Station through Stoneybatter, Cabra, Glasnevin, and on to Clontarf, and the S2 orbital would run from Heuston through Rialto, Kimmage, Rathmines, Ranelagh, Ballsbridge, and on to Sandymount.

In addition to these orbital routes, the 'C' radial spine would run east/west through Heuston, which would run from Poolbeg and Sandymount in the East, to Liffey Valley, Lucan and on to Maynooth and Celbridge in the West. Other radial spines which pass close to the site include the 'B' Spine which would run between Blanchardstown and UCD/Dun Laoghaire, and the 'G' Spine which would run between Liffey Valley/Red Cow and Spencer Dock.

Two of the minor radial routes would also pass along Parkgate Street, the 14, which would run from Liffey Valley through Chapelizod into the City Centre, and then south through Rathmines to Ballinteer, and the 93 which would run from Rathcoole into the city centre and terminate in Dublin Port.

The planned routes in the vicinity of the development are presented in Figure 6.6.

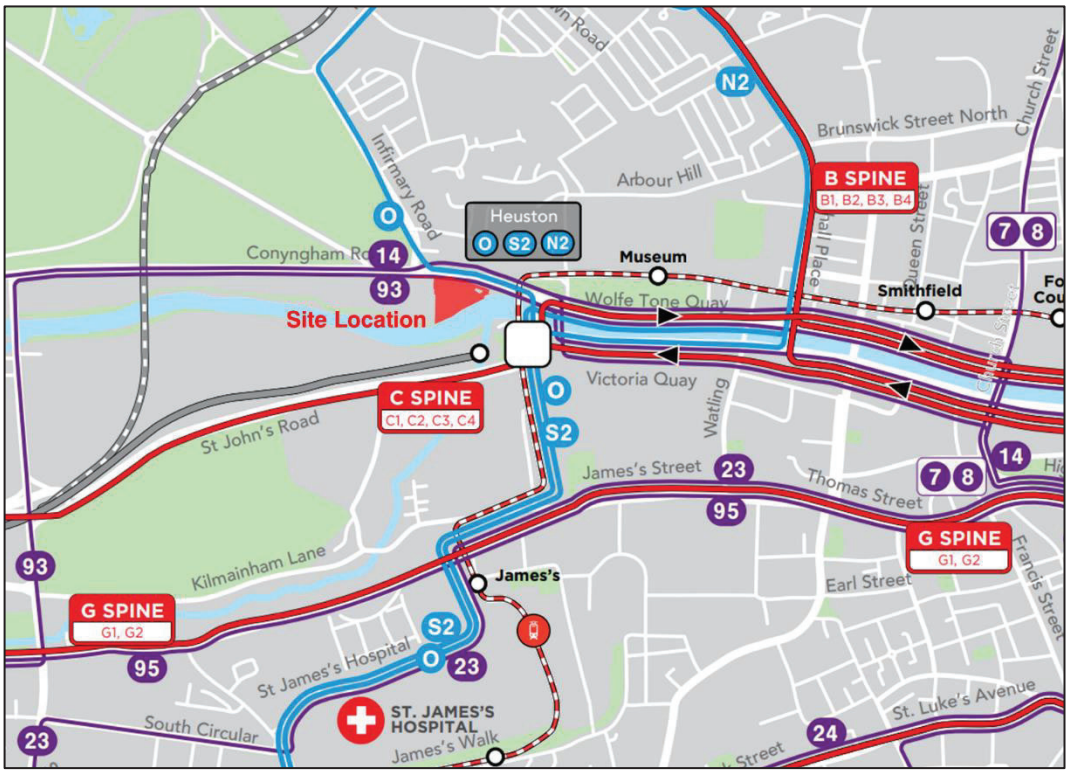

Figure 6.6: Extract from the Draft BusConnects Bus Network Redesign Proposals[4]

6.4 Likely Significant Effects

This section outlines the proposed development and the likely changes to the existing traffic and transportation networks during both the construction and operational phase of the proposed development.

6.4.1 Assessment of effects during construction

6.4.1.1 Site Access and Vehicular Routes

It is anticipated that all construction vehicles accessing and egressing the site will do so from a construction access point on Parkgate Street. Construction traffic travelling to and from the site will do so via the Conyngham Road, South Circular Road, and Con Colbert Road/Chapelizod Bypass from where they will access the M50 and the national road network. This will keep trucks to an established HGV route, minimising their impact on residential areas. A Construction Traffic Management Plan (CTMP) has been prepared and is included in the CEMP. The CTMP will be agreed with Dublin City council and An Garda Síochána in advance of the works.

Figure 6.7 shows the designated construction traffic route to/from the site.

[4] NTA, 2019. Dublin Area Revised Bus Network. Available at https://busconnects.ie/initiatives/dublin-area-bus-network-redesign/. Accessed 04/12/19.

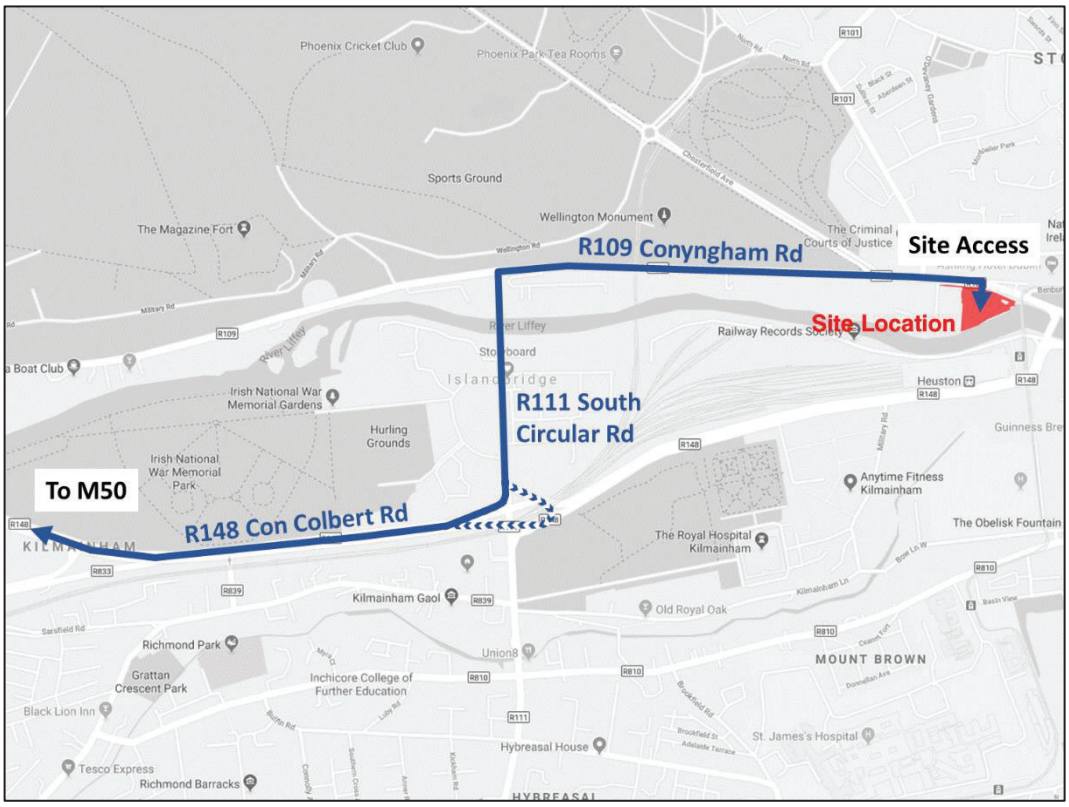

Figure 6.7: Designated Construction Traffic Route

6.4.1.2 Pedestrian Facilities

During certain stages of construction, it may be necessary to close part of the footpath along Parkgate Street. If this were to occur, a minor diversion for pedestrians would be provided along the carriageway of the road immediately adjacent to the footpath, closing off one lane of traffic to westbound vehicles. There are two vehicle lanes in the westbound direction, so no detours would be required for vehicles. A Construction Traffic Management Plan has been included in the CEMP and all details will be agreed with Dublin City Council and An Garda Síochána in advance of the works.

6.4.1.3 Cycle Facilities

Cycle parking spaces will be provided on site for construction staff and in addition lockers will be provided to provide necessary storage for cyclist's personal belongings. There are also several Dublin Bikes stations in the vicinity of the site near Heuston Station.

As part of the proposed development it will be necessary to permanently re-locate Dublin Bikes Station No. 92 on Parkgate due to the provision of a loading bay in the current location of the station. It is likely that the relocation will occur early in the construction phase. The new location for the Dublin Bikes Station will be confirmed by DCC.

6.4.1.4 Public Transport

It is not envisaged that there will be any impact on public transport infrastructure or services during the construction of this development.

6.4.1.5 Car parking

No car parking is being provided on site for staff as the location of the proposed development is in the centre of Dublin and can be easily accessed by public transport, walking and cycling. If staff drive, they will have to park in the wider area such as Phoenix Park, Royal Hospital Kilmainham, or the various city centre car parks. However, the majority of these trips will likely occur before 7:00 and thus will not impact the network during the peak period of traffic volume.

6.4.1.6 Construction Traffic Trip Generation

The level of construction traffic directly associated with the construction of the proposed development will vary over the course of the construction project. The construction works will generate traffic during the following phases:

- Phase 1 – Enabling Works and Demolition;
- Phase 2 – Piling and Groundworks; and
- Phase 3 – Main Construction Works

The following section presents the projected volume of traffic generated during the peak period of construction activity.

It is expected that the most onerous phase of construction activity is during Phases 1 and 2 which may potentially run concurrently over a period of 4 months. For the purposes of this assessment and its robustness, it has been assumed that the entirety of the construction works for these phases will occur over a period of 2 months. This means an assumption of the same volume of trips but distributed by a shorter time period, thus resulting in more trips per day or hour.

Removal of Excavated and Demolished Material: The largest number of HGV movements will be associated with the excavation and demolition stage. It has been robustly assumed that approximately 14,500m^3 of bulk excavation material and approximately 2,250m^3 of demolition waste (based on estimate of 2,695 tonnes, at 1.2T/m^3) will require removal from the site, and this is assumed to occur over a 2-month period. It is unlikely that demolition and excavation will happen at the same time. However, for robustness, this assessment assumes that they will occur at the same time.

On the basis of a 10m^3 truck capacity, approximately 28 trucks per day are needed over the 2-month period. This equates to less than 2.5 trucks per hour on average. During peak construction periods this number could potentially double to 5 trucks per hour.

Imported Fill Material: It has been robustly assumed that 6,500m^3 of fill material will be imported to the site, and again, it is assumed that this will occur over a 2-month period.

On the basis of a 10m^3 truck capacity, approximately 11 trucks per day are needed over the 2-month period. This equates to less than one truck per hour on average. During peak construction periods this number could double to 2 trucks per hour.

Total Construction Traffic Generation: The total traffic generation for construction activities based on the assumptions set out above is presented in Table 6.1 below. Note these are 2-way movements (i.e. one truck = two movements).

Table 6.1: Traffic Generated During the Construction Period

Construction Aspect	2-Way Trips in Peak Hour
Removal of Excavated Material	10
Imported Fill Material	4
Total	14

A total of 14 two-way trips in a peak construction hour will not have any significant impact on the local traffic network.

6.4.1.7 Indirect Effects

There are no significant direct effects expected during the construction phase of the development, and therefore there are no significant indirect effects identified.

6.4.1.8 Cumulative Effects

Having reviewed the existing granted planning applications in the vicinity of the site as detailed in **Appendix 21.1**, no relevant proposed developments have been identified that could be considered to result in significant cumulative effects in the context of the proposed development during the construction stage.

6.4.2 Assessment of effects during operation

6.4.2.1 Site Access

Vehicles will access the site from Parkgate Street at the most northern point of the site. This entrance will provide access to the car parking spaces at ground level and a double car lift which provides access to car parking in the basement.

6.4.2.2 Car parking

As per the *Dublin City Development Plan*[5] the maximum permissible number of car parking spaces for this development would be 491 spaces, with 481 for the residential component of the development (1 per unit), 9 for the office component (1 per 400sq.m) and 1 for the retail (1 per 350sq.m).

[5] DCC, 2016. Dublin City Development Plan 2016-2022. Available at https://www.dublincity.ie/sites/default/files/content/Planning/DublinCityDevelopmentPlan/Written%20Statement%20Volume%201.pdf. Accessed 03/01/2020.

It is proposed that only 26 car parking spaces will be provided as part of the development.

Nine will be provided for office use, made up of eight standard spaces and one disabled space. The remaining 17 will be provided for residential use, made up of 15 standard spaces and two disabled spaces.

The standard residential car parking spaces will be operated as a bespoke car club for the purpose of non-commuting trips for the residents of the apartments. These cars will be available for residents to use for trips where a car is required such as a shopping trip, weekend needs (family/day trips), occasional transport of bulky items, etc. This facility would be managed centrally and would operate on the basis of online bookings.

6.4.2.3 Pedestrian Accessibility

Pedestrian facilities and the public realm will be enhanced with this proposed development.

The eastern courtyard will be accessible to the public, allowing through access for pedestrians and providing a new public plaza with outdoor seating, landscaping, and entrances to the retail units.

A public river walk will be provided along the southern edge of the site, providing a view of the River Liffey and Heuston Station. The eastern end of the river walk will connect to the external footpath, providing more space for pedestrians at what is currently a constrained area of the footpath.

Transport Infrastructure Ireland has requested information regarding pedestrian movements across Sean Heuston Bridge and the potential interactions of the proposed development with Luas movements. In this context, the applicant has commissioned surveys to enable the identification of potential impacts of additional pedestrian movements at this location.

The survey results show that 1,065 pedestrians use Sean Heuston Bridge between 9.00 and 10.00 in the morning and 1,181 between 18.00 and 19.00 in the evening, equating to about 18 and 20 movements per minute on average, respectively.

The likely person trips generated by the development during the identified busiest periods at the bridge (as above) have been calculated using the TRICS (Trip Rate Information Computer System) trip rate database. It is predicted that the development will generate a total of 230 in the morning (9.00-10.00) and 302 person trips the evening (18.00-19.00).

These trips were assigned to the various modes, of which the relevant ones were pedestrian (22%) and public transport (40%). The latter is relevant as it is considered that half of these will use the bridge as a connection to trains, Luas and buses. The pedestrian volumes were assigned to the local pedestrian network, with 20% of them using Sean Heuston Bridge.

The total flows on the bridge are therefore robustly estimated to be in the order of 59 in the morning (9.00-10.00) and 77 in the evening (18.00-19.00), equating to 5.5% and 6.5% of the present total peak hour flows, respectively.

This is not considered to be significant in the context of an urban setting and the fact that the present proposals aim to encourage sustainable travel.

6.4.2.4 Cycle Accessibility

Cycle parking is accessed via safe dedicated stairwells with wheeling ramps to facilitate access and egress. There will also be dedicated storage for bicycles at ground level, basement and in the gateway entrance spaces. As required by the Dublin City Development Plan and in accordance with the sustainability objectives of the project, bicycle parking spaces for the office accommodation with appropriate changing shower and drying room facilities are also provided in the basement. A total of 551 bicycle parking spaces will be provided.

As part of the proposed development it will be necessary to permanently re-locate Dublin Bikes Station No. 92 on Parkgate due to the provision of a loading bay in the current location of the station. The new location for the Dublin Bikes Station will be confirmed by DCC.

6.4.2.5 Public Transport

It is not envisaged that there will be any impact on physical public transport infrastructure as part of this development. The introduction of a large number of residential units, along with the minimal amount of car parking provided means that public transport usage is likely to increase as a result of this development. There are a large number of public transport options in the area including the Luas red line along with multiple high frequency bus routes, so there is ample capacity to serve the expected increase in demand.

6.4.2.6 Service, Deliveries and Emergency Access

Services such as waste collection and deliveries will use the loading bay to be provided for the development on Parkgate Street (see Figure 6.8). This provides necessary capacity and flexibility for service and delivery. On a less frequent basis, the courtyards can also be accessed.

Emergency access will be provided through the entrances into each of the courtyards. Additionally, an emergency access route is provided between the two courtyards. Figure 6.8 shows the proposed emergency access route.

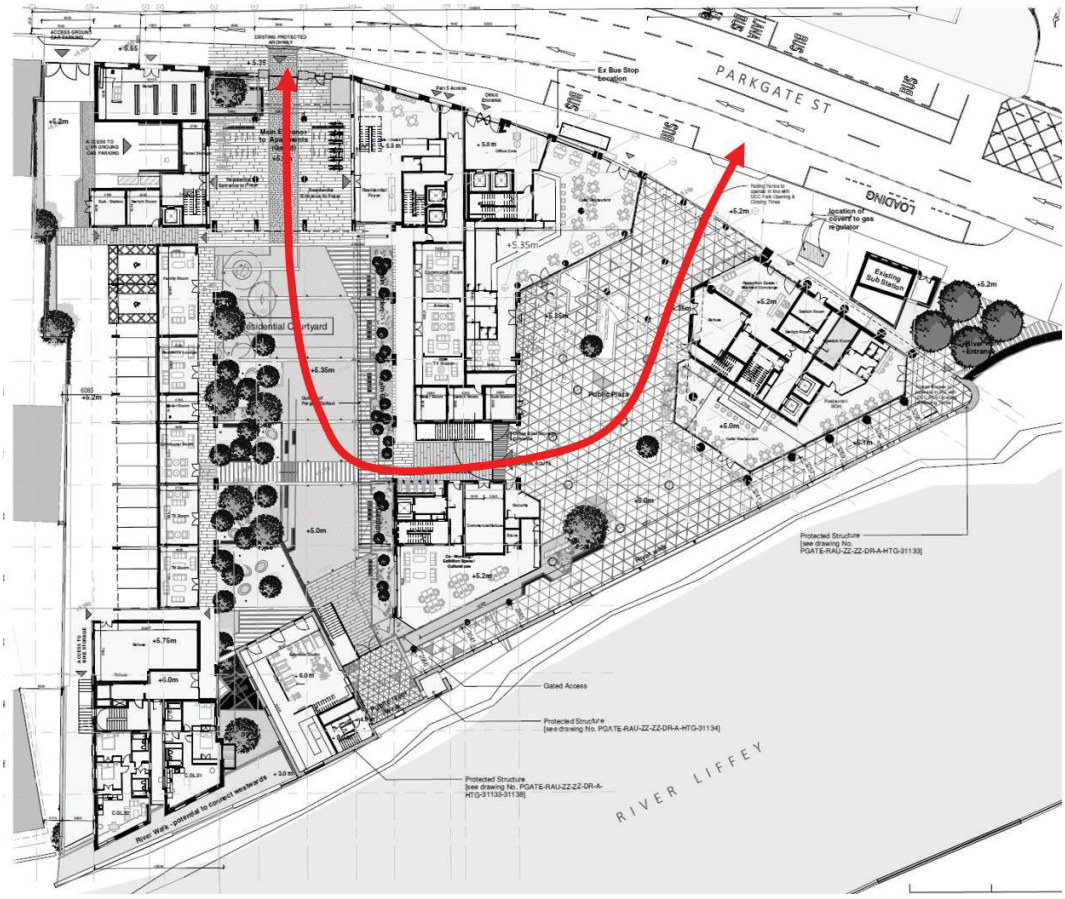

Figure 6.8: Proposed Emergency Access Route

6.4.2.7 Operational Traffic Trip Generation

Trip generation during the operational phase will be minimal as only 8 car parking spaces are allocated for office use. At most, the office spaces will generate 8 one-way trips during the peak hours. It is unlikely that a significant number of trips will be generated by the car club spaces as they are intended for non-commuting trips only and so those trips will tend to occur outside peak hours. For a robust assessment it has been assumed that 5 one-way trips will be generated by these car-club cars during the peak hours. This equates to 13 trips during peak hours in the operational stage, which is a negligible addition to the overall volume of traffic in the area.

The site will also generate trips due to deliveries and waste collection, these numbers are anticipated to be relatively small and will not have a significant effect.

6.4.2.8 Indirect Effects

As there are no significant direct effects expected during the operational phase of the development, there are therefore no significant indirect effects identified.

6.4.2.9 Cumulative Effects

Having reviewed the existing granted planning applications in the vicinity of the site as detailed in **Appendix 21.1**, no relevant proposed developments have been identified that could be considered to result in significant cumulative effects in the context of the proposed development during the operational stage.

6.5 Mitigation Measures and Monitoring

This section outlines the various mitigation measures that will minimise or eliminate the potential effects of the scheme in terms of traffic and transportation.

6.5.1 Mitigation During Construction

The following mitigation measures are proposed for the construction phase of the scheme:

Construction Environmental Management Plan and Construction Traffic Management Plan

A Construction Environmental Management Plan (CEMP) has been prepared (**see Appendix 4.1.**) and is incorporated in the planning application documentation. The Construction Management Plan will be included as a section within the CEMP. The contractor will develop the CEMP and a Construction Traffic Management Plan (CTMP) in order to implement the requirements of the CEMP prepared as part of this application. This will be developed by the appointed contractor in advance of the works and will be agreed with Dublin City Council and An Garda Síochána.

6.5.2 Mitigation During Operation

The development will have a pro-active Mobility Management Plan (MMP) that will include measures to further encourage sustainable transport trips. A Framework MMP has been included in the Transport Statement, which is submitted as part of the planning application documentation.

6.5.3 Monitoring

Since there are no significant effects anticipated, no monitoring has been proposed with respect to effects from construction or operational traffic associated with the proposed development.

6.6 Residual Effects

Since no significant traffic effect is predicted to arise from either the construction or operational stages, there are no residual effects anticipated. Cumulative effects have also been considered.

6.7 References

Arup (2019) Parkgate Street Development Transport Statement. Dublin, Ireland

Dublin City Council, 2016. Dublin City Development Plan 2016-2022. Available at https://www.dublincity.ie/sites/default/files/content/Planning/DublinCityDevelopmentPlan/Written%20Statement%20Volume%201.pdf. Accessed 03/01/2020.

Dublin City Council, 2019. Dublin Bikes Station Map. Available at http://www.dublinbikes.ie/All-Stations/Station-map. Accessed 04/12/19.

National Transport Authority, 2013. GDA Cycle Network Plan. Available at https://www.nationaltransport.ie/publications/strategic-planning/gda-cycle-network-plan/. Accessed 04/12/2019

National Transport Authority, 2019. Dublin Area Revised Bus Network. Available at https://busconnects.ie/initiatives/dublin-area-bus-network-redesign/. Accessed 04/12/19.

Transport Infrastructure Ireland, 2014. Traffic and Transport Assessment Guidelines. Available at https://www.tii.ie/tii-library/land-use-planning/Transport-Assessment-GuidelinesMay2014.pdf. Accessed: 21/10/19.

7 Air Quality

7.1 Introduction

This chapter assesses the likely significant effects of the proposed development on air quality, including a qualitative assessment of construction and operational air emissions. Climate is addressed separately in **Chapter 8**.

Chapter 3 provides a description of the proposed development and **Chapter 4** describes the indicative construction strategy for the proposed development. The following aspects are particularly relevant to the air quality assessment:

- Design:
  - Aspects relating particularly to the design and location of the proposed development include access to public transport and limited operational traffic movements, with 26 car parking spaces proposed.
- Operation:
  - Aspects relating particularly to the operation include the sizing of boilers and emergency generator.
- Construction:
  - Aspects relating particularly to the construction of the proposed development, including mitigation measures to reduce dust impacts, and procedures to deal with Asbestos Containing Materials (ACMs) in accordance with the relevant procedures and legislation.

This chapter has been prepared by Cormac McKenna and Sinead Whyte of Arup. Refer to **Appendix 1.1** for details on relevant qualifications and experience.

7.2 Assessment Methodology

7.2.1 General

Air quality assessments are concerned with the presence of airborne pollutants in the atmosphere. The likely significant effects of the proposed development on air quality have been assessed by considering the background concentration levels of pollutants in the atmosphere and the potential for construction and operational effects associated with the proposed development.

Predicted concentrations associated with the proposed development are then compared to the relevant limit values described in **Section 7.2.2** to determine likely significant effects.

An assessment of the potential risk of ACMs being released to the environment has also been undertaken.

This assessment has also been undertaken with regard to the Transport Infrastructure Ireland (TII)[1], (formerly the National Roads Authority (NRA)), air quality guidelines. These guidelines provide a methodology for the assessment, management and mitigation of air quality at construction sites which can be adapted accordingly depending on the nature of the works.

The TII guidelines state that increases in Annual Average Daily Traffic (AADT) flows of less than 5% and 10% during the operational and construction phases respectively are unlikely to result in significant air quality effects. Likely significant effects on air quality are therefore assessed when the AADT flows are projected to increase above these thresholds during construction and operation of the proposed development.

The traffic volumes as presented in **Chapter 6**, Traffic and Transportation, show that there will be approximately 14 additional HGV movements per hour as a result of the construction phase of the proposed development. This increase is significantly less than the 10% increase in traffic volumes that triggers the requirement for a detailed assessment and is unlikely to result in significant air quality effects during construction. Traffic volumes during the operational phase will also be minimal, limited to access/egress from the proposed 26 car parking spaces, deliveries/collections and service traffic, and as such, no significant air quality effects are predicted for the operational phase. There is therefore no requirement for a detailed assessment and is unlikely to result in significant air quality effects during operation.

This chapter has been prepared with due regard to the overarching guidance on EIA as outlined in **Section 1.9.3**.

7.2.2 Guidance and Legislation

7.2.2.1 Limit Values

Limit values for a range of air pollutants have been set through European and national legislation. These limit values are set for the protection of human health and ecosystems.

On 12 April 2011, *the Air Quality Standards (AQS) Regulations 2011 (S.I. No. 180 of 2011)*[2] came into force and transposed *EU Directive 2008/50/EC*[3] on ambient air quality and cleaner air for Europe into Irish law. The purpose of the AQS Regulations is to:

- establish limit values and alert thresholds for concentrations of certain pollutants;
- to provide for the assessment of certain pollutants using methods and criteria common to other European Member States;

[1] TII, 2011. Guidelines for the Treatment of Air Quality during the Planning and Construction of National Roads Schemes.
[2] Air Quality Standards (AQS) Regulations 2011 (S.I. No. 180 of 2011)
[3] EC, 2008. Directive 2008/50/EC. *Ambient Air Quality and Cleaner Air for Europe*

- to ensure that adequate information on certain pollutant concentrations is obtained and made publicly available; and
- to provide for the maintenance and improvement of ambient air quality where necessary.

The limit values established under the AQS Regulations relevant to this assessment are included in Table 7.1.

Table 7.1: Limit values in the AQS Regulations

Pollutant	Limit value for the protection of:	Averaging period	Limit value ($\mu g/m^3$)	Basis of application of limit value	Limit value attainment date
NO_2	Human Health	1-hour	200	≤ 18 exceedances p.a. (99.79%ile)	1 January 2010
		Calendar year	40	Annual mean	1 January 2010
NO_x	Vegetation	Calendar year	30	Annual mean	1 January 2010
PM_{10}	Human Health	24-hours	50	≤ 35 exceedances p.a. (90%ile)	1 January 2005
		Calendar year	40	Annual mean	1 January 2005
$PM_{2.5}$	Human Health	Calendar year	20 Note 1	Annual mean	1 January 2020

Note 1: Limit value to be reviewed by the Commission in light of further information on health and environmental effects, technical feasibility and experience of the Target Value in Member States.

There are no statutory limits for dust at a European or national level. However, *TA Luft*[4] provides a guideline for the rate of dust deposition of 350mg/m^2/day averaged over one year. The EPA concurs[5] that this guideline may be applied, although the EPA typically applies the guideline limit as a 30-day average.

The European Union (Medium Combustion Plant) Regulations 2017 were signed into law in December 2017. Their purpose is to limit emissions to atmosphere from boilers and other stationary combustion plants in the 1-50 MWTH (thermal input) range.

[4] TA Luft, 2002. *Technical Instructions on Air Quality.*
[5] EPA, 2006. *Environmental Management in the Extractive Industry (Non-Scheduled Minerals).*

7.2.3 Study Area

The proposed development is located at 42A Parkgate Street, Dublin. The proposed development is contained within the planning boundary as shown in **Chapter 1**, Figure 1.2.

Sensitive receptor locations are defined by TII guidance as *residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present.* The closest sensitive receptors[6] to the proposed development are located less than 5m from the site boundary on the western side. The buildings located 20m to the north of the proposed are of mixed use and have been considered as sensitive for this assessment as they include dwellings.

7.2.4 Site Visits

No site visits were considered necessary in the preparation of this chapter.

7.2.5 Consultation

No specific consultation was undertaken in the preparation of this chapter. A number of pre-planning meetings have been held with Dublin City Council and An Bord Pleanála, please refer to **Chapter 1**.

7.2.6 Categorisation of the Baseline Environment

A desk-based study of the baseline environment of the proposed development area was undertaken in order to inform this assessment. EPA Air Quality Reports[7,8,9] were referred to.

7.2.7 Impact Assessment Methodology

7.2.7.1 Significance Criteria

Significance criteria for the construction phase have been adopted from the *TII Guidelines*[1] and are presented in Table 7.2. These criteria provide a basis for assessing the level of effects due to the additional traffic present during construction.

[6] TII, 2011. Sensitive receptor locations include: residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present.
[7] EPA, 2019. Air Quality in Ireland 2018- Indicators of Air Quality.
[8] EPA, 2018. Air Quality in Ireland 2017- Indicators of Air Quality.
[9] EPA, 2017. Air Quality in Ireland 2016- Indicators of Air Quality.

Table 7.2: Assessment criteria for the effect of dust emissions from construction activities with standard mitigation in place

Source		Potential distance for Significant Effects (Distance from Source)		
Scale	**Description**	**Soiling**	**PM_{10}[10]**	**Vegetation Effects**
Major	Large construction sites, with high use of haul routes	100m	25m	25m
Moderate	Moderate sized construction sites, with moderate use of haul routes	50m	15m	15m
Minor	Minor construction sites, with limited use of haul routes	25m	10m	10m

7.2.7.2 Dust Assessment Methodology

The TII guidelines state that dust emissions from construction sites can lead to soiling, elevated PM_{10} concentrations and can cause effects on vegetation such as reduction in light required for photosynthesis and an increase in leaf temperature due to changed surface optical properties.

The likely significant effects of dust emissions during construction are assessed by considering the proximity of sensitive receptors to the construction works. The likely significant effects of construction dust on sensitive habitats are also considered.

7.2.7.3 Operational air emissions

As part of the proposed development, a number of operational air emission sources will be located onsite. An emergency generator, of indicative sizing of 450kVA, will be located onsite. As this generator will only be used during periods of power failure, no significant effect on air quality is expected to occur.

In addition, four onsite gas boilers will be located onsite of an indicative size of 600kVA each. An assessment of the emissions from these boilers is provided in **Section 7.4.3.1.**

7.3 Baseline Conditions

7.3.1 Air Quality

The Environmental Protection Agency (EPA) *Air Quality in Ireland Reports*[7] describes the air quality zoning adopted in Ireland under the *Air Quality Standards Regulations, 2011*[2] as follows:

- Zone A (Dublin conurbation);

[10] Significance based on the PM_{10} Limit Values specified in SI No. 180 of 2011, which allows 35 daily exceedances/year of 50 µg/m³

- Zone B (Cork conurbation);
- Zone C (24 Cities and towns); and
- Zone D (Rural Ireland: areas not in Zones A, B and C).

The site falls within Zone A. Background levels from 2018[7], 2017[8] and 2016[9] air quality monitoring of NO_2, $PM_{2.5}$ and PM_{10} in Zone A provided by the EPA are presented in Table 7.3.

Concentrations of each pollutant recorded in Zone A are averaged to represent typical background levels. Average concentrations were obtained from all stations where 90% data capture was achieved. This is in accordance with *Directive 2008/50/EC*[3] which specifies that any site used for assessment purposes must comply with 90% data capture.

Pollutant background concentrations are considered in this assessment. Table 7.3 presents a three-year average of background pollutant concentration values for Nitrogen Dioxide (NO_2) and Particulate Matter ($PM_{2.5}$ and PM_{10}). The EPA monitoring reports state that the NO_x annual mean limit value for the protection of vegetation only applies to Zone D. Therefore, the assessment of NO_x has not been considered in this assessment.

Table 7.3: Annual Mean Background Pollutant Concentrations for Zone A

Year	Annual Average NO_2 (µg/m³) Limit (40 µg/m³)	Annual Average PM_{10} Limit (40 µg/m³)	Annual Average $PM_{2.5}$ Limit (25 µg/m³)
2018	21.3	14.2	7.5
2017	19.7	11.5	7.5
2016	23.9	13.6	8.8
Average	*21.6*	*13.1*	*7.9*

As outlined in **Chapter 15**, Land and Soils, low levels of asbestos containing materials (ACM) were detected during the site investigation.

7.4 Likely Significant Effects

7.4.1 Do-Nothing Scenario

In the scenario where the proposed development did not proceed as planned, none of the construction or operational impacts as set out in this chapter would occur.

7.4.2 Assessment of potential direct effects during construction

7.4.2.1 Direct Effects

Chapter 3 provides a description of the proposed development with **Chapter 4** providing details of the proposed construction strategy for the proposed development.

Dust emissions are likely to arise from the following activities:

- Building demolition;
- Transport of demolition material;
- Site excavation;
- Breaking of undercroft piles;
- Piling;
- Crushing;
- Use of generators;
- Stockpiling of separated particles;
- Handling of construction materials;
- Construction works on Parkgate Street;
- Construction traffic movements; and
- Landscaping.

In general, any additional airborne concentrations of particulate matter arising from construction would be small and very local to the construction site (minimising human exposure). Particles generated by most construction activities tend to be larger than 10µm in diameter which are too large to enter the human lung.

The construction phase of the proposed development is considered to be potentially of a major scale, refer to Table 7.2. This has the potential to result in soiling effects within 100m and PM_{10} and vegetation effects within 25m of the works with standard mitigation in place.

A number of sensitive receptors are located on the western boundary; the closest of which is located approximately 5m from the site boundary. There is potential for a significant impact from soiling, PM_{10} and vegetation effects arising from construction activities at properties along the western and northern boundary of the proposed development.

During the construction phase of the proposed development it is also possible that disturbance of ACMs on site could cause asbestos fibres to be released into the ambient environment which may cause a significant impact, see **Section 7.5.1.1** for more details.

7.4.2.2 Indirect Effects

The traffic volumes as presented in **Chapter 6**, Traffic and Transportation, show that there will be approximately 14 additional traffic movements per hour during peak construction, which will have a minimal effect on the existing road network. As such, no likely effects on air quality from construction traffic is predicted to occur.

7.4.2.3 Cumulative Effects

Appendix 21.1 of **Chapter 21**, Interactions and Cumulative Effects, outlines the proposed and permitted developments within 1km of the proposed development.

Two of these developments are located within the immediate surrounds (Parkgate Street, Conyngham Road, Infirmary Road, Benburb Street) of the proposed development.

One has been completed (First Ireland Risk Management Ltd 2168/15) and as such, no cumulative effects with this development are anticipated.

The other development (17-22 Parkgate Street 3539/17) involves the construction of a four-storey building approximately 50m from the proposed development.

Given the scale of this adjacent development, in terms of both construction activities and construction traffic, there is the potential for cumulative effects. However, with the implementation of standard construction practices, no significant cumulative effects are envisaged in combination with the adjacent development.

7.4.3 Assessment of effects during operation

7.4.3.1 Direct Effects

As outlined in **Section 7.2.7.3**, the indicative sizing of the proposed gas boilers for use will be 600kW. Four such boilers are proposed to be located in the basement of Block B. These boilers are not subject to registration under the Medium Combustion Plant Directive (for emission sources between 1MW and 50MW) and are therefore not considered significant.

7.4.3.2 In-direct Effects

Traffic volumes during the operational phase will also be minimal, limited to access/egress associated with 26 car parking spaces, deliveries/collections and service traffic. As no increase in traffic >5% is likely to be generated during the operational phase of the proposed development, a negligible effect on air quality from operational traffic is predicted.

7.4.3.3 Cumulative Effects

Appendix 21.1 of **Chapter 21**, Interactions and Cumulative Effects, outlines the proposed and permitted developments within 1km of the proposed development.

Given the minimal amount of traffic generation during the operational phase of the proposed development, any cumulative effect, in combination with the operational effects of other proposed or permitted developments, will be negligible. Therefore, no significant cumulative impacts are predicted in combination with the proposed development.

7.5 Mitigation Measures and Monitoring

7.5.1 Mitigation

7.5.1.1 Mitigation During Construction

The assessment of likely significant effects during construction (contained in **Section 7.4.2**) includes for the implementation of 'standard mitigation', as stated in the TII guidance[11]. The measures which are appropriate to the proposed development, and which will be implemented, include:

- Spraying of exposed earthwork activities and site haul roads during dry weather;
- Provision of wheel washes at exit points;
- Covering of stockpiles;
- Control of vehicle speeds, speed restrictions and vehicle access; and
- Sweeping of hard surface roads.

In addition, the following measures will be implemented during the construction phase of the proposed development:

- Facades of buildings will be covered and sprayed with water while being demolished;
- A c. 1.8m hoarding will be provided around the site works to minimise the dispersion of dust from the working areas;
- Any generators will be located away from sensitive receptors in so far as practicable; and
- Stockpiles will be located as far as possible from sensitive receptors and covered and/or dampened during dry weather.

Employee awareness is also an important way that dust may be controlled on any site. Staff training and the management of operations will ensure that all dust suppression methods are implemented and continuously inspected.

[11] TII, 2011. Guideline for the Treatment of Air Quality During the Planning and Construction of National Road Schemes. Available at: *https://www.tii.ie/technical-services/environment/planning/Guidelines-for-the-Treatment-of-Air-Quality-during-the-Planning-and-Construction-of-National-Road-Schemes.pdf*

During the construction phase of the proposed development it is possible that disturbance of ACMs on site could cause asbestos fibres to be released into the ambient environment. An asbestos audit will be carried out on the buildings scheduled for demolition prior to demolition works. Any asbestos discovered will be removed by a Specialist Contractor in accordance with *Safety, Health, and Welfare at Work (exposure to Asbestos) Regulations 2006/2013*[12], and disposed of by specialist contractors to an appropriately licenced facility. Traceable records of this activity, including the disposal licence, will be kept.

7.5.1.2 Mitigation During Operation

As there are no significant effects on air quality predicted during the operational phase of the proposed development, no mitigation measures are proposed.

7.5.2 Monitoring

7.5.2.1 Monitoring During Construction

Dust monitoring will be undertaken at a range of nearest sensitive receptors during the demolition and construction phases. The TA Luft dust deposition limit values of 350mg/m^2/day (averaged over one year) will be applied as a 30-day average.

7.5.2.2 Monitoring During Operation

As no significant effects are predicted to occur during the operation of the proposed development, no monitoring measures are required.

7.6 Residual Effects

With the implementation of the mitigation measures outlined in **Section 7.5**, no significant residual negative effects on air quality are envisaged during the construction or operation of the proposed development. Cumulative effects have also been considered.

[12] Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013). Available at: *https://www.hsa.ie/eng/Legislation/New_Legislation/SI_291_2013.pdf*

7.7 References

Air Quality Standards Regulations (AQS), 2011 (S.I. No. 180 of 2011). The Stationery Office, Dublin, Ireland.

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Environmental Protection Agency, 2006. Environmental Management in the Extractive Industry (Non-Scheduled Minerals). EPA, Wexford, Ireland.

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Environmental Protection Agency, 2019. Air Quality in Ireland 2017- Indicators of Air Quality. Available at: http://www.epa.ie/air/quality/.

Environmental Protection Agency, 2019. Air Quality in Ireland 2016- Indicators of Air Quality. Available at: http://www.epa.ie/air/quality/.

Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013). Available at: https://www.hsa.ie/eng/Legislation/New_Legislation/SI_291_2013.pdf.

TA Luft, 2002. Technical Instructions on Air Quality.

Transport Infrastructure Ireland (TII), (formerly the National Roads Authority (NRA)), 2011. Guidelines for the Treatment of Air Quality during the Planning and Construction of National Roads Schemes. TII, Dublin, Ireland.

8 Climate

8.1 Introduction

This chapter assesses the likely significant effects of the proposed development on climate; including a qualitative assessment of construction and operational effects on carbon and an assessment of wind effects as well as a daylight and sunlight analysis. The wind, daylight and sunlight assessment herein considers only off site effects. More detailed reports including offsite and onsite effects are included in the reports contained in **Appendix 8.1** and **8.2**.

Air Quality is addressed separately in **Chapter 7**.

Article 94 of the Planning and Development Regulations 2001, as amended, and Schedule 6, paragraph 2 thereof requires -

"2. Additional information, relevant to the specific characteristics of the development or type of development concerned and to the environmental features likely to be affected, on the following matters…

(e) (i) a description of the likely significant effects on the environment of the proposed development resulting from, among other things— …

(VI) the impact of the proposed development on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the proposed development to climate change,

Chapter 3 provides a full description of the proposed development and **Chapter 4** describes the construction strategy. The following aspects are particularly relevant to the climate assessment:

- Design:
  - Aspects relating particularly to the design and location of the proposed development where it is in proximity to residential and commercial properties or in areas publicly accessible. A Wind Study and a Daylight and Sunlight Analysis have been prepared and are appended to this EIAR (**Appendix 8.1** and **8.2** respectively) to assess the potential effect on surrounding building users.
- Operation:
  - Aspects relating particularly to the operation include the energy usage of the building, which also forms part of the design considerations.
- Construction:
  - Aspects relating particularly to the construction of the proposed development, include sourcing and disposal of materials during the construction phase.

This chapter has been prepared by Cormac McKenna and Sinead Whyte of Arup, and Graeme Parker and William O'Donnell of IN2. Refer to **Appendix 1.1** for details on relevant qualifications and experience.

8.2 Assessment Methodology

8.2.1 General

8.2.1.1 Carbon emissions

The climate assessment for the construction and operational phases estimates the potential for greenhouse gas (GHG) emissions over the design life of the proposed development.

EU greenhouse gas emission reduction targets and reduction obligations for Ireland are split into two broad categories. The first category covers the large energy and power (i.e. energy intensive) industry which have their emissions controlled under the EU Emissions Trading Scheme (ETS). The second category deals with the non-Emissions Trading Scheme (non-ETS) sectors such as agriculture, transport, residential, commercial, waste and non-energy intensive industry. The proposed development will operate within the non-ETS sector.

The results of this assessment have been compared against the EPA`s projected GHG emissions for both the non-Emission Trading Scheme (ETS) sector and total emissions for two years, 2020 and 2030[1].

8.2.1.2 Wind, Daylight and Sunlight

A wind, daylight and sunlight assessment was carried out to ascertain the impact of the proposed development, as detailed in **Appendix 8.1** and **8.2**.

Wind Analysis

In order to determine the predicted wind patterns around the proposed development, airflow simulations were undertaken using Computational Fluid Dynamics (CFD) software (Phoenics/Flair).

This enabled an assessment of the site wind conditions, calculating zones of high pressure, negative pressure, and predicted air velocities/directions for varying wind conditions.

An initial 3D representational model of the proposed buildings and their immediate surroundings was created representing the proposed development and existing neighbouring buildings.

[1] EPA, 2019. *Ireland's Greenhouse Gas Emissions Projections 2018 - 2040.* Available at http://www.epa.ie/pubs/reports/air/airemissions/ghgprojections2018-2040/Greenhouse_Gas_Projections.pdf

The CFD simulations utilised wind profiles accounting for terrain effects. Allowing for the urban nature of the site, a boundary layer profile representative of suburban terrain was utilised.

Daylight and Sunlight Analysis

The BRE *Site Layout Planning for Daylight and Sunlight* Design Guide provides guidance with regards to sunlighting and shading to external Amenity spaces for new developments.

A 3D model was utilised to assess the daylight, shadow and sunlight impacts. The OSI land registry compliant map was used to define the location of the neighbouring amenity space in conjunction with Google Maps aerial view.

Sunlight availability to the Amenity spaces was assessed against the BRE guideline criteria target of 50% achieving 2-hours sunlight on March 21st. The **shadow cast** of the building was analysed through the day for the Spring Equinox and the Summer Solstice against the existing site. The internal **Average Daylight Factors (ADF)** for each of the living areas and bedrooms were assessed against BRE guideline targets.

8.2.2 Guidance and Legislation

8.2.2.1 Carbon emissions

National

The Government of Ireland's *Climate Action Plan*[2] was published in 2019. It commits to achieving a net zero carbon energy systems objective for Ireland. The plan sets out a detailed sectoral roadmap to deliver a cumulative reduction in emissions. In relation to the Built Environment, of relevance to the proposed development, the plan proposes:

- Introducing stricter requirements for new buildings and substantial refurbishments;
    - More stringent building regulations will apply from the second half of 2019, with all new buildings to be Near Zero Energy Building (NZEB); and
    - Better spatial planning will reduce the carbon emissions of new developments, and deliver a better quality of life, including shorter commute times, better connections between our places of work and homes, and more vibrant, people-focused environments.
- Increase attention to Energy and Carbon ratings in all aspects of managing property assets.

The *Climate Action and Low-Carbon Development National Policy Position*[3] for Ireland was published in 2014.

[2] GoI, 2019. Climate Action Plan.
[3] DCCAE, 2014. National Policy Position on Climate Action and Low Carbon Development

The Position provides a high-level policy direction for the adoption and implementation by Government of plans to enable the State to move to a low carbon economy by 2050.

The *Climate Action and Low Carbon Development Act*[4] was published by government in January 2015. The Act 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 National Mitigation Plans and Sectoral Plans which will specify policies to reduce greenhouse gas emissions for each sector. The first *National Mitigation Plan*[5] was published in July 2017 by the Department of Communications, Climate Action and Environment. The Plan is designed to be a whole-of-Government approach to tackling greenhouse gas emissions, particularly, in the key sectors i.e. electricity generation, the built environment, transport and agriculture. The key aspects relating to the built environment are:

1. Energy management: understand existing energy use – how and when energy is being used;

2. Energy efficiency: undertake energy efficiency improvements to reduce usage and make your demand for energy more flexible; and

3. Fuel switching: meet this reduced energy use with less energy intensive/ low carbon heating solutions.

In October 2014, the European Council reached political agreement on headline greenhouse gas emissions reduction targets in the context of the *2030 Climate and Energy Framework*[6]. An overall EU reduction of at least 40% in greenhouse gas emissions by 2030 compared to 1990 levels is to be delivered collectively by the EU.

Ireland's 2030 target is to achieve a 30% reduction of non-Emissions Trading Scheme sector emissions on 2005 levels with annual binding limits set for each year over the period 2021-2030.

The EU ETS is implemented in Ireland under *S.I. 490 of 2012*[7] and amendments and S.I. No. 261 of 2010 and amendments. The legislative framework of the EU ETS was revised in 2018 to enable it to achieve the EU's 2030 emission reduction targets in line with the *2030 Climate And Energy Policy Framework*[6] and as part of the EU's contribution to the *2015 Paris Agreement*[8].

This chapter has been prepared with due regard to the overarching guidance on EIA as outlined in **Section 1.9.3**.

[4] Houses of the Oireachtas, 2015. Climate Action and Low Carbon Development Act 2015.
[5] DCCAE, 2017. National Mitigation Plan.
[6] EC, 2013. 2030 Climate & Energy Framework
[7] Irish Statute Book, 2012. EC Greenhouse Gas Emissions Trading Regulations.
[8] Paris Agreement, 2015. Available at https://ec.europa.eu/clima/policies/international/negotiations/paris_en

Local

Dublin City Council's *Climate Change Action Plan*[9] sets out how the council aims to improve energy efficiency and reduce greenhouse gas emissions in its own buildings and operations in addition to making Dublin more climate resilient. The plan focuses on five key action areas; energy and buildings, transport, flood resilience, nature-based solutions and resource management.

The energy and buildings area of this plan focuses on public lighting upgrades, building retrofits with energy performance guarantees and energy master planning.

8.2.2.2 Wind

Whilst no specific legislation is defined for wind assessment the best practice guidance for pedestrian wind comfort is the *Lawson Criteria*. The '*Lawson Criteria*' scale has been developed as a means of assessing the long-term suitability of urban areas for walking or sitting without excessive air movement associated with wind forces. The Lawson Criteria scale, ranges from areas deemed suitable for long term sitting through to regions not suitable for pedestrian comfort, as wind effects and associated air velocities would be too excessive for significant periods of the year.

The Criteria allow for the predicted airflow patterns around buildings for all wind orientations and calculates average velocity applying weighting based on probability of occurrence throughout the year. Therefore, wind effects around buildings for prevailing wind conditions are deemed to have more of a potential impact to pedestrian discomfort, as these will occur on a more regular occurrence.

8.2.2.3 Sunlight / Daylight

The Department of Housing Planning and Local Government (DoHPLG) *Design Standards for New Apartments 2018*[10] recommends that planning authorities should have regard to quantitative performance approaches to daylight provision outlined in guides like the BRE guide '*Site Layout Planning for Daylight and Sunlight'*[11] or *BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting'*[12]*;* thus ensuring that development proposers have the capability to satisfy minimum standards of daylight provision.

The guidance recommends "*that for it to appear adequately sunlit throughout the year, at least half (50%) of a garden or amenity area should receive at least two hours of sunlight on 21st March*".

[9] DCC, 2019. Climate Change Action Plan 2019-2024.
[10] DHPLG, 2018. Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities.
[11] BRE, 2018.*Site Layout Planning for Daylight and Sunlight' (2nd edition)*
[12] BS, 2008. *BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting*

Additionally, the guidance notes "*If as result of new development an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on 21st March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable*".

8.2.3 Study Area

8.2.3.1 Carbon emissions

The potential impact of emissions of carbon due to the proposed development is considered in the context of Ireland's national climate change obligations.

8.2.3.2 Wind

The wind assessment takes account of the local areas that may be affected by the proposed development.

8.2.3.3 Daylight and Sunlight

The potential daylight and sunlight impact was assessed for the proposed development and neighbouring properties which could be impacted as detailed in **Appendix 8.2.**

8.2.4 Site Visits

A site visit was undertaken in the preparation of this chapter.

8.2.5 Consultation

During the pre-application meetings, Dublin City Council indicated that the relevant sunlight/daylight standards should be met or exceeded for the proposed development at 42A Parkgate Street. The design team is confident that these have been addressed during the development process as reported in 'Parkgate Daylight & Sunlight Analysis Report', see **Appendix 8.1** and **8.2**.

8.2.6 Categorisation of the Baseline Environment

8.2.6.1 Carbon emissions

A desk-based study of the baseline environment of the proposed development was undertaken in order to inform this assessment. The most recent EPA report[1] on greenhouse gas emissions and projections were used in order to determine the baseline environment for carbon emissions.

8.2.6.2 Wind, Daylight and Sunlight

The wind assessment was carried out utilising the European Wind Atlas 10 year averaged wind data for Dublin 53°26'N 06°15'W as a baseline.

Sunlight assessments were carried out for the longitude and latitude for the site, with daylight calculations derived against the CIE 10,000Lux uniform sky.

8.2.7 Impact Assessment Methodology

8.2.7.1 Carbon emissions

An assessment of carbon emissions was carried out in order to determine the likely significant effects of greenhouse gas emissions (Mt CO_2 equivalent) predicted due to the construction phase of the proposed development, relative to Ireland's projected baseline for 2020, as reported by the EPA. This assessment focuses on the embodied carbon of the material used during the construction and demolition phase; concrete, reinforcement, glazing, façade and brickwork, timber, plasterboard, insulation and fill material.

The Environment Agency's Carbon Calculator[13] has been used to estimate potential greenhouse gas emissions due to construction activities in terms of carbon dioxide equivalency (CO_2e). The tool calculates the embodied CO_2e of materials plus the CO_2e associated with their transportation. The results of the assessment are compared to Ireland's projected carbon emissions, as outlined in Table 8.1.

During the operational phase of the proposed development, the main sources of energy use will be from electricity and heating. As part of the proposed development, four onsite boilers will be provided onsite. These boilers will be of an indicative size of 600kW.

An Energy Analysis Report has been prepared as part of the planning documentation. This report outlines the current building regulations framework and the requirement to achieve a Nearly Zero Energy Building (NZEB) for all new developments. The NZEB standard is demonstrated using the Dwelling Energy Assessment Procedure (DEAP) software. The principal energy use associated with residential developments as assessed under DEAP is the domestic hot water to showers, sinks, basins etc. which accounts for over half of the total annual energy consumption for an apartment.

8.2.7.2 Wind

The predicted effects of wind were determined for the proposed development and surrounding site in order to assess Pedestrian Comfort.

Site Wind Analysis was undertaken utilising Computational Fluid Dynamics (CFD) software (Phoenics/Flair). CFD originated in the aeronautics industry but can be applied to the built environment in order to enable assessment of wind effects on buildings in a "virtual wind tunnel".

[13] EA, 2016. Carbon Planning Tool.

The CFD analysis involved creating a 3D representational model of the proposed Parkgate Street buildings in the context of their surrounding urban environment and adjacent buildings. Wind profile boundary layers were applied, applicable to urban terrain, for varying wind speeds and directions.

Predicted pressures and velocity vectors in the vicinity of the buildings were calculated for varying wind speeds and directions, accounting for turbulence effect, with derived parameters determined for Pedestrian Comfort (Lawson Criteria).

CFD enables graphical displaying of coloured contours, vectors and streamlines, allowing complex airflow phenomena to be visualised and understood.

8.2.7.3 Sunlight

The *BRE Design Guide*[11] provides guidance with regards to sunlighting and shading to external Amenity spaces for new developments.

The guide[11] recommends "*that for it to appear adequately sunlit throughout the year, at least half **(50%)** of a garden or amenity area should receive at least two hours of sunlight on 21st March*".

Additionally, the shadowing effects of the proposed development were assessed against the current pre-development condition to determine the extent of the shadowing from the proposed building massing throughout the day on the Spring Equinox and Summer Solstice.

8.3 Baseline Conditions

8.3.1 Carbon emissions

In June 2019, the EPA released the report *Ireland's Greenhouse Gas Emissions Projections 2018-2040*[14].

This report stated that total national greenhouse gas emissions in 2017 were estimated to be 60.7 million tonnes carbon dioxide equivalent (Mt CO_2eq). This is 0.9% lower than emissions in 2016. Ireland's greenhouse gas emissions for non-ETS sectors (i.e. agriculture, transport, residential, commercial, non-energy intensive industry and waste) were recorded to be 43.8 Mt CO_2 eq. in 2017.

Table 8.1 outlines the projected emissions for the residential and non-ETS sector *With Existing Measures* and *With Additional Measures* scenarios.

[14] EPA, 2019. Ireland's Provisional Greenhouse Gas Emissions 2018 – 2040.

Table 8.1 Projected Emissions for the ETS Sector and Total Emissions (EPA, 2019)[14]

Projections	Year	Non-ETS Sector Only (Mt CO_2 eq.)	Residential Sector Only (Mt CO_2 eq.)	Total (Mt CO_2eq)
Projections (with existing measures)[15]	2020	45.56	6.5	61.53
	2025	44.26	-	63.81
	2030	43.99	5.5	64.33
	2035	43.40	-	61.32
Projections (with additional measures)[16]	2020	43.98	6.4	60.53
	2025	43.05	-	61.43
	2030	41.08	4.5	64.56
	2035	39.50	-	55.20

Current projections by the EPA indicate that Ireland will exceed its greenhouse gas emissions reduction targets in 2020 and 2030.

8.3.2 Wind, Daylight and Sunlight

The current site comprises of low rise buildings up to two storeys in height. There are a number of other developments in the vicinity, which could be impacted by the proposed development, including those referenced in **Chapter 21**, Cumulative and Interactive Effects. Existing wind, daylight and sunlight data were used in the assessment, as detailed in **Section 8.2.6**.

In terms of microclimate assessment, wind data for the nearest available meteorological station at Dublin Airport was utilised. Analysis is based on frequency of hourly wind speeds and direction data included in European Wind Atlas for Dublin Airport. It may be noted that wind data and subsequent analysis is therefore based on hourly averages and does not include for example, intermittent gusting effects. The Windrose for Dublin Airport (01 January 1942 to 31 December 2014) is illustrated in Figure 8.1.

[15] EPA, 2019. The *With Existing Measures* scenario assumes that no additional policies and measures, beyond those already in place by the end of 2017 (latest national greenhouse gas emission inventory), are implemented.
[16] EPA, 2019. The *With Additional Measures* scenario assumes implementation of the *With Existing Measures* scenario in addition to, based on current progress, further implementation of Government renewable and energy efficiency policies and measures including those set out in the National Renewable Energy Action Plan (NREAP) and the National Energy Efficiency Action Plan (NEEAP) and more recently Ireland's National Development Plan 2018 - 2027.

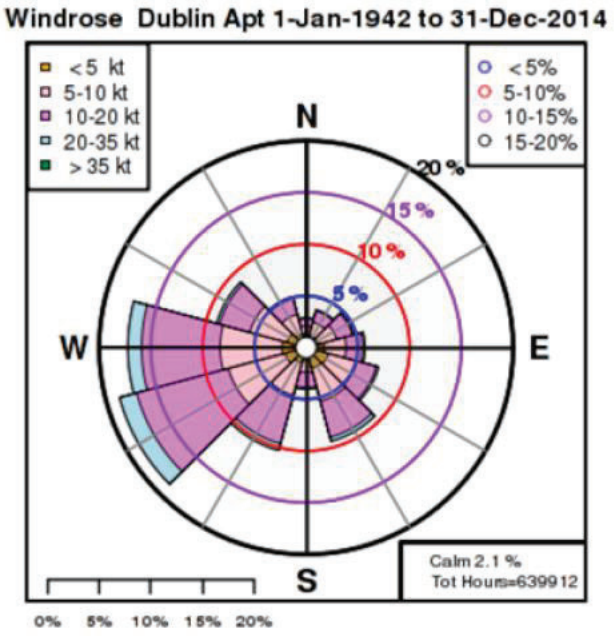

Figure 8.1: Windrose for Dublin Airport

The rose diagram illustrates the frequency that wind will be from a certain direction and at what speed. It can be seen how the prevailing South Westerly winds entirely predominate for Dublin due to Atlantic gulf stream, with only lower occurrence from other directions- notably South East, which tend to occur during warm summer weather due to offshore breeze effects.

Furthermore, higher wind speeds (which accentuate pedestrian discomfort) occur almost entirely for prevailing South Westerly conditions and therefore will predominate in terms of the potential impact on pedestrian comfort.

8.4 Likely Significant Effects

8.4.1 Do-Nothing Scenario

In the scenario where the proposed development did not proceed as planned, none of the construction or operational impacts as set out in this chapter would occur. The impact on climate would remain as is outlined in the baseline condition in **Section 8.3**.

8.4.2 Assessment of effects during construction

8.4.2.1 Carbon emissions

Direct Effects

The estimated carbon footprint of the proposed development during the construction phase is approximately 20 ktonnes of CO2eq, as outlined in Table 8.2.

The predicted results are compared to the EPA's Projected non-ETS Sector CO_2eq emissions for non-ETS and residential sectors in 2020 assuming additional measures, as a worst case.

Table 8.2 Estimated Carbon output during the construction phase

Estimated CO_2eq during Construction Phase (Mtonnes)	Estimated CO_2eq per year, assuming a 34 month duration (Mtonnes)	Projected non ETS Sector/residential sector CO_2eq emissions in 2020 with additional measures (Mtonnes)	As a percentage of 2020 non ETS /residential Sector CO_2eq emissions with existing measures
0.024	0.008	43.98/6.4	0.018 /0.13%

As a percentage of the projected 2020 non ETS Sector CO_2eq emissions (with additional measures) the estimated impact is 0.13% for the residential sector annual emissions, and 0.018% for the total annual non-ETS emissions. This impact is not considered significant.

Indirect Effects

There is the potential for carbon emissions to be generated from construction vehicles accessing the site. However, due to the scale of traffic predicted (14 two-way trips per peak hour), no significant indirect effects are predicted during the construction phase of the proposed development.

Cumulative

Appendix 21.1 of **Chapter 21**, Cumulative and Interactive Effects, outlines the proposed and permitted developments within 1 km of the proposed development. A review of these projects potential impacts on each topic cumulatively with the proposed development during the construction phase has been undertaken, with no significant impacts predicted.

8.4.2.2 Wind

Direct Effects

No direct effects are predicted during the construction phase of the proposed development.

Indirect Effects

No indirect effects are predicted during the construction phase of the proposed development.

Cumulative

Appendix 21.1 of **Chapter 21**, Cumulative and Interactive Effects, outlines the proposed and permitted developments within 1km of the proposed development.

A review of these projects potential impacts on each topic cumulatively with the proposed development during the construction phase has been undertaken, with no significant impacts predicted.

8.4.2.3 Sunlight & Daylight

Direct Effects

No direct effects are predicted during the construction phase of the proposed development.

Indirect Effects

No indirect effects are predicted during the construction phase of the proposed development.

Cumulative

Appendix 21.1 of **Chapter 21**, Cumulative and Interactive Effects, outlines the proposed and permitted developments within 1 km of the proposed development. A review of these projects potential impacts on each topic cumulatively with the proposed development during the construction phase has been undertaken, with no significant impacts predicted

8.4.3 Assessment of effects during operation

8.4.3.1 Carbon emissions

Direct Effects

As outlined in **Section 8.2.7.1**, there are four 600kW boilers proposed as part of the proposed development. Due to the size of the boilers they do not fall under Greenhouse Gas Permitting scheme.

Table 8.3 below summarises the results of three possible options which could be considered suitable for the Parkgate Street development as outlined in the Energy Analysis Report that has been included in the planning application documents. These options comply with the requirement to achieve a Nearly Zero Energy Building (NZEB) for new developments.

Table 8.3 Results for NZEB assessment for three options

Options	Annual CO_2 Emissions per Apartment (kg)	Total Annual CO_2 Emissions (kg)	CO_2 emissions relevant to non-ETS /residential sector (%)
Ducted Air Source Heat Pump	1,300	625,300	0.001/0.0098

Options	Annual CO_2 Emissions per Apartment (kg)	Total Annual CO_2 Emissions (kg)	CO_2 emissions relevant to non-ETS /residential sector (%)
Exhaust Air Heat Pump	1,300	625,300	0.001 / 0.0098
Centralised Air Source Heat Pump	750	360,750	0.0008 / 0.0056

All three options considered for Parkgate Street will achieve NZEB compliance and would be suitable options for this development. All three options considered rely on Heat Pump technology which uses the energy released from a phase change of the refrigerant to deliver more heating energy than inputted to the system. The application of this technology for each solution results in variable CO_2 emissions. However, the total CO_2 emissions, even for the worst-case option are not deemed significant in the context of Ireland's non-ETS and residential sector baseline for 2020 (with additional measures, refer to Table 8.1). No significant direct effects are therefore predicted during the operational phase of the proposed development.

Indirect Effects

There is the potential for carbon emissions to be generated from vehicles accessing the site. However, due to the scale of traffic predicted (26 car parking spaces), no significant indirect effects are predicted during the operational phase of the proposed development.

Cumulative

Appendix 2.1 of **Chapter 21**, Cumulative and Interactive Effects, outlines the proposed and permitted developments within 1 km of the proposed development. An assessment of these projects potential impacts on each topic cumulatively with the proposed development during the operational phase has been undertaken. No significant impacts are envisaged cumulatively.

8.4.3.2 Wind

Direct Effects

The potential for direct wind effects due to the proposed development were assessed against the Lawson Criteria as detailed within the wind analysis report included in **Appendix 8.1**. The analysis was carried out for three amenity types, namely ground level, roof top amenity and tower balconies.

The analysis determined that there were no significant effects with regard to pedestrian wind comfort, at ground level for the building configuration as proposed.

In terms of rooftop amenity, the minor areas of "suitable for business walking" identified on the 9th floor amenity space will be mitigated through the use of localised planting and canopy located at the base of the tower to prevent downdraft. No significant impacts are predicted.

With regard to the tower balconies, the design has ensured that where areas were identified as being 'not suitable for sitting' were removed from the overall quantum of amenity spaces.

Further, no areas off site are unsuitable for pedestrian comfort as a result of the proposed development. Therefore, no significant effects are predicted to occur.

Indirect Effects

No indirect effects are predicted during the operational phase of the proposed development.

Cumulative

Appendix 21.1 of **Chapter 21**, Cumulative and Interactive Effects, outlines the proposed and permitted developments within 1 km of the proposed development. An assessment of these projects potential impacts on each topic cumulatively with the proposed development during the operational phase has been undertaken. No significant impacts are envisaged cumulatively.

8.4.3.3 Sunlight & Daylight

Direct Effects

The potential for direct sunlight and daylight effects of the proposed development were assessed against BRE guideline criteria as detailed within the daylight and sunlight analysis report included in **Appendix 8.2**.

The results of the analysis illustrate that the amenity spaces adjacent to the proposed development will, as a result of the development, still achieve in excess of 50% of the space sun lit for at least two hours on 21st March. The proposed development will therefore not have a negative effect on the existing amenity space.

In terms of daylight availability to the neighbouring buildings, the results determined that an Average Daylight Factor of 1.1% will be achieved in the bedroom. As this is above the minimum standards, no significant effects is predicted on the neighbours' daylight availability.

With regard to shadowing, the results of the analysis (**Appendix 8.2**) indicate no significant shadowing of surrounding buildings, so no significant effect is predicted.

The neighbouring amenity space associated with Parkgate Place apartment complex was found to not be negatively impacted by the development.

It can therefore be concluded that there will be no significant effect on sunlight and daylight due to the proposed development on off-site receptors.

Indirect Effects

No indirect effects are predicted during the operational phase of the proposed development.

Cumulative

Appendix 21.1 of **Chapter 21**, Cumulative and Interactive Effects, outlines the proposed and permitted developments within 1 km of the proposed development. An assessment of these projects potential impacts on each topic cumulatively with the proposed development during the operational phase has been undertaken. No significant impacts are envisaged cumulatively.

8.5 Mitigation Measures and Monitoring

8.5.1 Mitigation

8.5.1.1 Mitigation During Construction

Carbon emissions

Due to the nature of effects predicted in **Section 8.4.22**, no mitigation measures are proposed during the construction phase of the proposed development.

Wind

As no significant impacts are predicted during the construction phase, no mitigation measures are proposed.

Daylight and Sunlight

As no significant impacts are predicted during the construction phase, no mitigation measures are proposed.

8.5.1.2 Mitigation During Operation

Carbon emissions

As the proposed development complies with the NZEB criteria for new developments, no mitigation measures are proposed during the operation phase of the proposed development.

Wind

A small area of rooftop amenity space on the 9th floor was identified as being 'suitable for business walking'. The potential negative effect in this area will be mitigated through the use of localised planting. Localised planting and a canopy located at the base of the tower will provide additional mitigation in some other minor areas of amenity space identified as being 'suitable for business walking'. No other mitigation measures are required.

Due to the nature of effects predicted, no mitigation measures are proposed during the operation phase of the proposed development.

Sunlight and Daylight

The design development has ensured that there are no significant effects associated with sunlight and daylight. As a result, no mitigation measures are proposed during the operation phase of the proposed development.

8.6 Monitoring

8.6.1.1 Monitoring During Construction

As no significant impact is predicted to occur during the construction phase of the proposed development, no monitoring measures are required.

8.6.1.2 Monitoring During Operation

As no significant impact is predicted to occur during the operational phase of the proposed development, no monitoring measures are required.

8.7 Residual Effects

No significant residual impacts are predicted on climate during the construction or operational phase of the proposed development. Cumulative effects have also been considered.

8.8 References

British Standards, 2008. BS 8206-2: 2008. Lighting for Buildings – Part 2: Code of Practice for Daylighting.

Building Research Establishment, 2018. Site Layout Planning for Daylight and Sunlight' (2nd edition).

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9 Noise and Vibration

9.1 Introduction

This chapter describes the likely significant noise and vibration effects resulting from the construction and operation of the proposed development. Where necessary, mitigation measures are identified to reduce effects and the likely residual construction and operational effects are described.

Chapter 3 provides a description of the proposed development and **Chapter 4** describes the construction strategy. The following aspects are particularly relevant to the noise and vibration assessment:

Construction:

- Noise and vibration associated with construction and demolition activities; and
- Noise associated with construction traffic accessing the site.

Operation:

- During the operational phase of the development it is anticipated that there will be an increase in traffic on surrounding roads as residents and employees access the proposed development. Any noise effects associated with additional traffic will be assessed; and
- Mechanical plant items serving the proposed development have the potential to generate noise while operating.

This chapter has been prepared by Leo Williams of AWN. Refer to **Appendix 1.1** for details on relevant qualifications and experience.

9.2 Assessment Methodology

9.2.1 General

This assessment considers the potential for generating significant noise and vibration effects during the construction and operation of the proposed development and the likely significant effects of noise and vibration on noise sensitive locations (NSLs). NSLs are defined as "*any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels*"[1].

Vibration has been considered during the construction phase only as there is not expected to be the potential for significant vibration during the operation of the development.

[1] EPA, 2016. *Guidance Note for Noise: Licence Application, Survey and Assessments in Relation to Scheduled Activities (NG4).*

The study will be undertaken using the following methodology:

- Baseline noise monitoring has been undertaken in the vicinity of the proposed development site in order to characterise the existing noise environment and to identify sensitive noise receptors;
- A review of the most applicable standards and guidelines relating to environmental noise and vibration to be conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development;
- Predictive calculations to be performed to assess the potential outward noise impacts during the construction phase of the project at the nearest sensitive locations to the development site;
- Predictive calculations to be performed to assess the potential outward noise impacts associated with the operation of the development;
- Predictive calculations will be performed to assess the potential inward noise impacts associated with existing traffic and tram noise at proposed residential units along the northern and eastern site boundary; and
- A schedule of mitigation measures will be proposed to reduce, where necessary, the identified potential outward and inward impacts relating to noise and vibration from the proposed development.

This chapter has been prepared with due regard to the overarching guidance on EIA as outlined in **Section 1.9.3**.

9.2.2 Guidance and Legislation

9.2.2.1 Construction Phase

9.2.2.1.1 Noise

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local Authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard BS 5228-1:2009+A1:2014[2].

9.2.2.1.2 Vibration

Vibration standards address two aspects: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings.

[2] BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites. Noise*.

For the purpose of this scheme, the range of relevant criteria used for surface construction works for both building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

Building Damage

Guidance relevant to acceptable vibration in order to avoid damage to buildings is contained within BS 7385-2 (1993) [3]. The guidance values contained within BS 7385 are also reproduced in BS 5228-2 (2014)[4].

These standards differentiate between transient and continuous vibration. Surface construction activities are considered to be transient in nature as they occur for a limited period of time at a given location. The standards note that the risk of cosmetic damage to residential buildings starts at a Peak Particle Velocity (PPV) of 15mm/s at 4Hz. The standard also notes that below 12.5 mm/s PPV the risk of damage tends to zero.

Typically, the most significant sources of transient vibration during the construction phase of the development are likely to be from the following activities or similar:

- Piling for foundations, and;
- Breaking of concrete during excavation/demolition works.

Both standards note that important buildings that are difficult to repair might require special consideration on a case by case basis, but buildings of historical importance should not (unless it is structurally unsound) be assumed to be more sensitive. If a building is in a very unstable state, then it will tend to be more vulnerable to the possibility of damage arising from vibration or any other ground borne disturbance. For the protected buildings near the works there is a greater potential for these to be more vulnerable than other adjacent modern structures.

As outlined in **Chapter 12**, Architectural Heritage, the proposed development site contains four protected structures and a number of other structures of heritage significance. Therefore, on a precautionary basis, the guidance values for structurally sound buildings are reduced by 50% in line with the guidance documents referred to above. In addition, measures proposed to prevent damage to protected structures are detailed in **Chapter 4**, Construction Strategy.

Human Perception

It is acknowledged that humans are sensitive to vibration stimuli and that perception of vibration at high magnitudes may lead to concern. Vibration typically becomes perceptible at around 0.15 to 0.3mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short-term duration, particularly during construction projects and when the origin of vibration is known.

[3] BS 7385-2:1993 *Evaluation and measurement for vibration in buildings. Guide to damage levels from ground borne vibration.*
[4] BS 5228-2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites. Vibration.*

For example, piling can typically be tolerated at vibration levels up to 6 mm/s respectively if adequate public relations are in place. These values refer to the day and evening time periods only.

During surface construction works (piling, rock breaking etc.) the vibration limits set within Table 9.1 will be perceptible to building occupants and have the potential to cause subjective impacts. The level of impact is, however, greatly reduced when the origin and time frame of the works are known and limit values relating to structural integrity are adequately communicated. In this regard, the use of clear communication and information circulars relating to planned works and their duration can significantly reduce vibration impacts to the neighbouring properties.

Expected vibration levels from the construction works will be discussed further in **Section 9.4.2.**

9.2.2.2 Operational Phase

9.2.2.2.1 Noise

Mechanical Plant

Due consideration must be given to the nature of the primary noise sources when setting criteria. Criteria for noise from these sources, with the exception of additional vehicular traffic on public roads, will be set in terms of the $L_{Aeq,T}$ parameter (the equivalent continuous sound level).

Guidance from DCC on noise emissions from mechanical plant items makes reference to BS 4142[5]. This document is the industry standard method for analysing building services plant noise emissions to residential receptors and is the document typically used by DCC in their standard planning conditions and also in complaint investigations.

BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

For an appropriate BS 4142 assessment it is necessary to compare the measured external background noise level (i.e. the $L_{A90,T}$ level measured in the absence of plant items) to the rating level ($L_{Ar,T}$) of the various plant items, when operational. Where noise emissions are found to be tonal, impulsive in nature or irregular enough to attract attention, BS 4142 also advises that a penalty be applied to the specific level to arrive at the rating level.

[5] BS 4142:2014+A1:2019 *Methods for Rating and Assessing Industrial and Commercial Sound.*

The subjective method for applying a penalty for tonal noise characteristics outlined in BS 4142 recommends the application of a 2dB penalty for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible.

The following definitions as discussed in BS 4142 are summarised below:

"ambient noise level, $L_{Aeq,T}$"	is the noise level produced by all sources including the sources of concern, i.e. the residual noise level plus the specific noise of mechanical plant, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T].
"residual noise level, $L_{Aeq,T}$"	is the noise level produced by all sources excluding the sources of concern, i.e. the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T].
"specific noise level, $L_{Aeq,T}$"	is the sound level associated with the sources of concern, i.e. noise emissions solely from the mechanical plant, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T].
"rating level, $L_{Ar,T}$"	is the specific sound level plus any adjustments for the characteristic features of the sound (e.g. tonal, impulsive or irregular components);
"background noise level, $L_{A90,T}$"	is the sound pressure level of the residual noise that is exceeded for 90% of the time period T.

If the rated plant noise level is +10dB or more above the pre-existing background noise level then this indicates that complaints are likely to occur and that there will be a significant adverse impact. A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

Traffic Noise

Given that traffic to and from the proposed development will make use of existing roads already carrying traffic volumes, it is appropriate to consider the increase in traffic noise level that arises as a result of vehicular movements associated with the development.

In order to assist with the interpretation of the noise associated with vehicular traffic on public roads, Table 9.1 offers guidance as to the likely impact associated with any particular change in traffic noise level (Source *Design Manual for Roads and Bridges, Highway Agency et al. Volume 11 Environmental Assessment (2011)* [6]). It shows that small changes in noise levels are not normally noticeable, whereas an increase of 10dB would be described as a doubling of loudness. In summary the assessment looks at the impact with and without development at the nearest noise sensitive locations.

Table 9.1: Significance in Change of Noise Level (DMRB, 2011)[6]

Change in Sound Level (dB)	Magnitude of Impact
0	No Change
0.1 – 2.9	Negligible
3 – 4.9	Minor
5 – 9.9	Moderate
10+	Major

Inward Noise Impact

Dublin Agglomeration Noise Action Plan

The *Dublin Agglomeration Environmental Noise Action Plan*[7] states the following with respect to assessing the noise impact on new residential development:

"Acoustic privacy is a measure of sound insulation between dwellings and between external and internal spaces. Development should have regard to the guidance on sound insulation and noise reduction for buildings contained in BS 8233:2014. The following principles are recommended for minimising disruption from noise in dwellings:

- *Utilise the site and building layout to maximise acoustic privacy by providing good building separation within the development and from neighbouring buildings and noise sources.*
- *Arrange units within the development and the internal layout to minimise noise transmission by locating busy, noisy areas next to each other and quieter areas next to quiet areas*
- *Keep stairs, lifts, and service and circulation areas away from noise-sensitive rooms like bedrooms. Particular attention should be paid to the siting and acoustic isolation of the lift motor room. Proposals close to noisy places, such as busy streets may need a noise impact assessment and mitigation plan."*

This content will be reviewed and commented upon as appropriate in this and following sections.

[6] Highways England et al., 2011. Design Manual for Roads and Bridges, Volume 11 Environmental Assessment.
[7] DCC, 2018. *Dublin Agglomeration Environmental Noise Action Plan December 2018 – November 2023 Volume 1: Dublin City Council.*

In relation to noise limits the NAP sates:

"No national limit values exist in relation to environmental noise control. This draft Action Plan sets out certain criteria in relation to environmental sound levels which will be applied in identification of Quiet Areas and areas that have 'Undesirable' high sound levels or 'Desirable' low sound levels. These are set out below are and are fully described in each of the individual local authority volumes. These criteria are the same as those contained in the previous two action plans."

The NAP states the following in relation to what it considers to be "'Undesirable' high sound levels or 'Desirable' low sound levels":

Table 9.2: Review of Undesirable Hight and Desirable Low Sound Levels

Desirable Low Sound Levels	Undesirable High Sound Levels
< 50 dB(A) Lnight	>55 dB(A) Lnight
< 55 dB(A) Lday	>70 dB(A) Lday

The existing noise environment in the vicinity of the development will be assessed in light of the above. The inward noise impact assessment presented in this chapter is based on the principles outlined in the Professional Practise Guidelines (ProPG)[8] guidance document.

Internal Noise (BS 8233)

There are no statutory guidelines or specific local guidelines relating to appropriate internal noise levels in dwellings. In this instance, reference is made to BS 8233: 2014[9].

BS 8233 sets out recommended internal noise levels for several different building types from external noise sources such as traffic. The guidance is primarily for use by designers and hence BS 8233 may be used as the basis for an appropriate schedule of noise control measures. The recommended indoor ambient noise levels for residential dwellings are set out in Table 9.3.

Table 9.3: Indoor Ambient Noise Levels for Dwellings from BS8233: 2014

Activity	Location	Day (07:00 to 23:00hrs)	Night (23:00 to 07:00hrs)
Resting	Living Room	35	--
Dining	Dining Room	40	--
Sleeping (daytime resting)	Bedroom	35	30

BS 8233 also provides some guidance on individual noise events, it states:

"Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance.

[8] ANC, 2017. *ProPG: Planning and Noise – Professional Practice Guidance on Planning & Noise. New Residential Development.*
[9] BS 8233:2014. *Guidance on sound insulation and noise reduction for buildings.*

A guideline value may be set in terms of SEL or LAFmax, depending on the character and number of events per night. Sporadic noise events could require separate values."

Typically, a 45dB L_{AFmax} criterion is applied to individual noise events within bedrooms at night. This criterion is generally considered a noise level that should not typically be exceeded.

External Noise (BS 8233 Amenity Areas)

BS 8233 also provides desirable noise levels for external amenity areas such as gardens, patios and balconies. It states:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited."

9.2.2.2.2 Vibration

Taking into account the expected activities associated with the operational phase of the proposed development, it is not anticipated that there will be any impact associated with vibration, therefore operational phase vibration is not discussed further.

9.2.2.3 Environmental Impact Assessment Report

In addition to specific noise guidance documents, the following guidelines will be considered and consulted for the purposes of this chapter:

- EPA *Guidelines on the Information to be contained in Environmental Impact Statements*, (EPA, 2002)[10];
- EPA *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements),* (EPA, 2003)[11];
- EPA *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (Draft August 2017)[12];

[10] EPA, 2002. *Guidelines on the Information to be contained in Environmental Impact Statements.*
[11] EPA, 2003. *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements).*
[12] EPA, 2017. *Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft).*

- EPA *Advice Notes for Preparing Environmental Impact Statements*, (Draft, September 2015)[13];
- Directive 2014/52/EU[14].

Study Area

Noise and vibration impacts will be assessed to the nearest sensitive locations to the development. These are shown in Figure 9.1.

NSL1	Apartments at Parkgate Place to the south west of the site.
NSL2	Commercial offices to the west of the site.
NSL3	Apartments/flats across Parkgate Street to the north of the site.
NSL4	Apartments/flats facing onto Parkgate Street to the north west of site.

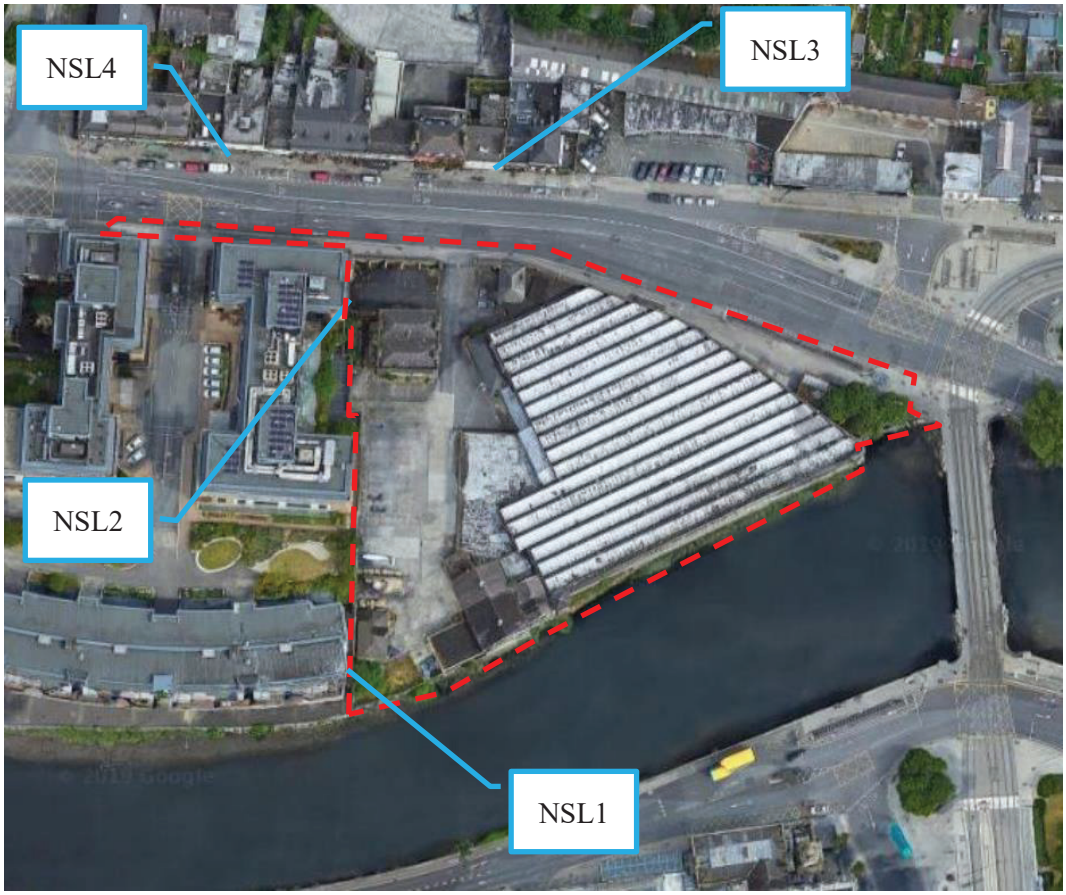

Figure 9.1: Noise Sensitive Locations (Source: Google Earth)

[13] EPA, 2015. *Advice Notes for Preparing Environmental Impact Statements (Drafts).*
[14] Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

9.2.3 Site Visits

Site visits were carried out to undertake the baseline noise surveys. These took place over 2nd February 25th and 26/27th March 2019.

9.2.4 Consultation

A number of pre-planning meetings have been held with Dublin City Council. Please refer to **Chapter 1**.

9.2.5 Categorisation of the Baseline Environment

An environmental noise survey was conducted at the site in order to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise*[15]. Specific details are set out in **Sections 9.2.5.1- 9.2.5.4** below.

9.2.5.1 Measurement Locations

Four measurement locations, three attended (NM2, NM3 and NM4) and one unattended (NM1), were selected as shown in Figure 9.2 and described below.

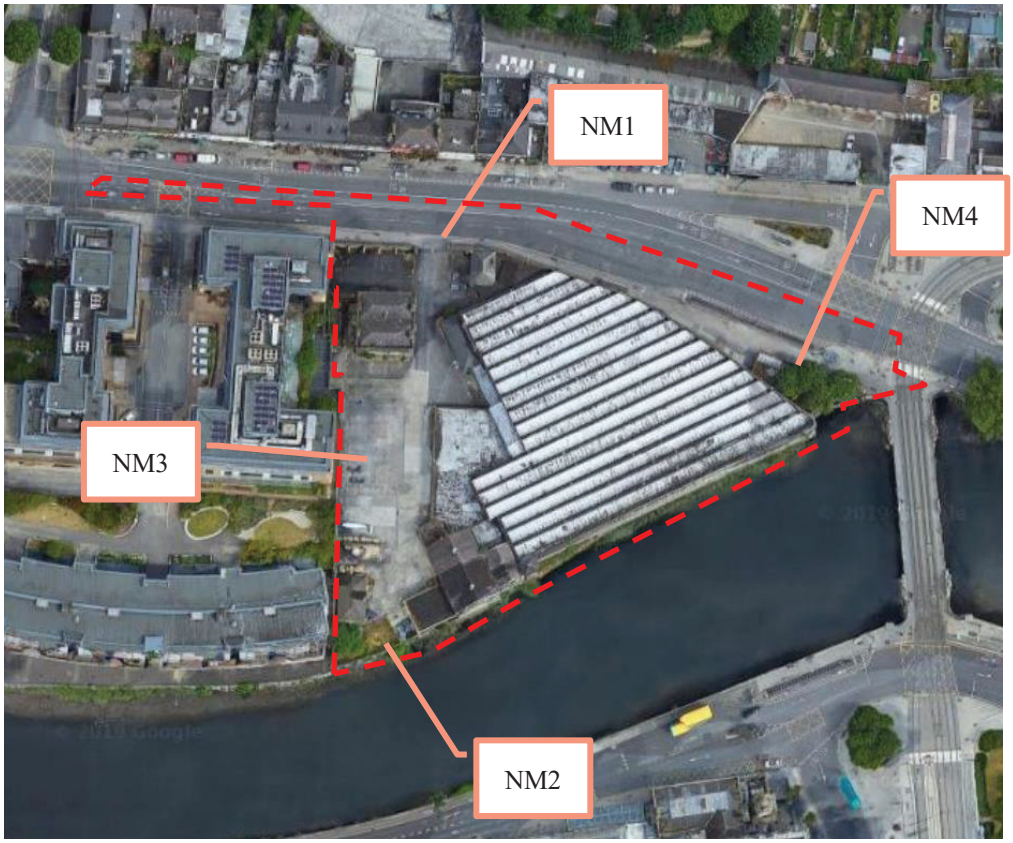

Figure 9.2: Baseline Noise Monitoring Locations (Source: Google Earth)

[15] ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise.*

NM1 This monitoring location was situated on north site boundary. The position was chosen to represent baseline noise levels associated with proposed facades exposed to traffic noise on Parkgate Street.

NM2 This monitoring position was located at the southern boundary of the proposed development.

NM3 This location was chosen in order to obtain representative noise levels in the vicinity of noise sensitive buildings adjacent to the western boundary of the proposed development

NM4 This monitoring position was located at a position representative of the proposed residential dwellings in the north east of the site across from the Luas tram line.

9.2.5.2 Instrumentation and Procedure

Attended Measurements

Attended noise monitoring was undertaking using a Brüel and Kjaer 2250 Type 1 Sound Level Meter. Measurements were conducted at the three monitoring locations on a cyclical basis. Sample periods for the noise measurements were 15 minutes in duration. The equipment was field calibrated before and after the survey using a Brüel and Kjaer 4321 sound level calibrator.

Unattended Measurements

Unattended noise monitoring was undertaking using a Brüel and Kjaer 2250 Type 1 Sound Level Meter. The monitoring equipment was set to log for 5-minute periods. The equipment was field calibrated before and after the survey using a Brüel and Kjaer 4321 sound level calibrator.

9.2.5.3 Measurement Parameters

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

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

L_{Amax} is the instantaneous maximum sound level measured during the sample period.

L_{Amin} is the instantaneous minimum sound level measured during the sample period.

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

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

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

9.2.5.4 Survey Periods

The noise survey was conducted at three locations over the following periods:

- 13:00hrs to 16:00hrs on 2 February 2019;
- 14:30hrs to 16:00hrs on 25 March 2019; and,
- 23:00hrs on 26 March to 00:10hrs on 27 March 2019.

For the purpose of this assessment, daytime is taken to be between 07:00hrs and 23:00hrs, whilst night-time is between 23:00hrs and 07:00hrs. The weather during the daytime survey period was dry and calm with wind speeds of less than 5m/s. Temperatures were in the range of 9 to 11°C. The weather during the night-time survey period was dry and calm with wind speeds less than 3m/s. Temperatures were in the range of 4 to 5°C.

9.2.6 Impact Assessment Methodology

9.2.6.1 Construction Phase – Noise

BS5228 gives several examples of acceptable limits for construction or demolition noise, the most simplistic being based upon the exceedance of fixed noise limits. For example, paragraph E.2 states:

"Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut."

Paragraph E.2 goes on to state:

"Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:

- *70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;*
- *75 decibels (dBA) in urban areas near main roads in heavy industrial areas".*

Note that since the proposed site is located within the jurisdiction of Dublin City Council (DCC) it is prudent to consider a typical planning condition issued by DCC. In relation to construction noise, typical conditions refer also to compliance with BS 5228 Part 1 as a means of controlling impacts to the surrounding environment.

BS 5228 Part 1, has therefore been used to inform the assessment approach for construction noise in line with DCC practice.

For residential properties it is considered appropriate to adopt the 70dB(A) criterion while for non-residential locations it is considered appropriate to adopt the higher category values of 75dB(A) during the day, as per BS 5228-1:2009+A1:2014. These category values are limits, above which a significant impact is likely to occur. The non-residential properties are only considered to be noise sensitive during office hours.

The following values are therefore considered appropriate for the noise sensitive locations identified in Figure 9.1:

- NSL1 (Apartments, Parkgate Place) 70dB LAeq,1hr
- NSL2 (Offices, Parkgate Place) 75dB LAeq,1hr
- NSL3 (Houses, Parkgate Street) 70dB LAeq,1hr
- NSL4 (Houses, Parkgate Street) 70dB LAeq,1hr

9.2.6.2 Construction Phase – Vibration

Table 9.4 summarises the proposed vibration criteria below which there is no risk of damage to buildings. These limits apply to vibration frequencies below 15Hz where the most conservative limits are required.

Table 9.4: Recommended Vibration Criteria During Construction Phase

Category of Building	Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:		
	Less than 15Hz	15 to 40Hz	40Hz and above
Structurally sound and non-protected buildings	12mm/s	20mm/s	50mm/s
Protected and /or potentially vulnerable buildings	6mm/s	10mm/s	25mm/s

The main potential source of vibration during the construction programme is associated with piling and ground-breaking activities.

9.2.6.3 Operational Phase – Noise

Mechanical Plant

Making the assumption that certain items of mechanical plant serving the development will operate 24/7 the mechanical plant noise emissions must be designed to achieve the BS4142 requirements during the night-time period.

Therefore, in order to limit the noise impact of mechanical plant serving the proposed development, during the detailed design of the development the specific plant noise levels will be designed to be equal or lower than the prevailing background noise level at the nearest off-site noise sensitive locations.

Due to the fact that there is the potential for short periods of noise to cause a greater disturbance at night-time, a shorter assessment time period (T) is adopted. Appropriate periods are 15min for daytime (07:00 to 23:00 hours) and 5 minutes for night-time (23:00 to 07:00 hours).

9.3 Baseline Conditions

This section provides a summary of the baseline survey results.

Location NM1

Attended Measurements

Table 9.5: Summary of Results for Location NM1

Date	Period	Time	Measured Noise Levels (dB re. 2x10-5 Pa)				
			LAeq	LAmax	LAmin	LA10	LA90
6th February	Day	15:15	69	85	50	73	54
25th March		14:23	71	88	51	75	57
		15:42	72	87	52	76	56
26th March	Night	23:19	69	83	46	74	52
		26:53	69	83	44	73	47

The noise environment at this measurement location was dominated by traffic noise on Parkgate Street. The noise environment also comprised pedestrian activity, car horns and Luas movements. Daytime noise levels were in the range from 69 to 72dB $L_{Aeq,15min}$ and 54 to 57dB $L_{A90,15min}$. Night-time noise levels were of the order of 69dB $L_{Aeq,15min}$ and 47 to 52dB $L_{A90,15min}$.

Unattended Measurements

Table 9.6: Summary of Unattended Results for Location NM1

Date	Period	Measured Noise Levels (dB re. 2x10-5 Pa)		
		LAeq	LAmax	LA90
6th February 2019	Day	75	84	55
7th February 2019	Night	72	82	48
	Day	76	84	55
8th February 2019	Night	72	82	50
	Day	76	83	57
9th February 2019	Night	72	81	53
	Day	75	81	54
10th February 2019	Night	73	82	47
	Day	78	82	53
11th February 2019	Night	71	82	46
	Day	74	82	56

Date	Period	Measured Noise Levels (dB re. 2x10-5 Pa)		
		LAeq	LAmax	LA90
Average	Day	76	83	55
	Night	72	82	49

Location NM2

Table 9.7: Summary of Results for Location NM2

Date	Period	Time	Measured Noise Levels (dB re. 2x10-5 Pa)				
			L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
2nd February	Day	14:41	57	67	50	59	54
25th March		14:49	55	80	50	58	52
		16:00	56	81	50	58	51

The noise environment at this measurement location comprised distant traffic noise on Parkgate Street and occasional distant train movements. It was observed that announcements on the Heuston Station PA system were audible intermittently. Daytime noise levels were in the range from 55 to 57dB $L_{Aeq,15min}$ and 51 to 54dB $L_{A90,15min}$. The site was not accessed at night time, the unattended measurements have been used in later assessment.

Location NM3

Table 9.8: Summary of Results for Location NM3

Date	Period	Time	Measured Noise Levels (dB re. 2x10^{-5} Pa)				
			L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
2nd February	Day	15:34	54	75	47	57	49
25th March		15:07	54	71	45	57	48
		16:18	50	64	44	52	46

The noise environment at this measurement location comprised distant traffic noise on Parkgate Street and occasional faint distant train movements. Delivery vans were observed accessing and exiting the car park. Daytime noise levels were in the range from 50 to 54dB $L_{Aeq,15min}$ and 46 to 49dB $L_{A90,15min}$. The site was not accessed at night time, the unattended measurements have been used in later assessment.

Location NM4

Table 9.9: Summary of Results for Location NM4

Date	Period	Time	Measured Noise Levels (dB re. 2x10^{-5} Pa)				
			L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
2nd February	Day	14:59	68	87	54	72	59
25th March		15:25	66	80	53	71	57
		16:37	68	86	53	71	57

Date	Period	Time	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
			L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
26th March	Night	23:02	66	80	48	71	51
		23:36	64	77	46	69	51

The noise environment at this measurement location was dominated by traffic noise on Parkgate Street. Other sources included pedestrian activity and Luas movements.

Daytime noise levels were in the range from 66 to 68dB $L_{Aeq,15min}$ and 57 to 59dB $L_{A90,15min}$. Night-time noise levels were in the range of 64 to 66dB $L_{Aeq,15min}$ and of the order of 51 dB $L_{A90,15min}$.

9.4 Likely Significant Effects

The following sections discuss the likely significant effects of noise and vibration associated with the construction and operational phase of the proposed development. The significance of impact on human health is discussed in **Chapter 18**, Population and Human Health. Do-Nothing Scenario

In the scenario where the proposed development does not proceed, none of the effects as set out in this chapter would occur. Under the 'do nothing' scenario the prevailing noise and vibration levels in the vicinity of the proposed development site would persist and no significant effects would arise.

9.4.1 Assessment of effects during construction

9.4.1.1 Noise

The construction programme will create typical construction activity related noise onsite. During the construction phase of the proposed development, a variety of items of plant will be in use, such as breakers, excavators, lifting equipment, dumper trucks, compressors and generators.

The construction strategy has been reviewed in order to account for anticipated construction activities. It is possible to predict typical noise levels using guidance set out in BS 5228-1:2009+A1:2014. Table 9.10 outlines typical plant items and associated noise levels that are anticipated for various phases of the construction programme.

Table 9.10: Typical Noise Levels Associated with Construction Plant Items

Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref.)	Construction Noise Level at 10m Distance (dB $L_{Aeq,1hr}$)
Site Preparation	Wheeled Loader Lorry (D3.1)	75
	Track Excavator (C2.22)	72
	Dozer (C2.13)	78

Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref.)	Construction Noise Level at 10m Distance (dB $L_{Aeq,1hr}$)
	Dump Truck (C4.2)	78
Demolition	Pulveriser on Tracked Excavator (C1.5)	72
	Tracked Crusher (C1.14)	82
	Pulveriser on Tracked Excavator (C1.4)	76
	Dump Truck (C4.2)	78
Substructure/Foundations	Tracked Excavator (C3.24)	74
	Concrete Pump (C3.25)	78
	Compressor (D7.6)	77
	Poker Vibrator (C4 33)	78
General Construction	Hand tools	81
	Tower Crane (C4.48)	76
	Pneumatic Circular Saw (D7.79)	75
	Internal fit – out	70
Landscaping	Dozer (C2.13)	78
	Dump Truck (C4.2)	78
	Surfacing (D8.25)	68
Drainage Upgrade Works	Tracked Excavator (C3.24)	74
	Compressor (D7.6)	77
	Telescopic Handler (C4.54)	79

For the purposes of the assessment it has been assumed that standard good practice measures for the control of noise from construction sites will be implemented.

Due to the nature of daytime activities undertaken on a construction site of this nature, there is potential for generation of significant levels of noise. The flow of vehicular traffic to and from a construction site is also a potential source of relatively high noise levels. Appropriate mitigation measures are provided in **Section 9.5**.

The noise levels associated with mobile plant items such as concrete mixer trucks, loaders etc. operational on site have been included as part of the construction noise assessment and calculated noise levels in Table 9.11. Consideration should also be given to the addition of construction traffic along the site access routes. Access to the development site for construction traffic will be via Parkgate Street.

Table 9.11 presents the predicted daytime noise levels from an indicative construction period on site at the nearest off-site receptors. It is possible to calculate the noise levels associated with the passing vehicle using the following formula.

$L_{Aeq,T} = L_{AX} + 10\log_{10}(N) - 10\log_{10}(T) + 20\log_{10}(r_1/r_2)dB$

where:

- $L_{Aeq,T}$ is the equivalent continuous sound level over the time period T in seconds);
- L_{AX} is the "A-weighted" Sound Exposure Level of the event considered(dB);
- N is the number of events over the course of time period T;
- r_1 is the distance at which L_{AX} is expressed; and
- r_2 is the distance to the assessment location.

A calculation distance of 5m from the road has been used to assess noise levels at the closest buildings along the construction routes. The mean value of Sound Exposure Level for trucks moving at low to moderate speeds (i.e. 15 to 45km/hr) is of the order of 82dB L_{AX} at a distance of 5 metres from the vehicle. This figure is based on a series of measurements conducted under controlled conditions.

The calculations also assume that the equipment will operate for 66% of the 12-hour working day (i.e. 8 hours) and that a standard site hoarding, typically 2.4m height will be erected around the perimeter of the construction site for the duration of works. It is assumed that construction works will take place during normal working hours only.

The predictions have been prepared for the worst case nearest residential noise sensitive locations illustrated in Figure 9.2 and summarised as follows:

- NSL1 at a distance of some 10m from the nearest significant site works;
- NSL2 at a distance of some 10m from the nearest significant site works, and;
- NSL3 at a distance of some 30m from the nearest significant site works.
- NSL4 at a distance of some 15m from drainage upgrade works on Parkgate Street.

Table 9.11: Predicted Noise Levels Associated with Construction Plant Items

Distance to NSL	Phase	Predicted Construction Noise Level $L_{Aeq,1hr}$ (dB)
10m	Site Preparation	74
	Demolition	77
	Foundations	75
	General Construction	75
	Landscaping	73
	Drainage Upgrade Works	75
20m	Site Preparation	68
	Demolition	71
	Foundations	69
	General Construction	69

Distance to NSL	Phase	Predicted Construction Noise Level $L_{Aeq,1hr}$ (dB)
	Landscaping	67
	Drainage Upgrade Works	69
30m	Site Preparation	65
	Demolition	67
	Foundations	65
	General Construction	66
	Landscaping	64
	Drainage Upgrade Works	66
50m	Site Preparation	60
	Demolition	63
	Foundations	61
	General Construction	61
	Landscaping	59
	Drainage Upgrade Works	61

There are noise sensitive residential units to the south west of the development site, approximately 10m from the site boundary. There is an existing wall along the boundary of the site that will be retained and that will provide some screening to this receiver. The predicted construction noise levels at this distance are above the 70dB(A) criteria and therefore it is expected that there will be a ***negative, significant*** and ***short-term*** impact at these receivers. Appropriate mitigation measures and recommended good practices have been outlined in **Section 9.5** and detailed in **Appendix 9.1** to minimise any impact.

At distances of 30m and greater from the works, the predicted construction noise levels are below the construction noise criteria and therefore the expected impact will be ***negative, moderate*** and ***short-term.***

Construction Traffic

Construction vehicle numbers have been assumed for peak hours associated with each key phase. Table 9.12 below summarises the calculated noise level associated with passing haul vehicles during each phase, assuming the peak hour flows per day.

Table 9.12: Predicted Construction Traffic Noise Levels

Construction Phase	No. of trucks/peak hour	Calculated Noise level at edge of road (5m), dB $L_{Aeq,1hr}$
Removal of Excavated Material	10	57
Imported Fill Material	4	61

The calculated noise levels associated with the various phases are in the range of 57 to 61dB $L_{Aeq,1hr}$. Measured ambient noise levels measured at the northern site boundary facing onto Parkgate Street were in the range 69 – 72 dB $L_{Aeq,15min}$. The noise associated with construction traffic is predicted to be 8-11dB below the ambient noise levels. Therefore, it is expected that there will be a ***negative, not significant, short term impact***.

9.4.1.2 Vibration

The main potential source of vibration during the construction programme is associated with piling and ground-breaking activities.

For the purposes of this assessment the expected vibration levels during piling have been determined through reference to published empirical data. The *British Standard BS 5228 – Part 2: Vibration*[4], publishes the measured magnitude of vibration of rotary bored piling using a 600mm pile diameter for bored piling into soft ground over rock, (Table D.6, Ref. No. 106):

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

During ground breaking in the excavation phase, there is also potential for vibration to be generated through the ground. Empirical data for this activity is not provided in the BS 5228- 2:2009+A1:2014[4] standard, however the likely levels of vibration from this activity is expected to be significantly below the vibration criteria for building damage on experience from other sites. AWN Consulting have previously conducted vibration measurements under controlled conditions, during trial construction works, on a sample site where concrete slab breaking was carried out. The trial construction works consisted of the use of the following plant and equipment when measured at various distances:

- 3 tonne hydraulic breaker on small CAT tracked excavator
- 6 tonne hydraulic breaker on large Liebherr tracked excavator

Vibration measurements were conducted during various staged activities and at various distances. Peak vibration levels during staged activities using the 3 Tonne Breaker ranged from 0.48 to 0.25 PPV (mm/s) at distances of 10 to 50m respectively from the breaking activities. Using a 6 Tonne Breaker, measured vibration levels ranged between 1.49 to 0.24 PPV (mm/s) at distances of 10 to 50m respectively.

Considering the low vibration levels at very close distances to the piling rigs, vibration levels at the adjoining buildings are not expected to pose any significance in terms of cosmetic or structural damage to any of the protected structures in proximity to the development works or any of the other adjacent buildings. In addition, the range of vibration levels is typically below a level which would cause any disturbance to occupants of adjacent buildings.

During any breaking within the site, there is also potential for vibration to be generated through the ground. Empirical data for this activity is not provided in the BS 5228-2 standard, however the likely levels of vibration from this activity are expected to be significantly below the lower adopted criteria for building damage based on experience from other sites.

The range of values discussed in **Section 9.3.3.1.2** provides some context in relation typical ranges of vibration generated by construction breaking activity likely required on the proposed site. The range of vibration magnitudes indicate vibration levels at the closest neighbouring buildings noted are likely to be orders of magnitude below the limits set out in Table 9.2 to avoid any cosmetic damage to buildings. Vibration levels are also expected to be below a level that would cause disturbance to building occupants.

Demolition of existing structures will involve careful deconstruction using controlled techniques. There may be a requirement for breaking ground as part of specific demolition procedures, depending on the structure. Vibration levels associated with this activity will be of similar or lower magnitude to ground breaking discussed above.

Due to the distances between sensitive locations and anticipated major works and considering the low vibration levels predicted in the vicinity of piling rigs, etc., it is expected that the vibration impact will be ***negative***, ***not significant*** and ***short-term***.

Notwithstanding the above, any construction activities undertaken on the site will be required to operate below the recommended vibration criteria set out in **Section 9.2.7.2.**

9.4.1.3 Indirect Effects

There are no indirect effects expected in connection with the construction phase.

9.4.1.4 Cumulative Effects

Should the construction phase of the proposed development coincide with the construction of any other permitted developments within the vicinity of the site then there is the potential for negative cumulative noise and vibration impacts to the nearby sensitive receptors.

The likelihood of negative cumulative effects occurring is low. Considering the proximity of noise sensitive locations to the subject site, the contribution of construction noise and vibration associated with any other development, at a greater distance, will be low.

Notwithstanding this, the construction mitigation measures outlined in this chapter should be applied throughout the construction phase of the proposed development, with similar mitigation measures applied for other permitted developments which will avoid significant cumulative impacts with respect to noise and vibration.

9.4.2 Assessment of effects during operation

9.4.2.1 Noise

9.4.2.1.1 Additional Traffic Noise

During the operational phase of any proposed development, there is potential for an increase in vehicular traffic on surrounding roads associated with the development.

Regarding the subject development, there are 26 no. car parking spaces proposed. Of these, 8 no. will be assigned to the office spaces. The remaining 18 no. spaces are reserved for residents use, who are part of a car club which is expected to undertake journeys outside of peak traffic periods. Considering the busy, city centre location of the site the number of vehicles coming to and from the development overall is very low in comparison to the existing traffic, and as such, it is expected that operational traffic associated with the development will be ***neutral, imperceptible*** and ***long-term***.

9.4.2.1.2 Mechanical Plant Noise

During the operational phase of the proposed development there will be mechanical and electrical services plant required to service the various residential, office and commercial buildings associated with the development. Depending on the plant items involved, there may be a requirement to operate over both day and night-time periods.

The majority of plant items are located at basement level within enclosed plant rooms. There will be some plant located externally at roof level serving the office spaces. At this stage of the development, specific details of the type and number of plant items required for the development are not available. In this instance, it is best practice to set appropriate emission limits relating to plant items which will be used during the detailed design stage.

Making reference to the background noise levels measured during the baseline noise survey and reference to the guidance from BS 4142 and BS 8233 as described in **Section 9.2.7.3**, the cumulative noise levels associated with building services plant items at the façade of the nearest noise sensitive buildings both within and external to the development site will be designed to not exceed the following level:

- Daytime - 50dB $L_{Aeq,1hr}$, and;
- Night-time - 43dB $L_{Aeq,15min}$.

These limits have been set in order to preserve the existing noise environment and to set appropriate limits at noise sensitive buildings and amenity space within the development site.

Noise levels associated with mechanical plant are expected to be within the adopted day and night-time noise limits set out above, at the nearest noise sensitive properties taking into account the site layout, the nature and type of units proposed and distances to nearest residences. Assuming the operational noise levels do not exceed the adopted design goals, the resultant residual noise impact from this source will be a ***neutral, imperceptible, long term impact.***

9.4.2.2 Vibration

There is no source of vibration associated with the operational phase of the proposed development.

9.4.2.3 Indirect Effects

There are no indirect effects expected in connection with the operational phase.

9.4.3 Cumulative Effects

In the case that additional developments are permitted or proposed in the future, in the vicinity of the proposed development, there is the potential to add further additional vehicles to the local road network. However, as the traffic impact for the proposed development has an imperceptible impact on noise and vibration, it is unlikely that other future developments of similar scale would give rise to a significant impact during the operational phase of those developments. Future developments of a large scale would need to prepare an EIAR to ensure that no significant noise and vibration impacts will occur as a result of those developments.

9.4.4 Inward Noise Impact

An inward noise impact assessment has been carried out to assess to potential for noise intrusion into residential spaces in the proposed development. This report is attached in **Appendix 9.2** (Report ref. 19/10606NR01a).

The main source of noise is traffic noise on Parkgate Street. Mitigation measures in the form of enhanced doubled glazing have been recommended in **Section 4.2** of this report and are summarised in **Section 9.5.1.2** of this chapter.

The potential for inward noise impact on the proposed development has been assessed. The assessment has been carried out with reference to the guidance contained in Professional Guidance on Planning & Noise (ProPG)[8], BS 8233:2014 *Guidance on Sound Insulation and Noise Reduction for Buildings (BSI)*[9]; and the local and national Noise Action Plans relevant to the area. To achieve suitable internal noise levels within buildings located closest to the surrounding transportation network, minimum sound insulation specifications have been provided for windows.

9.5 Mitigation Measures and Monitoring

9.5.1 Mitigation

9.5.1.1 Mitigation During Construction

9.5.1.1.1 Noise

The impact assessment conducted for the construction activity during the construction phase has highlighted that the predicted construction noise levels are above the adopted criteria at distances of 20m or less, and that a negative impact on nearby receivers will occur.

The following mitigation measures will be implemented during construction activities in order to reduce the noise and vibration impact to nearby noise sensitive areas. The contractor will provide proactive community relations and will notify the public and vibration sensitive premises before the commencement of any works forecast to generate appreciable levels of noise or vibration, explaining the nature and duration of the works.

The contractor will distribute information circulars informing people of the progress of works and any likely periods of significant noise and vibration.

During the construction and demolition phases, the proposed development shall comply with British Standard 5228 “Noise Control on Construction and open sites Part 1. Code of practice for basic information and procedures for noise control.

BS5228 includes guidance on several aspects of construction site mitigation measures. Noise control measures that will be implemented during the construction phase of the proposed development, and in accordance with BS5228, include: the selection of quiet plant, enclosures and screens around noise sources, and limiting the hours of work. Detailed comment is offered on these items in **Appendix 9.1**.

9.5.1.1.2 Vibration

Any construction activities undertaken on the site will be required to operate below the recommended vibration criteria set out in **Section 9.6.2.1**.

9.5.1.2 Mitigation During Operation

9.5.1.2.1 Noise

The external plant items will be designed so that emissions will be within the noise criteria set for day and night-time periods and the impact at any noise sensitive locations. The following forms of noise control techniques will be employed:

- duct mounted attenuators on the atmosphere side of air moving plant;

- splitter attenuators or acoustic louvres providing free ventilation to internal plant areas;
- solid barriers screening any external plant;
- anti-vibration mounts on reciprocating plant.

In addition to the above, it is proposed that the following practices be adopted to minimise potential noise disturbance for neighbours.

- All mechanical plant items e.g. motors, pumps etc. shall be regularly maintained to ensure that excessive noise generated any worn or rattling components is minimised;
- Any new or replacement mechanical plant items, including plant located inside new or existing buildings, shall be designed so that all noise emissions from site do not exceed the noise limits outlined in this document.

9.5.1.2.2 Inward Noise

Section 4.2 of the inward noise impact assessment report (**Appendix 9.2**) presents recommended mitigation in the form of enhanced double glazing to facades overlooking Parkgate Street. The locations of the range of required acoustic performances are illustrated in Figure 9.3.

Figure 9.3: Indicative Mark-up of Required Acoustic Performance for Glazing

In order to achieve the required internal noise levels set out in **Section 9.2.2.3** the facades will be provided with glazing that achieves the minimum sound insulation performance as set out in Table 9.13.

Table 9.13: Sound Insulation Performance Requirements for Glazing, SRI (dB)

Glazing Specification	Octave Band Centre Frequency (Hz)						Rw
	125	250	500	1k	2k	4k	
Red	27	24	34	39	42	49	37
Orange/Green	17	21	30	38	36	35	33

The glazing performance requirement for the various facades can be confirmed by reviewing Figure 9.3 above.

The overall R_w outlined above are provided for information purposes only. The over-riding requirement is the Octave Band sound insulation performance values which may also be achieved using alternative glazing configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Table 9.13 or greater.

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system.

In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

The window supplier will be required to provide laboratory tests confirming the sound insulation performance. It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system when installed on site.

9.5.1.2.3 Vibration

No vibration effects are expected in association with the operational phase therefore no mitigation measures are recommended.

9.5.2 Monitoring

9.5.2.1 Monitoring during Construction

Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criteria. Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise. Details of monitoring are presented in **Appendix 9.1**.

Vibration monitoring will be implemented during construction activities to ensure that vibration levels are in accordance with criteria set out in **Section 9.2.7.2**. Monitoring will be more rigorous in the proximity of any protected structures; including more frequent monitoring and additional monitoring points. Monitoring points will be located on the face of the structures and centred every 1m.

9.5.2.2 Monitoring during Operation

No noise or vibration monitoring will be required during the operational phase of the proposed development.

9.6 Residual Effects

9.6.1 Residual effects during construction

9.6.1.1 Noise

During the construction phase of the project there is the potential for significant impacts on nearby noise sensitive properties due to noise emissions from site activities, in the absence of mitigation. The application of binding noise limits, hours of operation, along with the implementation of appropriate noise control measures, will ensure that noise impact at NSLs less than 30m from construction works will have a ***negative, moderate*** and ***short-term*** impact on the surrounding environment.

At distances of 30m and greater from the works, the predicted construction noise levels are below the construction noise criteria and therefore the expected residual impact will be ***negative, slight*** and ***short-term***.

Cumulative effects have also been considered.

9.6.1.2 Vibration

Due to the distances between sensitive locations and anticipated major works and considering the low vibration levels predicted in the vicinity of piling rigs, etc., it is expected that the vibration impact will be ***negative, not significant*** and ***short-term***. In order to minimise any vibration, good practice measures have been presented in **Appendix 9.1**.

Cumulative effects have also been considered.

9.6.2 Residual effects during operation

9.6.2.1.1 Noise

Considering the busy, urban location of the site and the low number of vehicles coming to and from the development overall in comparison to the existing traffic, it is expected that operational traffic associated with the development will be ***neutral, imperceptible*** and ***long-term.***

Noise levels associated with mechanical plant are expected to be within the adopted day and night-time noise limits at the nearest noise sensitive properties taking into account the site layout, the nature and type of units proposed and distances to nearest residences. Assuming the operational noise levels do not exceed the adopted design goals, the resultant residual noise impact from this source will be a ***neutral, imperceptible, long term impact***.

Cumulative effects have also been considered.

9.6.2.1.2 Vibration

No vibration impact is expected in association with the operational phase therefore no vibration measures are recommended.

Cumulative effects have also been considered.

9.7 References

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Highways England et al., 2011. *Design Manual for Roads and Bridges, Volume 11 Environmental Assessment*. London, England.

ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

10 Biodiversity

10.1 Introduction

This chapter describes the likely significant effects on biodiversity resulting from the construction and operation of the proposed development at 42A Parkgate Street, Dublin 8. Where necessary, mitigation measures are identified to reduce effects and the likely residual construction and operational effects are described.

Chapter 3 provides a description of the proposed development and **Chapter 4** describes the construction strategy.

The aspects of the proposed development that are of particular relevance to biodiversity are:

- Potential effects on bats in the existing buildings to be removed or demolished;
- Potential effects on species associated with the aquatic ecology of the River Liffey, e.g. Salmonids and Otters; and
- Potential effects on water quality in terms of connectivity with the European sites located downstream in Dublin Bay.

The Appropriate Assessment (AA) process was commenced by Moore Group for the proposed development and a Report for AA Screening and Natura Impact Statement (NIS) are presented as separate documents as part of the Planning application.

This chapter was prepared by Ger O'Donohoe of Moore Group. Refer to **Appendix 1.1** for details of relevant qualifications and experience.

10.2 Assessment Methodology

10.2.1 General

This assessment concentrates on ecological features within the development area of particular significance, primarily designated habitats and species. This includes habitats/species listed in Annex I, II and IV of the EU Habitats Directive, birds listed in Annex 1 of the EU Birds Directive, rare plants listed in the Flora Protection Order and other semi-natural habitats of conservation value.

The European Habitats Directive 92/43/EEC (Article 6) indicates the need for plans and projects to be subject to Habitats Directive Assessment (also known as Appropriate Assessment) if the plan or project is not directly connected with or necessary to the management of a Natura 2000 site, which includes Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), but which has the potential to have implications on a site's conservation objectives. These implications can be significant effects, either individually or in combination with other plans or projects.

A habitat survey was carried out, in three stages, firstly through desktop research to determine existing records in relation to habitats and species present in the study areas. This included research on the National Parks and Wildlife Services (NPWS) metadata website, the National Biodiversity Data Centre (NBDC) database and a literature review of published information on flora and fauna occurring in the development area.

Other environmental information for the area was reviewed, e.g. in relation to soils, geology, hydrogeology and hydrology. Interactions in terms of the chapters on these topics presented in this EIAR were important in the determination of source vector pathways and links with potentially hydrologically connected areas outside the proposed development site. While the main focus of biodiversity was on the proposed development site within the red line boundary, the surrounding environment was taken into account in terms of biological and hydrological connectivity, particularly in relation to European sites. The Department of Housing Planning and Local Government (previously DoEHLG) *Guidance on Appropriate Assessment (2009)*[1] recommends an assessment of European sites within a zone of impact of 15 km. This distance is a guidance only and the zone of impact has been identified taking consideration of the nature and location of the proposed project to ensure all European sites with connectivity to it are considered in terms of a catchment-based assessment.

10.2.2 Guidance and Legislation

10.2.2.1 EU Habitats Directive

The *Habitats Directive* (*Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna*[2]) is the main legislative instrument for the protection and conservation of biodiversity within the European Union and lists certain habitats and species that must be protected within wildlife conservation areas, considered to be important at a European as well as at a national level. An SAC is a designation under the Habitats Directive. The Habitats Directive sets out the protocol for the protection and management of SACs.

The Directive sets out key elements of the system of protection including the requirement for "Appropriate Assessment" of plans and projects. The requirements for an Appropriate Assessment are set out in the EU Habitats Directive. Articles 6(3) and 6(4) of the Directive.

[1] Department of the Environment, Heritage and Local Government (2010) Guidance on Appropriate Assessment of Plans and Projects in Ireland (as amended February 2010
[2] European Council (1992) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

10.2.2.2 EU Birds Directive

The *Birds Directive* (*Council Directive 79/409/EEC and Council Directive 2009/147/EC on the Conservation of Wild Birds*[3]) provides for a network of sites in all member states to protect birds at their breeding, feeding, roosting and wintering areas. This directive identifies species that are rare, in danger of extinction or vulnerable to changes in habitat and which need protection (Annex I species). Appendix I indicates Annex I bird species as listed on the Birds Directive. An SPA, is a designation under The Birds Directive.

SACs and SPAs form a pan-European network of protected sites known as Natura 2000 sites (also called "European Sites") and any plan or project that has the potential to impact upon a Natura 2000 site requires appropriate assessment.

10.2.2.3 Wildlife Acts (1976 - 2012)

The primary domestic legislation providing for the protection of wildlife in general, and the control of some activities adversely impacting upon wildlife is the *Wildlife Act of 1976*[4]. The aims of the wildlife act according to the National Parks and Wildlife Service are *"... to provide for the protection and conservation of wild fauna and flora, to conserve a representative sample of important ecosystems, to provide for the development and protection of game resources and to regulate their exploitation, and to provide the services necessary to accomplish such aims."* All bird species are protected under the Act. The *Wildlife (Amendment) Act of 2000*[5] amended the original Act to improve the effectiveness of the Act to achieve its aims.

10.2.3 Study Area

The study area of this assessment included the footprint of the existing buildings and hardstanding areas comprising the existing Hickey's site, and two small 'green' areas: one of recolonised bare ground within the site and one small patch outside the existing Hickey's site on Parkgate Street, beside Seán Heuston Bridge and the section of Parkgate Street at the entrance to the site. The accessible area of the River Liffey was viewed for up to 250 m either side of Heuston Bridge, see Figure 10.1.

[3] European Council (2009) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds
[4] Wildlife Act 1976. Irish Statute Book.
[5] Wildlife Amendment Act 2000. Irish Statute Book.

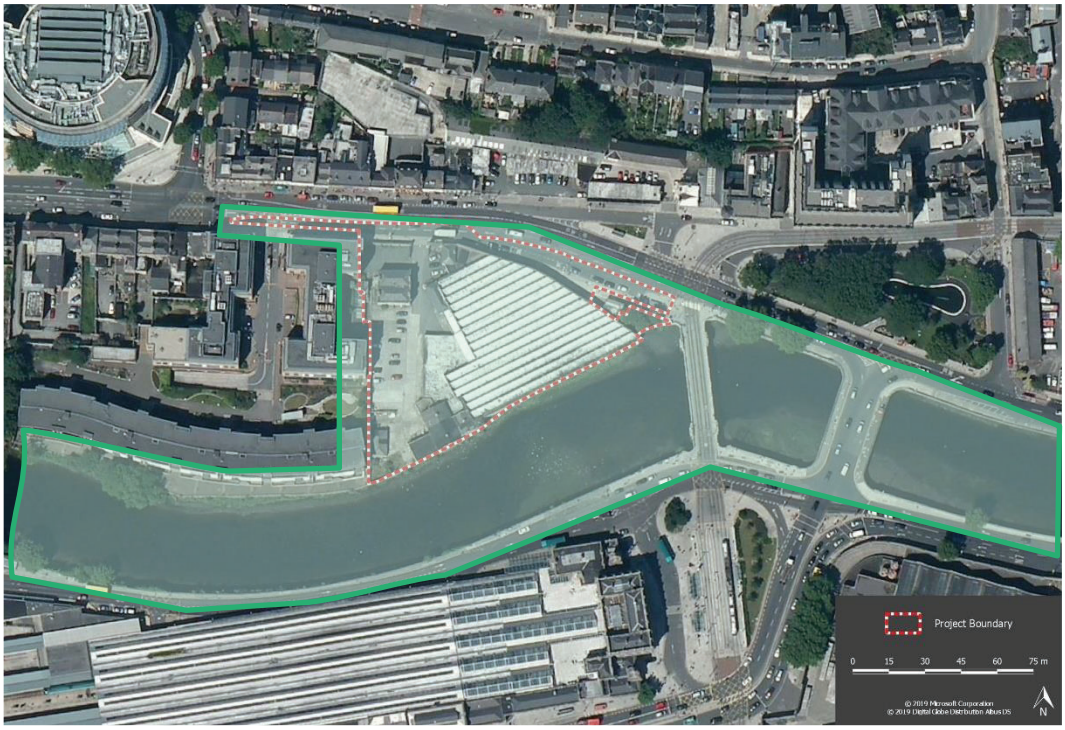

Figure 10.1: Showing the site location and general survey area.

10.2.4 Site Visits

The following surveys were undertaken on 26th, 27th February and 28th March 2019 and 23rd and 24th January 2020:

- Habitats;
- Bats (Internal Survey in February, 2019 and January 2020);
- Otters; and
- Birds.

Habitats were surveyed by conducting a study area walkover covering the main ecological areas identified in the desktop assessment. The survey dates are outside the optimal survey periods for botanical species, but this is not considered critical given the urban nature of this brownfield site.

The timing for internal building surveys for bats was optimal for surveying roosting bats and an unseasonably warm night in February 2019 allowed an external bat detector survey to be undertaken.

A visual survey for commuting otters was undertaken at low tide. A photographic record was made of features of interest.

Birds were surveyed using standard transect methodology and signs were recorded where encountered during the field walkover surveys.

Weather conditions during all surveys were dry with little or no wind.

10.2.5 Consultation

Consultation with the Development Applications Unit of the Department of Culture, Heritage, and the Gaeltacht and Inland Fisheries Ireland will be undertaken at the discretion of An Bord Pleanála.

10.2.6 Categorisation of the Baseline Environment

The habitat survey was carried out firstly through desktop research to determine existing records in relation to habitats and species present in the study areas. This included research on the National Parks and Wildlife Services (NPWS) metadata website, and the National Biodiversity Data Centre (NBDC) database.

The following resources assisted in the production of this chapter of the report:

- The following mapping and Geographical Information Systems (GIS) data sources, as required:
  - National Parks & Wildlife (NPWS) protected site boundary data;
  - Ordnance Survey of Ireland (OSI) mapping and aerial photography;
  - OSI/Environmental Protection Agency (EPA) rivers and streams, and catchments;
  - Open Street Maps;
  - Digital Elevation Model over Europe (EU-DEM);
  - Google Earth and Bing aerial photography 1995-2019;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
  - Natura 2000 - Standard Data Form;
  - Conservation Objectives;
  - Site Synopses;
- National Biodiversity Data Centre records:
  - Online database of rare, threatened and protected species;
  - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2019)[6]; and
- Dublin City Development Plan 2016-2022[7]

The second phase of the survey involved a site visit to establish the existing environment in the footprint of the proposed development area.

[6] NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin
[7] Dublin City Council (2016) Dublin City Development Plan 2016-2022. Vols 1 – 7

Areas which were highlighted during desktop assessment were investigated in closer detail according to the *Heritage Council Best Practice Guidance for Habitat Survey and Mapping* (Smith et al., 2011)[8]. Habitats in the proposed development area were classified according to the Heritage Council publication *A Guide to Habitats in Ireland* (Fossitt, 2000)[9]. This publication sets out a standard scheme for identifying, describing and classifying wildlife habitats in Ireland. This form of classification uses codes to classify different habitats based on the plant species present. Species recorded in this report are given in both their Latin and English names. Latin names for plant species follow the nomenclature of *An Irish Flora (Parnell & Curtis, 2012)*[10].

The key ecological receptors were determined from desktop review of draft plans to be; potential effects on roosting bats, and potential effects on the water quality of the River Liffey and associated species including otters and salmon.

10.2.7 Assessment Methodology

Following desktop assessment and fieldwork, an evaluation of the development area and determination of the potential effects on the flora and fauna of the area is based on the following guidelines and publications:

- *Assessment of plans and projects significantly affecting Natura 2000 sites* (EC, 2002)[11];
- *Managing Natura 2000 Sites* (EC, 2018)[12];
- *Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC* (EC, 2007)[13];
- *Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities* (DEHLG, December 2009, Rev 2010)[14];
- *EPA Draft Guidelines on Information to be contained in an EIAR* (EPA, 2017)[15];
- *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011);

[8] Smith, G.F., O'Donoghue, P., O'Hora, K. and E. Delaney (2011) Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council
[9] Fossitt, J. (2000) A Guide to Habitats in Ireland. The Heritage Council
[10] Parnell, J. and T. Curtis (2012) Webb's An Irish Flora. Cork University Press
[11] EC (2002) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43EEC. European Commission, Brussels
[12] EC (2018) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC
[13] EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive '92/43/EEC: Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interests, compensatory measures, overall coherence and opinion of the Commission. European Commission, Brussels
[14] Department of the Environment, Heritage and Local Government (2009) Guidance on Appropriate Assessment of Plans and Projects in Ireland (as amended February 2010)
[15] EPA (2017) EPA Draft Guidelines on Information to be contained in an EIAR; EPA, August 2017

- *Ecological Surveying Techniques for Protected Flora & Fauna* (NRA, 2008)[16]
- *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009)[17]
- *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2018)[18].

10.3 Baseline Conditions

10.3.1 Designated Conservation Areas

The Department of Housing, Planning and Local Government (previously DoEHLG)'s *Guidance on Appropriate Assessment (2009)(loc. cit.)* recommends an assessment of European sites within a zone of impact of 15 km. This distance is a guidance only and the zone of impact has been identified taking consideration of the nature and location of the proposed development to ensure all European sites with connectivity to it are considered in terms of a catchment-based assessment.

European sites that are located within 15 km of the Project are listed in Table 10.1 and presented in Figures 10.2 and 10.3, below. Spatial boundary data on the Natura 2000 network was extracted from the NPWS website (www.npws.ie) on the 18th October 2019.

Table 10.1: European Sites located within 15km or the potential zone of impact of the Project.

Site Code	Site name	Distance (km)[19]
000199	Baldoyle Bay SAC	11.96
000202	Howth Head SAC	13.22
000205	Malahide Estuary SAC	14.1
000206	North Dublin Bay SAC	7.47
000210	South Dublin Bay SAC	5.41
001209	Glenasmole Valley SAC	10.99
001398	Rye Water Valley/Carton SAC	13.14
002122	Wicklow Mountains SAC	12.02
003000	Rockabill to Dalkey Island SAC	13.48
004006	North Bull Island SPA	7.46
004016	Baldoyle Bay SPA	12.34
004024	South Dublin Bay and River Tolka Estuary SPA	4.37

[16] NRA (2008) Ecological Surveying Techniques for Protected Flora & Fauna. Available at: http://www.nra.ie/Environment/
[17] NRA (2009) Guidelines for Assessment of Ecological Impacts of National Road Schemes. Dublin: National Roads Authority. Available at: http://www.nra.ie/Environment/
[18] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.
[19] Distances indicated are the closest geographical distance between the proposed development and the European site boundary, as made available by the NPWS. Connectivity along hydrological pathways may be significantly greater.

Site Code	Site name	Distance (km)[19]
004025	Malahide Estuary SPA	14.1
004040	Wicklow Mountains SPA	12.11

The proposed development site is currently covered predominantly by warehousing, with a high stone wall where it fronts onto the River Liffey, along its southern boundary. The nearest European sites are those associated with Dublin Bay including the South Dublin Bay and River Tolka Estuary SPA (Site code 004024) which is located approximately 4.37 km to the east, the South Dublin Bay SAC (Site code 000210) which is located approximately 5.41 km to the east, the North Bull Island SPA (Site code 004006) which is located approximately 7.46 km to the east, and the North Dublin Bay SAC (Site code 000206) which is located approximately 7.47 km to the east.

It should be noted that the primary pathway to European sites during the construction phase is hydrologically via the River Liffey and in this way the nearest sites are the South Dublin Bay and River Tolka Estuary SPA which is located over 6.8 river km downstream and the North Dublin Bay SAC and North Bull Island SPA which are located over 8.4 river km downstream. The South Dublin Bay SAC is located outside the South Bull wall and while hydrologically more disconnected from the River Liffey, it is included as it overlaps the South Dublin Bay and River Tolka Estuary SPA.

There will be indirect connectivity to Dublin Bay via the municipal system to Ringsend Wastewater Treatment Plant during the operational phase.

The Report for AA Screening establishes that potential effects on any other European sites outside 15km or the potential zone of impact.

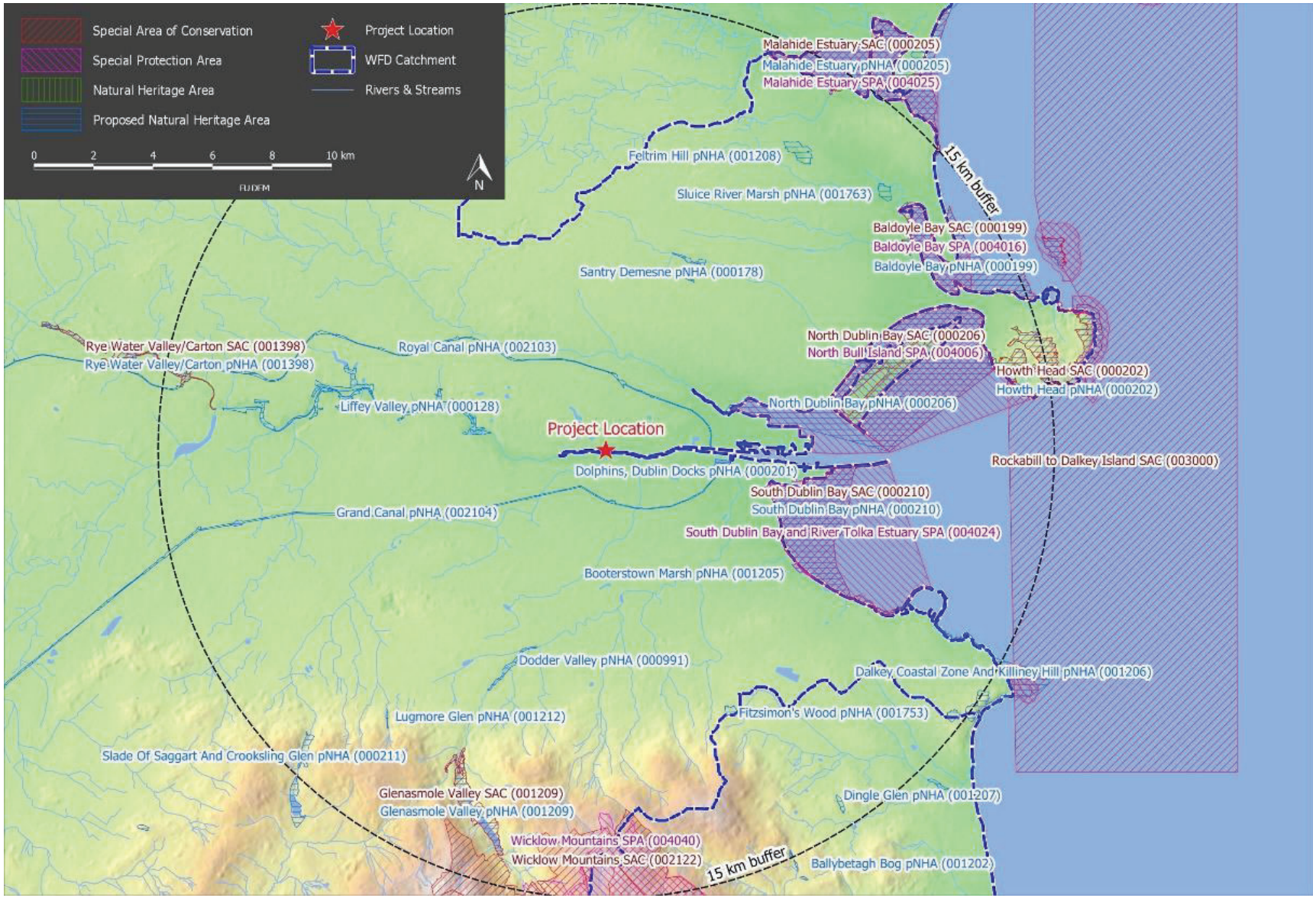

Figure 10.2: Showing the locations of European sites within a potential zone of impact.

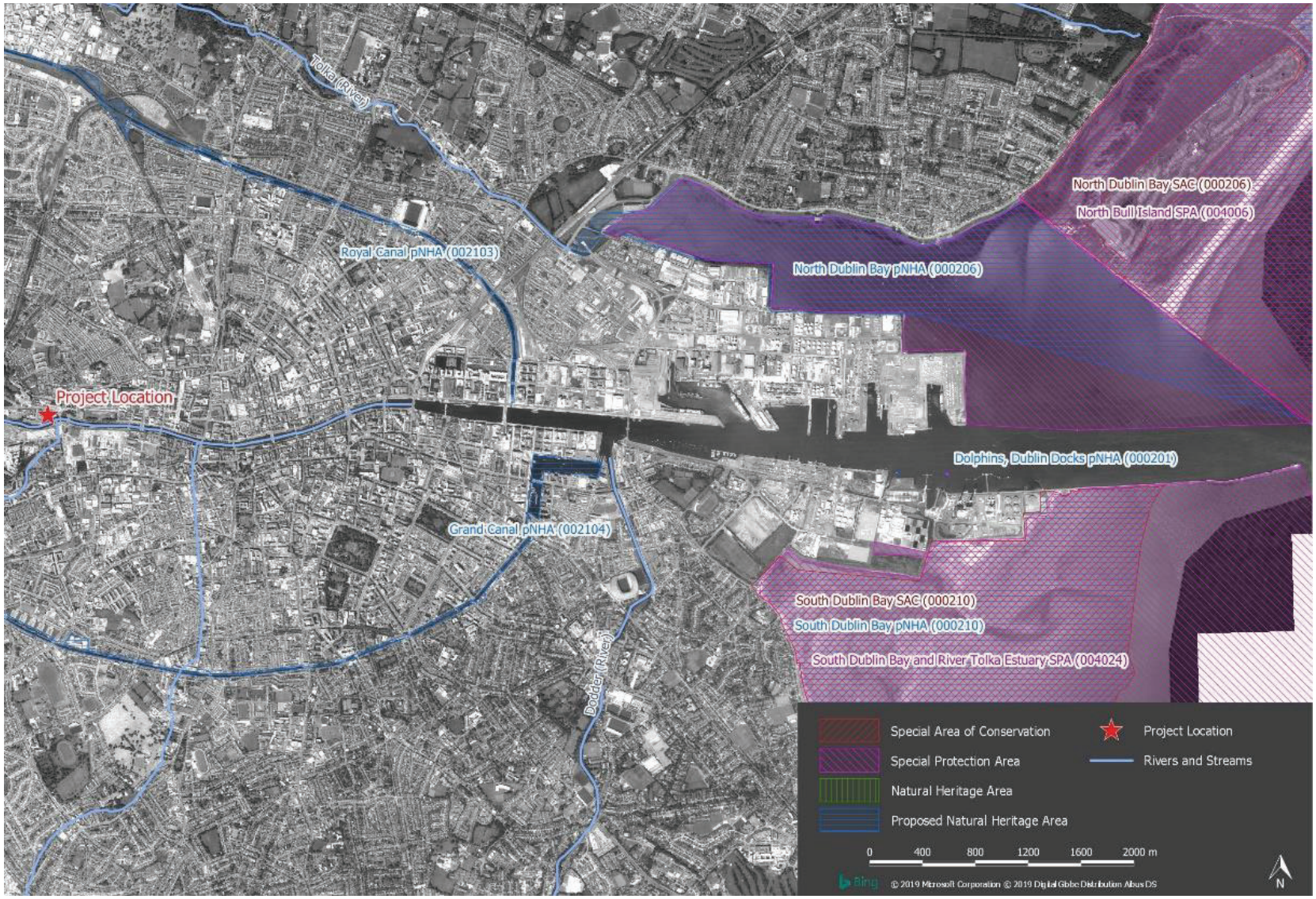

Figure 10.3: Detail of the locations of nearby European sites within a potential zone of impact.

10.3.2 Habitats; Flora & Fauna

In general, there are few natural habitats remaining in the proposed development area. They have either been modified or are artificial in nature. The main natural habitat of conservation concern is the River Liffey. Habitats are classified under the Fossitt codes (Fossitt, 2000).

10.3.2.1 Habitats & Flora

The predominant habitat on site is 'Buildings and artificial surfaces' (BL3) which comprise the entrance from Parkgate Street, the existing buildings and hardstanding areas of the site and adjacent Parkgate Street. A boundary stone and concrete wall (BL1) encompasses much of the site both by Parkgate Street and to the rear of the site, by the River Liffey.

There were no rare protected flora recorded in the Project area.

There are two 'green' areas; a small patch of grass which is scrubby in appearance to the south centre of the hardstanding area and an area outside the existing Hickey's site adjacent to Parkgate Street. The internal area is recolonised (ED3) by ruderal species such as Dandelion (*Taraxacum* agg.) and Dock (*Rumex obtusifolius*), Petty spurge *(Euphorbia peplus),* Germander speedwell *(Veronica chamaedrys)*, Rye grass *(Lolium* spp*.)*, Daisy *(Bellis perennis),* Ribwort plantain *(Plantago lanceolata),* Red clover *(Trifolium pratense)*, Rosebay willowherb *(Chamerion angustifolium)* along with Cow parsley *(Anthriscus sylvestris),* Yorkshire fog *(Holcus lanatus)*, Ragwort *(Senecio jacobaea)*, False oat-grass *(Arrhenatherum elatius),* Juvenile Sycamore *(Acer pseudoplatanus),* Bramble *(Rubus fruticosus agg.),* Cleavers *(Galium aparine)* and with Ivy (*Hedera helix*) growing onto the adjacent wall. A few Butterfly bushes (*Buddleia davidii*) give the area a scrubby appearance. Buddleia is considered an invasive species on road projects but is widespread in abandoned urban sites and is easily removed.

The eastern corner of the site is bordered by a small landscaped area at the corner of Parkgate Street and Heuston Bridge; separated from the internal site by the boundary wall and from the urban street by metal railings. It is comprised of a patch of rough grass planted with four cultivar Lime trees (*Tilia cordata*).

Sections between the buildings consist primarily of concrete, with a very sparse cover of plant species found in cracks and flower beds. Species recorded include: dandelion *(Taraxacum vulgaria),* mouse-ear chickweed *(Cerastium),* Herb Robert *(Geranium robertianum),* Ladies smock *(Cardamine pratensis)*, Shepherds purse *(Capsella bursa-pastoris)*, Smooth sow-thistle *(Sonchus oleraceus)*, Willowherb *(Epilobium hirsutum)*, Creeping bent *(Agrostis stolonifera)* and Oxeye daisy *(Leucanthemum vulgare)*. A small flowerbed has non-native holly and ornamental willow scrub.

The boundary wall to the River Liffey is colonised by patches of Ivy with small amounts of Ivy growing on the outer river side along with occasional Buddleia plants and Broad-leaved dock *(Rumex obtusifolius)* at lower levels.

The River Liffey (FW2) is tidal at the point of the proposed development site at Seán Heuston Bridge with the Islandbridge weir upstream of Sarah Bridge (Islandbridge) historically referred to as the 'highest point to which ordinary tides flow'. Thus, downstream of the weir the waters become brackish or have saltwater intrusion, depending on the level of the tide. Shortly after the weir and 'Sarah Bridge' downstream, the river enters its urban course through Dublin City. It discharges to Dublin Bay and feeds into the designated European sites which comprise the Dublin Bay Biosphere.

Upstream of Chapelizod, the river has a more natural course and is designated at a proposed Natural Heritage Area; the Liffey Valley pNHA and also holds the status of a Special Amenity Area. The River Liffey is a Salmon river and the river valley upstream is designated for mixed deciduous woodlands which occur on both sides of the river, normally consisting of old estate woodlands.

The immediate riverine environment adjacent to the proposed development site does not contain any designated habitats but is important in terms of water quality as a habitat for salmonids and otters.

10.3.2.2 Fauna

Otters

The most recent and nearest records for otters from the National Biodiversity Data Centre is from the adjacent section of the river between Heuston Station and the proposed development site from 6th June 2017 as a recording of one live animal.

The nearest upstream sighting was from the vicinity of the War Memorial Gardens on 11th February 2015.

Other records include one from downstream at Ushers Quay on 18th May 2015 and from Millennium Bridge on 28th August 2013.

Sightings from the Grand Canal Dock and the mouth of the River Dodder are likely to refer to known recordings from the River Dodder. However, otters have wide ranging territories and there may be movement from the River Dodder upstream to the vicinity of the proposed development site. Suffice to say, the River Liffey is a commuting habitat for otters for the course of the river immediately adjacent to the proposed development site, as well as upstream in the more natural habitat of Liffey Valley and further downstream in Dublin City.

No holts, slides or prints of otter were observed on the habitats located within the subject site during the habitat surveys. A night time search for otters was conducted during low tide on 27th February 2019 at 22:00. Two surveyors; Ger O' Donohoe and John Curtin conducted searches of the site and the adjacent stretch of river for one hour. No signs of passing otters were noted.

The results of the assessment of otters and otter usage in the area was supported in a personal communication between the Ger O'Donohoe and Ross Macklin who has completed a survey of otters in the rivers of Dublin County and City[20]. That report confirms the presence of otters upstream at Islandbridge and downstream at Grand Canal Dock and the mouth of the River Dodder with no records for the stretch of river adjacent to the proposed development site.

Bats

There are few records of bats from the general area with undetermined records of Daubenton's bat from upstream at Island Bridge (Tubridy & Associates, 2017; unpublished report) and other records from within the Phoenix Park (Phoenix Park Conservation Management Plan - www.phoenixpark.ie).

There is a small group of trees outside the main site area adjacent to Parkgate Street which are semi-mature and have no bat roosting potential. There are no other trees on site with potential roost features (PRFs).

The bat survey included four buildings, see Figure 10.4 below. The bat surveys were undertaken are in line with recommendations in Chapter 10 of the Bat Conservation Trust 'Good Practice Guidelines, 3rd Edition, 2016' (Collins, J. (ed) 2016[21]) and The Irish Wildlife Manual No. 25' (Kelleher, C. & Marnell, F. 2006[22]).

Given the relatively mild weather experienced at the end of February 2019, it was decided that a bat detector survey may have been useful in picking up any early season flying bats and as such a short night time bat detector survey was conducted from half an hour prior to sunset and ran for 2.5 hours. Temperatures ranged from 11.5 degrees Celsius at 17:25 to 9.1 degrees by 20:05. The bat detector used during the walked surveys was a Wildlife Acoustics Inc. (Massachusetts, USA) Echo Meter EM3 bat detector which is triggered to record when a bat call is emitted louder than 18dB for 1sec. This detector uses full spectrum sampling; detecting all frequencies simultaneously, meaning that multiple bat calls can be recorded at the same time.

There were no recorded calls or passing bats on the night of 26th February 2019.

Given the lack of evidence for roosting bats it was decided that there was no merit in repeating the detector survey later in the season.

However, given the time between initial surveys and the planning application it was decided to repeat the internal survey on 23-24th January 2020.

The results of the internal survey are outlined as follows.

[20] Macklin, R., Brazier, B. & Sleeman, P. (2019). Dublin City otter survey. Report prepared by Triturus Environmental Ltd. for Dublin City Council as an action of the Dublin City Biodiversity Action Plan 2015-2020.
[21] Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London
[22] Kelleher, C. &. F. Marnell (2006). *Bat Mitigation Guidelines.* Dublin: National Parks and Wildlife Service, Department of Environment, Heritage

Building 1 is a derelict dwelling while Building 2 is a disused warehouse. Building 3; taking up the majority of the site contains a currently used warehouse and office backing onto the river wall. The final building examined is a small boiler room; Building 4.

Each of the buildings on site was examined for the presence of bats or their roosts. Searches were completed using ladder, high powered torch, thermal imaging device and endoscope by specialist John Curtin.

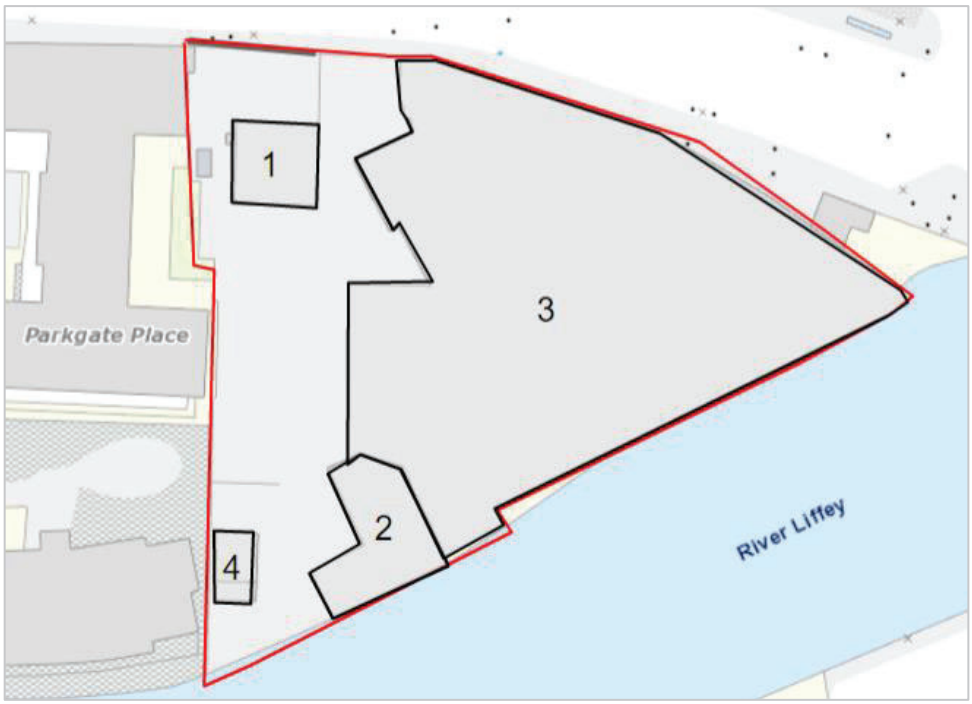

Figure 10.4: Locations of targeted internal bat surveys.

Evidence of bat usage sought during the surveys include:

- Bat droppings (these will accumulate under an established roost or under access points);
- Insect remains (under feeding perches);
- Oil (from fur) and urine stains;
- Scratch marks; and
- Bat corpses.

Building 1

Building 1 is a plastered stone construct with a damaged slated roof. The downstairs windows are boarded up. Potential access points for bats could be found through some open windows upstairs, along with numerous gaps in the roof and eaves. Curtains, chimneys and roof spaces were examined for evidence of bats however none were found. The building also contains a basement with some wintering bat roost potential, however a large amount of cobwebs would suggest bats do not use this space. Feral Pigeons occupy the dwelling. Despite a thorough examination no evidence of bat usage was found.

Figure 10.5: Derelict residential (B1) B1

Figure 10.6: Partially collapsed floor

Figure 10.7: Internal view (B1)

Figure 10.8: Attic space (B1)

Building 2

Building 2 consists of a two-storey cast concrete and brick building. This derelict warehouse contained single glazed broken windows and was occupied by numerous feral pigeons. Some wall cavities were noted suitable for bats. However, no signs of bats were found. The roof girders are recessed into walls where one unused birds' nest was found.

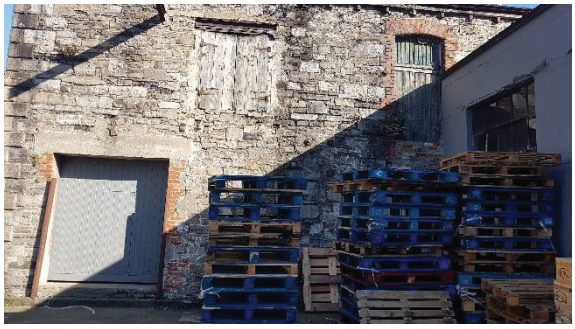

Figure 10.9: External view (B2)

Figure 10.10: Internal view (B2)

Building 3

Building 3 encompasses the main building within the site; an occupied warehouse and offices. This large building is constructed from precast concrete, roof sheeting and a small portion of slate to the north. The building does not have an attic space. To the rear of the warehouse several rooms adjoin the river wall.

These rooms have stone walls with exposed rafters and tongue and groove cladding underneath the slates. Potential access for bats is possible through open windows. However, no evidence of bats was found.

Plate Figure 10.11: Exterior of Building 3

Figure 10.12: Interior of Building 3

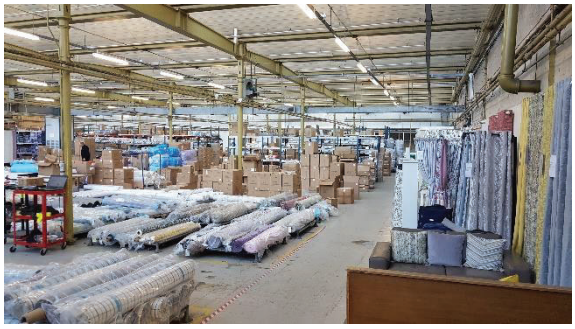

Figure 10.13: Warehouse section B3

Figure 10.14: Roof space of B3

Building 4

The fourth building examined was a boiler type room constructed of concrete with a concrete tiled roof. Two large openings to the east provided considerable light exposure thus reduced potential of the building as a day roost. A room to the south was dark however this section contained a high degree of cobwebs; indicative of a lack of bat activity from void dwelling bats.

No signs of bats were found on top of rafters or on the ground. No evidence of bats was found in this building. The adjoining open storage shed is too open and light for bat potential.

Figure 10.15: Boiler room (B4)

Figure 10.16: Roof space (B4)

The boundary stone walls were also examined for bat roost potential. Searches were completed using ladder, high powered torch, thermal imaging device and endoscope. The walls are partially plastered stone walls. There is some roost potential in wall crevices, but no evidence of bats was found during the search.

Birds

The only record of birds from within the site were feral pigeons. The more interesting records relate to Cormorants (*Phalacrocorax carbo*) observed drying their wings on the parapet wall adjacent to the river during fieldwork.

Two Mute swans (*Cygnus olor*) and a mixed age flock of Herring gulls (*Larus argentatus*) were noted in the River Liffey at low water upstream of the site near Heuston Station.

A list of birds recorded during habitat surveys is presented in Table 10.2 below.

Table 10.2: Birds recorded within and adjacent to the Parkgate Street site.

Common Name	Scientific Name	Behaviour	Numbers
Feral pigeon	*Columba livia domestica*	Within buildings	10+
Rook	*Corvus frugilegus*	Perched on building	1
Herring Gull	*Larus argentatus*	Perched on riverside wall and on river	~60
Black-headed Gull	*Chroicocephalus ridibundus*	Perched on building	1
Cormorant	*Phalacrocorax carbo*	Perched riverside wall	3
Mute Swan	*Cygnus olor*	On river	2
Jackdaw	*Corvus monedula*	Overflying	1
Robin	*Erithacus rubecula*	Overflying	1

10.4 Likely Significant Effects

10.4.1 'Do-Nothing' Scenario

If the proposed development were not to proceed, there would be a neutral effect in terms of biodiversity.

10.4.2 Assessment of effects during construction

10.4.2.1 Terrestrial Environment

There are no predicted effects on the terrestrial habitats of the proposed development. There are no rare or protected flora under the footprint of the proposed development.

There are no records of Third Schedule Invasive Species on or near the proposed development site.

The vegetation recorded is not significant and may be removed with demolition waste material.

There will be no impacts on the outer green area or Lime trees.

The vegetation of the river wall is sparse and riverside works are not predicted to be significant.

Mammals

The buildings on site present roosting potential to bats. However, none were recorded in two separate surveys at the appropriate time of the year. There are no proposed mitigation measures for bats with regard to the demolition of buildings.

This area of the River Liffey is urban in nature and experiences a background level of noise and disturbance. Otters are relatively tolerant of urban activity and it is not predicted that the construction activity will affect the passage of otters along the river.

Birds

There will be a minor loss of perching area for cormorants and gulls as a result of the proposed development. The disturbance is not considered significant given the availability of resting places along the river downstream and particularly around the structures of Dublin Port.

10.4.2.2 Aquatic Environment

Surface Water

The River Liffey holds populations of Brown Trout (*Salmo trutta*) and Atlantic Salmon (S. salar). Salmonids are highly sensitive to pollutants of freshwater e.g. hydrocarbons, elevated suspended solids, oils and/or toxic substances. While not designated as a 'Salmonid river', Atlantic Salmon is listed under Annex II of the Habitats Directive and protected in freshwater.

A Hydrological & Hydrogeological Qualitative Risk Assessment Report prepared by AWN Consulting is presented in Appendix 1 of the NIS which accompanies this planning application). That report presents the following sources (hazards) considered plausible for the proposed construction site:

(i) Leakage could occur from construction site equipment. As a worst-case scenario an unmitigated leak from a temporary refuelling tank which would typically have a maximum capacity of 300 litres is considered. This would be a single short-term event i.e. if not adequately mitigated.

(ii) Use of wet cement is a requirement during construction. Run-off water from recent cemented areas will result in highly alkaline water with high pH. As this would only occur during particular phases of work this is again considered as a single short-term potential event rather than an ongoing event.

(iii) The demolition of the existing building units and construction requires soil excavation and removal and import. Unmitigated run-off could contain a high concentration of suspended solids during earthworks. This could be considered an intermittent short-term event i.e. if proposed mitigation measures to control sediment laden run-off were to fail.

Further, the absence of pollution control measures, there is the potential for suspended solids, from dewatering activities, demolition or excavation, to enter the adjacent River Liffey during the construction phase of the proposed development.

Elevated suspended solids may be harmful to salmonids resulting in reduced oxygenation of surface waters due to settlement and the formation of deposits on the riverbed which in turn can give rise to septic and offensive conditions. Elevated suspended solids can clog salmonid gills and potentially cause mortality.

Chemical spills can result in fish mortality and could affect feeding habitats for bird species that rely on the sand and mudflats downstream in Dublin Bay for food sources.

Wet concrete and cement are very alkaline and corrosive and, in the absence of mitigation, can cause serious pollution to watercourses.

Excavations are not expected to encounter the groundwater table except in localised deepenings such as lift pits and will require special consideration in these locations.

Existing surface water drainage on the site discharges to the River Liffey. It is envisaged that one of the existing surface water discharge points shall be maintained for the duration of the Works, subject to local authority agreement. All other existing surface water discharge points to the River Liffey will be decommissioned.

The majority of the works to the River Liffey wall will be land based. However, some works from the River Liffey may be necessary, such as vegetation removal and repointing of mortar. The vegetation of the river wall is sparse and these riverside works are not predicted to be significant. The Contractor will obtain the relevant foreshore consent for temporary scaffolding erection in the River Liffey to facilitate the works, should this be necessary.

10.4.2.3 Indirect Effects

Indirect effects during construction relate to the potential for the proposed development to affect the water quality of the River Liffey and thus the species of conservation concern which inhabit the River Liffey, such as Salmon and Otter which extend from the mouth of the river up to and above the proposed development site. It also refers to the potential effect on the European sites located downstream in Dublin Bay, see the Appropriate Assessment and NIS documents.

The AWN Risk Assessment Report (see Appendix 1 of the NIS which accompanies this planning application), as summarised in the AA documents, presents the following sources (hazards) considered plausible for the proposed construction site:

(i) Leakage could occur from construction site equipment. As a worst-case scenario an unmitigated leak from a temporary refuelling tank which would typically have a maximum capacity of 300 litres is considered. This would be a single short-term event i.e. if not adequately mitigated.

(ii) Use of wet cement is a requirement during construction. Run-off water from recent cemented areas will result in highly alkaline water with high pH. As this would only occur during particular phases of work this is again considered as a single short-term potential event rather than an ongoing event.

(iii) The demolition of the existing building units and construction requires soil excavation and removal and import. Unmitigated run-off could contain a high concentration of suspended solids during earthworks. This could be considered an intermittent short-term event i.e. if proposed mitigation measures to control sediment laden run-off were to fail.

Further, in the absence of pollution control measures, there is the potential for suspended solids, from dewatering activities, demolition or excavation, to enter the adjacent River Liffey during the construction phase of the proposed development.

Any likely effects which could alter the trophic status of the greater Dublin Bay area and as a result affect the qualifying habitats which support the birds for which the Special Protection Areas are designated, could be considered a significant effect.

However, it is predicted that if the Best Practice mitigation measure described in the CEMP are implemented, see **Appendix 4.1,** indirect effects will be avoided.

10.4.2.4 Cumulative

There have been 67 planning applications which have been granted in the vicinity of the proposed development in the past 5 years to date. These have been referred to in Chapter 21 of this EIAR. Of the 67 applications to Dublin City Council listed, those referring to building extensions and/or changes of use have been eliminated due to their small scale and the focus moved to those applications for residential development that could have in combination effects in terms of wastewater. Given the inclusion of Best Practice Construction Management enforced in the CEMP, see **Appendix 4.1**, indirect effects can be avoided and there will be no cumulative impacts.

10.4.3 Assessment of effects during operation

10.4.3.1 Terrestrial Environment

The arrangement of the residential blocks around a courtyard space allows for a communal garden. The open space is conceived as a green space, in contrast to the public plaza. It consists of an open grass plane, with a birch grove, structural planting, flowering mixes to encourage pollinator species, raingardens, seating and a play area for toddlers and young children. The inclusion of pollinator friendly species in reference to the All-Ireland Pollinator Plan is seen as a positive effect on biodiversity.

Mammals

With regard to Bats and Otters, while it has been established that the immediate vicinity of the proposed development is of low value with few records of bats, there are records of bats upstream at Islandbridge and Daubenton's bats may feed further downstream near the Parkgate Street site. It has been established that there is some movement of otters along the River Liffey, albeit with no records in the immediate vicinity of the proposed development site. There will be no significant change in night time light levels over the river that would deter potentially commuting bats or otters.

Lighting along the river will be directed inward toward the developed areas. This will be achieved by appropriate lighting design and placement and the use of directional features such as cowls.

The internal river walk is unlikely to have an effect on commuting otters as it is predominantly located within the site and there will be no light spill onto the river.

The adjacent river and urban area is of relatively low value to commuting and feeding bats. However, the inclusion of pollinator friendly species will encourage insects as food sources in some small way.

Having regard to the Urban Development and Building Heights: Guidelines for Planning Authorities (DoHLG, 2018)[23], in development locations in proximity to sensitive bird and/or bat areas, proposed developments need to consider the potential interaction of the building location, building materials and artificial lighting to impact flight lines and/or collision. The river may provide a commuting habitat for bats such as Daubenton's. This species feed low over the water surface and would not be susceptible to collision. Indeed, all bats navigate their environment using echolocation and the risk of collision is unlikely.

Birds

Again, having regard to the Urban Development and Building Heights: Guidelines for Planning Authorities (2018), it is not predicted that there would be an effect on birds in terms of the proposed development height.

[23] Department of Housing, Planning and Local Government (2018) Urban Development and Building Heights: Guidelines for Planning Authorities

Consideration of collision would be for larger species such as Mute swan recorded on the river in the vicinity of the site.

The site is located at the upstream urban area of the River Liffey and given the proximity of Seán Heuston Bridge and the Sherwin Bridge, and the short distance between, the movement of larger birds species alighting on the river would be either from the east further downstream from these two bridges or from the west, further upstream adjacent to Heuston Station where the landing trajectory is longer. Therefore, there are no predicted effects with regard to collision.

10.4.3.2 Aquatic Environment

Surface Water

The proposed development includes the construction of a new drainage network to service the site. This drainage network includes Sustainable Urban Drainage (SuDS) features which will provide treatment to and improve the quality of surface water leaving the site. The SuDS features will also provide some stormwater storage which will reduce the discharge during storm events.

The drainage network has been designed for a 1 in 100-year storm event plus a 20% allowance for climate change. A section of the existing combined sewer on Parkgate Street will also be upgraded as part of the development.

The development will not have any impact on flood plain storage or conveyance and will not increase flood risk off site.

The development will not have any negative effects on the surrounding area in relation to water quality, hydrology and flood risk.

The Hydrological & Hydrogeological Qualitative Risk Assessment Report prepared by AWN Consulting presented in Appendix 1 of the NIS which accompanies this planning application) presents the following sources (hazards) considered plausible post construction:

(i) Leakage of petrol/ diesel fuel may occur from individual cars in parking areas, run-off may contain a worst-case scenario of 70 litres for example. The risk of a short-term release of a larger volume of hydrocarbons is already considered under the construction scenario above i.e. without mitigation. It is noted that mitigation will be provided within the design of the proposed development by a proposed oil/ petrol interceptor on the stormwater drainage infrastructure.

(ii) All [attenuated] stormwater will be discharged into the River Liffey after being processed through a Surface Water Management Plan which incorporates removal of silt/pollutants and debris by the installation of SuDS measures and a two-stage treatment train approach to the drainage strategy to improve the quality of water discharging to the Liffey.

10.4.3.3 Indirect Effects

Surface Water

As with construction, post-construction and/or operational indirect effects relate to the potential for the proposed development to affect the water quality of the River Liffey and thus the species of conservation concern which inhabit the River Liffey, such as Salmon and Otter which extend from the mouth of the river up to and above the proposed development site. It also refers to the potential effect on the European sites located downstream in Dublin Bay.

It is predicted that with appropriate design measures such as SuDS, indirect effects will be avoided.

Wastewater

The foul wastewater from the proposed development will be collected and discharged to the municipal sewer, which in turn discharges to the Ringsend Wastewater Treatment Plant, for appropriate treatment, prior to discharge to Dublin Bay. However, it has been established in the description of the proposed development that that the sewage discharge will not impact on the overall water quality within Dublin Bay and therefore would not have an impact on the current Water Body Status.

10.4.3.4 Cumulative

Given the inclusion of appropriate design measures such as SuDS, indirect effects will be avoided and there will be no cumulative effects during operation. With regard to Wastewater it has been established that that the sewage discharge will not impact on the overall water quality within Dublin Bay and therefore would not have an impact on the current Water Body Status.

10.5 Mitigation Measures and Monitoring

10.5.1 Mitigation

10.5.1.1 Mitigation During Construction

Terrestrial Environment

Mammals

The buildings on site present roosting potential to bats. However, none were recorded in two separate surveys at the appropriate time of the year. There are no proposed mitigation measures for bats with regard to the demolition of buildings.

There will be no direct lighting of the river during the construction period. All arc or flood lighting will be directed into the site and away from the river to reduce potential effects on commuting otters and bats during night time hours.

Birds

There are no specific measures required for birds during construction.

Aquatic Environment

Surface Water

Surface water from the proposed development will discharge to the River Liffey. A foreshore consent will be sought for this discharge. Mitigation measures relating to the protection of surface water quality and status are described in **Chapter 14**, Water and Hydrology and are summarised below.

"*The employment of good construction management practices will minimise the risk of pollution of soil, surface water and groundwater. The following site-specific measures will be implemented for the proposed development which will include:*

- *Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding;*
- *Run-off will be controlled to minimise the water effects in outfall areas;*
- *All concrete mixing and batching activities will be located in areas away from watercourses and drains; and*
- *Good housekeeping (site clean-ups, use of disposal bins, etc.) will be implemented on the site.*

In order to prevent the accidental release of hazardous materials (fuels, cleaning agents, etc.) during construction site activity, all hazardous materials will be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks will be used on the site during the construction phase of the project. Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the proposed development. The contractor's sanitary facilities will discharge into the existing combined sewer on Parkgate Street or as otherwise agreed with Dublin City Council."

Construction management measures including specific measures to prevent pollution of the River Liffey have also been incorporated into the CEMP, see **Appendix 4.1,** which will ensure that there are no likely effects on the River Liffey from surface water runoff.

The CEMP has been formulated in consideration of standard best practice and, as expanded on by the contractor, will align with the guidance set out in the following documents:

- CIRIA – Guideline Document C532 Control of Water Pollution from Construction Sites (CIRIA, 2001)[24]; and

[24] CIRIA, 2001. Guidance Document C532 Control of Water Pollution from Construction Site: https://www.ciria.org [Accessed October 2018]

- CIRIA – Guideline Document C624 Development and Flood Risk - guidance for the construction industry (CIRIA, 2004)[25]; and
- CIRIA (2015) Environmental Good Practice on Site C692 (4th Edition) (C762)[26].

10.5.1.2 Mitigation During Operation

Terrestrial Environment

Mammals

Lighting along the river will be directed inward toward the developed areas. This will be achieved by appropriate lighting design and placement and the use of directional features such as cowls.

Aquatic Environment

Surface Water

The proposed development will incorporate SuDS features in order to improve water quality and reduce the quantity of surface water discharging into the receiving system. The water supply network will include low flow devices with the aim of minimising water usage.

10.5.2 Monitoring

10.5.2.1 Monitoring During Construction

During the construction phase when and if dewatering of excavations is required, the Contractor will be responsible for monitoring the suspended solids content of the adjacent River Liffey water. The discharge of treated surface water from construction activities will be monitored to ensure that the discharged treated water will be in accordance to the Dublin City Council Discharge Licence if required.

The settlement tank and silt bag will be monitored by a Site Environmental Manager who will direct the control of settlement and whether a silt bag needs to be changed.

10.5.2.2 Monitoring During Operation

No monitoring has been proposed with respect to effects from operation of the proposed development.

[25] CIRIA, 2004. Guidance Document C624 Development and Floor Risk – guidance for the construction industry: https://www.ciria.org [Accessed October 2018
[26] CIRIA, 2015. Environmental Good Practice on Site C692 (4th Edition): https://www.ciria.org [Accessed October 2018]

10.6 Residual Effects

10.6.1 Residual effects during construction

Having regard to the mitigation measures outlined in **Section 10.5.1**, no residual effects during construction are predicted.

10.6.2 Residual effects during operation

Having regard to the mitigation measures outlined in **Section 10.5.1,** no residual effects during operation are predicted.

10.7 References

CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland. Second Ed. Jan 2016.
Department of the Environment, Heritage and Local Government (2010?) Wildlife, Habitats & the Extractive Industry - Guidelines for the Protection of Biodiversity within the Extractive Industry.
Department of the Environment, Heritage and Local Government (2010) Guidance on Appropriate Assessment of Plans and Projects in Ireland (as amended February 2010).
EC (2000) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.
EC (2001) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43EEC. European Commission, Brussels.
EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive '92/43/EEC: Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interests, compensatory measures, overall coherence and opinion of the Commission. European Commission, Brussels.
EPA (2017) EPA Draft Guidelines on Information to be contained in an EIAR; EPA, August 2017.
Fossitt, J. (2000) A Guide to Habitats in Ireland. The Heritage Council.
Nairn, R. and J. Fossitt (2004) The Ecological Impacts of Roads, and an Approach to their Assessment for National Road Schemes. In: J. Davenport and J.L Davenport (eds) The Effects of Human Transport on Ecosystems: Cars and Planes, Boats and Trains, 98-114. Dublin. Royal Irish Academy.
NRA (2008) Ecological Surveying Techniques for Protected Flora & Fauna. Available at: http://www.nra.ie/Environment/
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NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.
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Parnell, J. and T. Curtis (2012) Webb's An Irish Flora. Cork University Press.

Smith, G.F., O'Donoghue, P., O'Hora, K. and E. Delaney (2011) Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council.

11 Archaeology and Cultural Heritage

11.1 Introduction

This section describes the likely significant effects of the proposed development on the archaeological and cultural heritage environment within the proposed development site. The purpose of the study is to assess the possible significance of this receiving environment. It will also identify and evaluate the significance of the effect of the development on this environment and suggest appropriate ameliorative measures.

A detailed description of the proposed development is provided in **Chapter 3,** Description of the Proposed Development and **Chapter 4,** Construction Strategy.

The following aspects are particularly relevant to the archaeology and cultural heritage assessment:

Design:

- Foundation design (e.g. piling, ground beam layout, groundworks, basement levels/location, attenuation, lift shafts etc.)

Construction:

- Earth-moving works (e.g. piling, drainage, services)

This chapter has been prepared by Dr Clare Crowley of Courtney Deery Heritage Consultancy. Refer to **Appendix 1.1** for details on relevant qualifications and experience.

11.2 Assessment Methodology

11.2.1 General

The evaluation of the archaeological and cultural heritage resource of the proposed development was based on a desk study of published and unpublished documentary and cartographic sources, supported by a site inspection (see **Section 11.2.6**). This chapter was also prepared with due regard to the overarching EIA guidance as outlined in **Section 1.9.3**. It also incorporated the results of archaeological monitoring of ground investigation works at the site. This has facilitated the production of an archaeological and historical background to the proposed development lands, identifying the nature of the recorded archaeological sites and finds arising from previous development and excavation in its environs. This has established, as far as the records allow, the archaeological potential of the site and its immediate environs (including Parkgate Street, where transport and drainage works will take place as part of the proposed development).

11.2.2 Guidance and Legislation

The following legislation, standards and guidelines were consulted to inform the assessment:

- *National Monuments (Amendments) Acts,* 1930-2014;
- *Planning and Development Act 2000*, as amended;
- *Heritage Act,* 1995;
- *UNESCO World Heritage Convention,* 1972;
- ICOMOS *Xi'an Declaration on the Conservation of the Setting of Heritage Structures, Sites and Areas,* 2005;
- Council of Europe *Convention for the Protection of the Architectural Heritage of Europe (Granada)* 1985, ratified by Ireland in 1991;
- Council of Europe European *Convention on the Protection of the Archaeological Heritage (Valletta)* 1992, ratified by Ireland in 1997;
- *The Burra Charter, the Australia ICOMOS Charter for Places of Cultural Significance* 2013;
- *The European Landscape Convention* (ELC), ratified by Ireland 2002. (The Department of the Environment, Heritage and Local Government 'Landscape and Landscape Assessment Guidelines' have been in draft form since 2000, however the Draft National Landscape Strategy (NLS) was launched in July 2014);
- *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* – A publication of the International Council on Monuments and Sites, January 2011;
- *Guidelines on the information to be contained in Environmental Impact Statements*, 2002, EPA;
- *Advice Notes on Current Practice (in preparation of Environmental Impact Statements)*, 2003, EPA;
- EPA: *Draft Revised Guidelines on The Information to be Contained in Environmental Impact Statements,* September 2015;
- EPA: *Advice Notes for Preparing Environmental Impact Statements, Draft,* September 2015;
- *Frameworks and Principles for the Protection of the Archaeological Heritage,* 1999, (formerly) Department of Arts, Heritage, Gaeltacht and Islands;
- *Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act,* 2000;
- *Guidelines for the Assessment of Architectural Heritage Impact of National Road Schemes,* 2006, NRA;
- *Guidelines for the Assessment of Archaeological Heritage Impact of National Road Schemes,* 2006, NRA;

- *Guidelines for the Testing and Mitigation of the Wetland Archaeological Heritage for National Road Schemes,* 2006, NRA; and
- *National Landscape Strategy for Ireland* 2015 - 2025, Department of Arts, Heritage and the Gaeltacht;
- Historic England (July 2015), *Historic Environment Good Practice Advice in Planning,* Note 3: The Setting of Heritage Assets;
- Historic Scotland (October 2010), *Managing Change in the Historic Environment*; and
- The Heritage Council (2010), *Proposals for Irelands Landscapes and International Council on Monuments and Sites* (2011).

11.2.3 Study Area

The study area extends in an approximately 1km radius from the proposed development site and includes the areas of Kilmainham, Islandbridge and the Phoenix Park, which are archaeologically and historically important. The proposed development site is located at 42A Parkgate Street, on the northern bank of the River Liffey opposite the point of discharge for the culverted River Camac. It lies immediately west of Sean Heuston Bridge. It is situated to the south of the Phoenix Park and within Arran Quay Ward, with the River Liffey acting as the boundary between Arran Quay Ward and Usher Quay Ward. Parkgate Street itself marks a Municipal Boundary, with the southern wall of the Phoenix Park acting as a County, City and Parliamentary Boundary.

The proposed development site lies within the statutory zone of archaeological potential for the Historic City of Dublin, RMP No. DU018-020. There are no specific RMP sites recorded within the subject site. Prominent landmark features in the surrounding urban landscape include the Royal Hospital, c. 545m southwest, the Wellington Monument, c. 600m to the northwest within the Phoenix Park, and Heuston Station, c. 100m south of the proposed development on the south side of the River Liffey.

11.2.4 Site Visits

A site inspection was undertaken on 23rd May 2019 to assess the current condition of the site.

11.2.5 Consultation

Consultation took place with the Dublin City Archaeologist on 21st May 2019, to discuss the results of the baseline assessment and archaeological monitoring of groundworks. An archaeological strategy of test excavation using a phased approach was agreed for the site, with testing proceeding once the site had been vacated and the existing buildings cleared. Details of the recommended strategy are provided in **Section 11.5**.

Consultation with the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht (DCHG) was requested on several occasions, including a formal meeting request through the Development Applications Unit on 7th May 2019. The National Monuments Service are aware of the project, having approved the method statement and issued a licence for the monitoring of site investigations on the site in February 2019 (Licence No. 19E0179). A monitoring report was subsequently submitted to the National Monuments Service, National Museum of Ireland and Dublin City Archaeologist in May 2019. A further archaeological licence has been issued by the DCHG for archaeological test excavation (Licence No. 19E0781) in January 2020, once the proposed development site has been vacated.

11.2.6 Categorisation of the Baseline Environment

The assessment has been conducted based on the available information and has followed the existing best practice format of desk and field study. The desk study availed of the following sources:

- National Monuments, Preservation Orders and Register of Historic Monuments lists, which were sourced directly from the Department of Culture, Heritage and the Gaeltacht ('DCHG');
- Record of Monuments and Places ('RMP') and Sites and Monuments Record ('SMR'). The SMR, as revised in the light of fieldwork, formed the basis for the establishment of the statutory RMP in 1994 (pursuant to Section 12 of the *National Monuments (Amendment) Act*, 1994). The RMP records known upstanding archaeological monuments, their original location (in cases of destroyed monuments) and the position of possible sites identified as cropmarks on vertical aerial photographs. The information held in the RMP files is read in conjunction with published constraint maps. Archaeological sites identified since 1994 have been added to the non-statutory SMR database of the Archaeological Survey of Ireland ('ASI', National Monuments Service, DCHG), which is available online at www.archaeology.ie and includes both RMP and SMR sites. Those sites designated as SMR sites have not yet been added to the statutory record, but are scheduled for inclusion in the next revision of the RMP;
- Dublin City Development Plan (2016 - 2022)[1];
- The topographical files of the National Museum of Ireland ('NMI');
- Cartographic sources, which included deGomme (1673), Bolton, (1717), Brooking (1728), Rocque (1756), Taylor (1816), Clarke's map of a conjectural medieval city superimposed on the 1943 edition of the Ordnance Survey ('OS') map and various editions of the OS Maps;
- Excavations Bulletins and Excavations Database (1970 - 2018);
- Other documentary sources (as listed in the references, **Section 11.7**);
- Aerial imagery (Google Earth 2001–2018, Bing 2013; OSi 1995, 2000, 2006).

[1] DCC, 2016. *Dublin City Development Plan 2016-2022.*

The site inspection was carried out within the context of an assessment of the archaeological and cultural heritage potential of the surrounding area (e.g. results of previous archaeological investigations nearby), taking cognisance of the potential implications of the development on the surviving cultural heritage landscape (e.g. where upstanding monuments might be visible).

The methodology has been designed so a full understanding of the potential effects on the character of the historic landscape can be assessed. A detailed archaeological and historical background has been included which describes the character of the immediate and wider historic landscape, as well as the individual heritage assets, and highlights the potential to reveal subsurface features. The methodology used is based on the *EPA Guidelines*[2], and both direct physical effects, as well as impacts to the setting of individual heritage assets, have been assessed.

By using all the different sources and data sets an understanding of the historic character that surrounds and is part of the proposed development, has been developed. The modern urban streetscape is a result of change and modifications over the millennia and understanding how these processes occur and how they are represented in today's city is critical.

11.2.7 Impact Assessment Methodology

The assessment of the likely significant effects on the environment resulting from the construction and/or operation of the proposed development relies on a combination of qualitative and quantitative assessment.

Cultural heritage sites/landscapes are considered to be a non-renewable resource and cultural heritage material assets are generally considered to be location sensitive. In this context, any change to their environment, such as construction activity and ground disturbance works, could affect these sites. The likely significance of all effects is determined in consideration of the magnitude of the effects and the baseline rating of the cultural heritage asset (i.e. its sensitivity or value). Having assessed the magnitude of effect with respect to the sensitivity/value of the asset, the overall significance of the effect is then classified as imperceptible, slight, moderate, significant, or profound. A glossary of impact assessment terms, including the criteria for the assessment of impact significance, is contained in **Appendix 11.1**.

Cultural heritage is a broad term that includes a wide range of tangible and intangible cultural considerations. It encompasses aspects of archaeology and architecture and is expressed in the physical landscape as well as in non -physical ways (architectural heritage is assessed separately in **Chapter 12**). Cultural heritage can relate to settlements, former designed landscapes, building and structures, as well as folklore, townland and place names, historical events and traditions. Archaeological sites that are afforded protection as Recorded Monuments are regarded as being of high importance.

[2] EPA, 2017. *Draft Guidelines on information to be contained in Environmental Impact Assessment Report*.

Cultural heritage sites with upstanding features which are not afforded protection under the above criteria are considered to be of medium importance.

In accordance with the NRA '*Guidelines for the Assessment of Archaeological Heritage Impact of National Road Schemes*' (2006)[3], the significance (i.e. value) criteria used to evaluate an archaeological site, monument or complex are as follows: existing status (level of protection), condition or preservation, documentation or historical significance, group value, rarity, visibility in the landscape, fragility or vulnerability, and amenity value. The archaeological and cultural heritage environment is assigned a baseline rating, taking into account the importance, value and/or sensitivity of the receiving environment (Cf. Table 3, **Appendix 11.1**).

11.3 Baseline Conditions

11.3.1 Archaeological and Historical Background

11.3.1.1 Introduction

Cartographic analysis indicates that the usage of the site evolved from open meadow in the eighteenth century to the use of the site for industrial purposes from the early 19th century onwards (e.g. the Phoenix Iron Works in the early 1800s, followed by Kingsbridge Woollen Factory and the Parkgate Printing Works). The topography of the site has been altered in relatively modern times (19th century) with the construction of industrial units overlooking the River Liffey. Elements of buildings within the boundary of the site are listed as protected structures and are assessed in **Chapter 12**, Architectural Heritage.

11.3.1.2 Prehistoric Period (c. 9000BC to c. 500AD)

The earliest archaeological site in the wider landscape is a megalithic structure[4] that now stands within the Zoological Gardens in the Phoenix Park, c. 900m north-west. This is the closest known prehistoric site. It was originally uncovered in a sandpit close to Chapelizod not far from Knockmary in the Phoenix Park. A human skeleton was found within the tomb.[5]

There is also a Linkardstown-type burial[6] of late Neolithic date at Knockmary, in the Phoenix Park. The site was excavated in the early 19th century and comprised a mound overlying a central cist that contained two crouched skeletons. These were accompanied by a shell necklace, flint knife and bone toggle. Four small cists were also discovered dating from the Early Bronze Age, containing cremated bones and food vessels, two of which were bowls[7].

[3] As the only published guidelines specifically relating to archaeological impact assessment, these are accepted as best practice by the profession and are commonly applied to non-road related projects, for which they are referenced in conjunction with the EPA Guidelines.
[4] RMP No. DU018-007009
[5] Borlase, 1897. 381, 2; Poe 1904, 5-6, cited in RMP file.
[6] RMP No. DU018-007011
[7] Wood-Martin, 1895. 281, Fig.74; Waddell 1970, 115; Waddell 1990, 81, cited in RMP file.

Although this site lies over 3km west of the subject site, this evidence suggests continuity of occupation in the prehistoric period, in the general Phoenix Park area.

Further evidence of continued occupation in the area, north of the river, during the prehistoric period can be found in the topographical files of the National Museum of Ireland, which record two Bronze Age axes and a bronze pin dated to the Iron Age, all found in the Phoenix Park. South of the river, there is additional Bronze Age activity. A pit burial[8] is recorded within the grounds of the former Infirmary of the Royal Hospital. It was uncovered during archaeological testing and was found to contain a tripartite Food Vessel cremation[9] .

11.3.1.3 Early Medieval Activity (c. 500AD to c. 1100AD)

One of the earliest references to this area of the city is the establishment of the ecclesiastical foundation at Kilmainham. The place name Kilmainham is derived from the Gaelic *Cill Maignenn* or *Cill Mhaighneann*, which refers to an early seventh century Irish saint known as Maignenn, who is thought to have founded a monastery at this location. The most likely location for this monastery is on a high ridge of land on the south side of the river, possibly at Bully's Acre cemetery, c. 975m southwest of the proposed development site. This ridge ran for two kilometres along the southern bank of the Liffey, from the confluence of the rivers Liffey and Camac westward to the War Memorial Park in Islandbridge.

The monastery was ideally located, and the elevated ridge on which it stood was recognised for its considerable strategic importance throughout the area's subsequent history. It held a prime position above the mouth of the river[10]. It also benefitted from proximity to the ford of *Kylmehanok* (possibly a later corruption of *Cill Mhaighneann*), which is believed to have been located upstream of where Island Bridge now spans the Liffey (formerly Sarah Bridge, c. 895m to the west of the proposed development). The better known 'ford of the hurdles', which gives its name to the city of Dublin (*Áth Cliath*), was situated approximately one kilometre downstream at the later, permanent Viking settlement.

In 919 Niall Glundubh, or 'Black-knee', reportedly led a combined force of Irish against the Vikings at Kilmainham and subsequently lost his life[11]. A century later, in 1013–14, Brian Bóruma (Brian Boru) set up his headquarters at the monastery, and it was from here that he launched his successful military offences against the Norse settlers of Dublin. This legendary Irish king is believed to have burned down whatever remained of the *Cill Mhaighneann* monastery before his final battle at Clontarf in 1014.

An early medieval bronze bell[12], found during the 19th century in the Kilmainham area and now housed in the National Museum, has been dated to the period AD 700–900. It is possible that this bell is a surviving relic of the monastic settlement of St Maignenn, or perhaps of another monastic centre in the Kilmainham area.

[8] RMP No. DU018-112
[9] Licence No. 02E0067; Excavations Bulletin Ref. 2002:0610
[10] Kenny, 1995.
[11] *Ibid.*
[12] NMI Ref: 1917:2

Given the existence of the ecclesiastical foundation and the known fording points the vicinity of Parkgate Street, it is likely that there was also activity on the north side of the River Liffey during this period.

11.3.1.4 Viking Settlement

It is probable that the location of the Early Christian monastery of *Cill Mhaighneann* was adapted in the 9th century by Vikings and used as a longphort. The term longphort was first coined in 840 and it described the defended Viking ship encampments that were generally defined by an earthwork. The longphort also doubled as the place where trading and campaigning took place. O'Brien[13] points to the concentration of the recorded Viking activity west of the River Camac. She suggests the possibility of a 9th-century Viking settlement, in the land between the Camac and the Liffey rivers, located on the same ridge as St. Maighnenn's original monastery. Briggsand Graham-Campbell have also identified the monastic site as the possible focus of early Norse settlement[14]. This area lies on the south bank of the River Liffey, to the southwest of the proposed development site.

An examination of the location and context of all Viking material recovered since the 19th century has demonstrated the presence of two Viking cemeteries, one near the early monastic foundation in Kilmainham, the second further west in the vicinity of the War Memorial Park at Islandbridge[15]. It has been suggested that the spread of Viking burials was extensive, stretching at least from Memorial Park/Islandbridge in the west to Heuston Station to the east, a distance of 1.5km but confined to the natural gravel ridge, bordered by the Liffey on the north and the Camac River to the south[16]. Two Viking brooches have also been discovered within Phoenix Park, which indicate that there is a possibility of recovering such isolated remains within the proposed development area. These burial sites and stray finds illustrate the extent of Viking activity along both the south and north banks of the Liffey, which also points to an interaction between both banks during the Viking settlement of the area.

[13] O'Brien, 1998.
[14] Briggs ,1985 and Graham-Campbell ,1976.
[15] O'Brien 1998; Figure 11.1
[16] Simpson, 2004.

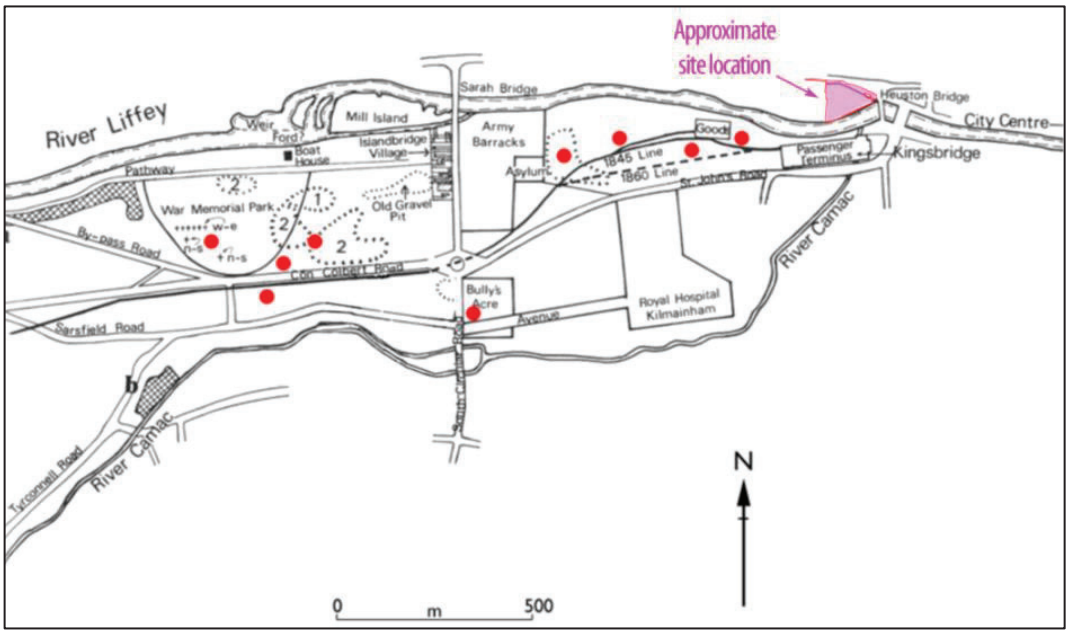

Figure 11.1: Map showing the locations (in red) of Viking material recovered in the 19th century (after O'Brien 1998)

11.3.1.5 Islandbridge

Activity spanning both sides of the Liffey becomes more tangible with the arrival of the Anglo-Normans in 1169 and a number of new religious orders from the continent. One such order was the Knights Hospitallers of Saint John of Jerusalem, a military and religious organisation founded in the wake of the crusades. Granted land in Kilmainham by Richard de Clare (Strongbow), the knights founded a new priory[17] in c.1174, close to the site of the old monastic buildings associated with *Cill Mhaighneann*. The priory was given lands from the Tyrrells of Castleknock, leaving it with landed possessions of over five hundred acres. Its possessions included a moiety (portion) of the River Liffey that reached as far as Conyngham Road and the entrance to the Phoenix Park in Parkgate Street, this became the source of numerous disputes between the local inhabitants and the priory[18].

The knights, during their occupation at Kilmainham, are reputed to have erected a six-arch bridge to connect their land on both sides of the river, near the ford of '*Kilmehanoc'*. A reference to 'the bridge of Kylmaynan' in 1261 in the White Book of the City of Dublin offers evidence that the bridge was in existence from at least that time. The bridge is mentioned again during the reign of Henry VIII, so it appears to have continued in use until the 16th century. This same bridge is also believed to have given Islandbridge its name. In 1577, Lord Deputy Sidney erected a new stone bridge at Islandbridge to replace the original six-arched bridge.

[17] RMP No. DU018-020286
[18] Kenny, 1995.

11.3.1.6 Phoenix Park

During the Suppression of the Monasteries in the mid-16th century, the Crown acquired the lands owned by the Knights Hospitallers of St John of Jerusalem, which had formerly belonged to the Templars. These lands were in turn ceded to Sir Richard Sutton in 1611, who proceeded to sell them to Sir Edward Fisher. The name 'Phoenix' is first documented in 1619 and originally referred to a spring located within the grounds of the park called *Fionn-Uisge* meaning 'clear water' (rendered phonetically, the Irish words became 'feenisk', which was anglicised to 'phoenix'). It was initially applied by Sir Edward Fisher to his residence on Thomas Hill[19]. In 1618 the Phoenix house and surrounding grounds were once more purchased by the Crown as a residence for the Irish Viceroy.

The Duke of Ormond instigated plans to enclose the lands of Inchicore, Island Bridge and Kilmainham as part of the Phoenix Park. It was hoped that the establishment of such a park would demonstrate how fashionable Dublin was becoming and encourage the English nobility to come to live in Dublin. But his decision was reversed when he established the Royal Hospital near the ruinous priory in Kilmainham, and the Park was reduced to its present limits. Islandbridge at this time became the scene of a considerable amount of development and was renowned for its market gardens and nurseries. Once plans for the Phoenix Park were finalised, Sir John Temple conducted the construction of the perimeter wall along the line of the road to Chapelizod in 1680. He did so in exchange for the lands between Conyngham Road and the River Liffey[20].

By 1734 the park residence had fallen out of use and was replaced by the Magazine Fort, which was constructed to secure the munitions necessary for the defence of the city. In the middle of the 18th century, the Park had become popular as a recreation ground for the citizens of Dublin, and shrubs and trees were planted and formal gravel walks were laid down. As such a public amenity it became the location for a series of commemoratory monuments the most visible of which is the Wellington Monument. The Wellington Monument was built to commemorate the military successes of the Iron Duke, Arthur Wellesley, and it remains a popular landmark. Although the foundation stone was laid in June 1817, the monument was not completed until June 1861, nine years after the duke's death[21].

11.3.1.7 Parkgate Street

Further development of the area surrounding Parkgate Street occurred with the advent of railway industry in the 19th century and the subsequent growth of residential development. To the west of the site lies the Liffey Viaduct, a section of the railway system that centres on Heuston Station. This railway bridge was constructed in 1877 and was linked to the longest railway tunnel in the city at the time, being a half-mile in length.

[19] Joyce, 1995.
[20] Ball, 1906.
[21] Jordan, 2005.

The tunnel ran in a north-south direction under the Phoenix Park and its location is marked by a stone arch in the wall of the park itself[22], c. 700m to the west of the proposed site.

In 1786 the Wide Streets Commissioners were given the power to alter and widen the road westward from Barrack Street (now Benburb Street) to Island Bridge. The western part of the improved road was named Conyngham Road, while the eastern part – from the Phoenix Park gate to Temple Street West – is first named as Park Gate Street on a map produced by Sherrard for the commissioners of the Royal Barracks in 1790[23]. It is also so-named on *Wilson's Directory, Plan of Dublin* in 1804.

Sean Heuston Bridge had replaced the ferry crossing from Steevens Hospital to the north side of the River Liffey in 1828; the commemorative plaque marks the date of the royal visit in 1821, when funds were made available to design and build the bridge. The structure is a single-span seven-ribbed cast iron arched bridge designed by George Papworth. The bridge was initially named as Kings Bridge, but was also known as Sarsfield Bridge, and now as Sean Heuston Bridge.

The River Camac discharges into the River Liffey directly opposite the proposed development site. Prior to the building of Heuston railway station, the confluence of the River Camac and Liffey was, at high tide, a broad expanse of water, as shown on many views drawn by 18th century artists of the Liffey from Phoenix Park. The terminus building for Heuston Station was built over the channel of the River Camac, burying it in the culvert through which it now flows, beneath the station and into the Liffey.

11.3.1.8 Hickey's Site (42A Parkgate Street)

The history of the proposed development site (42A Parkgate Street) was compiled from various documentary and online sources, including Thom's *Dublin Street Directory*, the *Freeman's Journal*, and Ordnance Survey maps.

The proposed development site was occupied by the Royal Phoenix Iron Works, also known as Robinson's Iron Works from the early 1800s (Figure 11.7). The Iron works was located over a large area which extended westwards outside the proposed development area and included a dwelling house, pleasure gardens, foundry workshops, a forge, outhouses and workers cottages (Figures 11.7 and 11.8). The owner was Richard Robinson, a native of Hull, an engineer and an iron founder, who had settled in Dublin in 1800. His foundry was responsible for casting King's Bridge (Sean Heuston Bridge), designed by George Papworth to commemorate the visit of George IV to Dublin in 1823; the foundry acquired the designation 'Royal' in this year[24].

The foundry was also responsible for casting '*new tobacco presses of a rare construction*' for Alderman Gardiner in 1843, at a cost of £1000.

[22] Conlin and De Courcy, 1988.
[23] Wide Streets Commissioners, 15
[24] De Courcy, 1996 and www.buildingsofireland.com; NIAH Reg. No. 50060346

The presses were '*so constructed as to bring by a species of brass screw a pressure of ten tons weight on a quantity of tobacco without any manual labour whatever*' and were worthy of a visit by the Lord Mayor in January 1843[25].

In 1839, a public exhibition was held at the foundry to raise funds for the Mendicity Institution. An advertisement for the exhibition appeared in the Freeman's Journal on January 8th and announced that '*to such as may not have seen the ordinary process of large Iron Works, Bar Iron heated, slit, and rolled into hoops, or Metal melted, and run into moulds, it is submitted that the sight will prove a most attractive one, and Parents, during those holiday times, cannot give their Children a greater treat, or a more instructive lesson, than by bringing them to see this truly wonderful exhibition*'. A notice in the same newspaper from three days previously commented on the type of objects produced at the works, ranging from '*the most delicate and richly finished articles to the largest factory wheels*'[26].

Robinson died in 1848 and is buried in St Michan's Church of Ireland church. By 1844 he had been succeeded in the business by William Robinson who carried on until 1858 or later. By 1863 the foundry had been taken over by Edward Toomey.[27]

The Iron works had been in operation from the early 1800s to approximately 1880. The demise of the site as an iron works was first noted from an advertisement in the *Freeman's Journal* on 20th July 1878 when there was a sale of machinery, bricks, granite quoins:

> *'To iron founders and others. To be disposed of, at the Royal Phoenix Ironworks, several engines and boilers to match, lathes, planning and drilling machines, punching presses and iron rollers, putty mill, scrab (crab?) winches, single and double purchase, shafting, pulleys and wheels, patterns of all descriptions, bellows, hearths, anvils and all tools necessary for smithy purposes. Foundry fixtures of all kinds, tools for boiler shop, viz:- furnace, templets and force pump, steam valves, mill machinery, leather belting and buckets, two sets of three through (throw) pumps, columns and pipes, beams, scales and weights; oil cisterns, tanks, timber, granite, quoins and bricks, with numberless other items. The above will be sold privately in convenient lots to suit purchasers.'*

A further advertisement on 24th January 1880 in the *Freeman's Journal*, cited the sale of extensive premises, plant and stock etc at a site known as the Royal Phoenix Iron Works. The site was described as follows:

[25] *Freeman's Journal* 30 January 1843; cited in www.gracesguide.co.uk/Royal_Phoenix_Iron_Work
[26] www.gracesguide.co.uk/Royal_Phoenix_Iron_Work
[27] https://www.dia.ie/architects

'together with the superior dwellinghouse, out-houses, pleasure grounds, gardens &c., the entire containing 3a 6r 38p statute measure, with a handsome entrance from Parkgate Street, the river Anna Liffey being its boundary in the south.

There are also eight two-storied cottages for workmen, with foundry workshops, forge, &c. where a considerable trade was successfully carried on for many years, there being also a great facility of water carriage up and down the river Liffey for the export and import of heavy articles connected with the trade. The above premises are held under lease for ever at the extremely low rent of £84 per annum, the cottages along producing a rental of £150.

The plant and stock consists of the usual machinery adapted to the trade, comprising steam engines, from 1 to 16 horse power, and several large steam boilers, lathes, planning, drilling, punching and rolling machines, steam hammer anvils, and smiths' tools in general, also a quantity of boilermaker's tools, furnace for bending Figures, levelling blocks, bellows, hearths and troughs, cranes, core boxes, beam ladles, moulding boxes, core barrels, brass furnace, &c for foundry uses; also wheel pattern and models of all descriptions, crab, winches, double and single purchase pulley, blocks and chains, wrought iron shafting pulleys and wheels, steam gauges and boiler mountings, &c. Sale to commence at 11 o'clock with the machinery; interest of premises at 2 o'clock pm.'

These advertisements would appear to indicate that the site, its machinery and buildings were stripped clean prior to its sale. There is also evidence to suggest that many of the buildings on the site were demolished (as indicated by a comparison of the 1864 and 1889 Ordnance Survey maps; Cf. **Section 11.3.2.2**), being replaced sometime after 1882 by new factory buildings for the Kingsbridge Woollen Mills, established by Edward C. Guinness (owner of the Guinness brewery and 1st Earl of Iveagh). Thom's Directories record the valuation for the Royal Phoenix Ironworks falling from £130 in 1870 and 1880 to just £10 in 1882. By 1886, under the direction of Guinness, the valuation had risen to £405. Guinness intended the mills to create employment for the daughters of Guinness workers, though the endeavour failed as the mills were closed down in less than a decade due to serious economic difficulties.[28]

The Kingsbridge Mills, a woollen manufacturer, occupied the site for a decade. Another manufacturer, Phoenix Park Works, was in operation on the site from approximately 1900 to 1910, though the specific type of manufacture is unknown.

While in the possession of the Phoenix Park Works, the strongly walled site was used as a location for a bomb-making factory during the First World War (listed in Thom's Directory from 1917 - 1920 as the '*Dublin National Shell Factory*'. The munitions were carried down the river in barges that were loaded at a jetty beside the factory. The following two years saw the site taken over for use as Government Stores.[29]

[28] Corcoran, 2005.
[29] De Courcy, 1996.

By 1924 a printing works was set up on site around ten years later (under the auspices of Cahill Printers), by which time the original site had been subdivided, with the Lucan Dairy Depot occupying the western half (i.e. the area now outside of and separate from the proposed development site; see Figure 11.11 below). The printing works remained in operation until the mid-1970s when the current owners, Hickey's Fabrics, took up residence.

11.3.2 Cartographic Sources

11.3.2.1 Earliest available sources

The 1656 Down Survey Parish Map of Kilmainham is the earliest cartographic source for the study area (Figure 11.2). It is possible to identify the approximate location of the proposed development site on this early map source using the course of the Liffey and the outlet for the Camac river as topographical pointers. Other features depicted on the map include a bridge crossing upstream on the Liffey (Sarah Bridge, now Island Bridge), which is flanked by two mills. At this time there was no bridge crossing the river at the site of the present Sean Heuston Bridge. The road to '*Maynooth from Dublin*' appears to terminate at the bridge, though a route of some sort continuing along the north bank is likely. The bridge itself provided access to the network of principal roads on the south side of the river. A large house is shown on the map and represents the substantial residence built by Sir Edward Fisher in the former lands of Kilmainham Priory (now the Phoenix Park) and is named 'Phoenix' (this is the site of the present Magazine fort, DU018-007012).

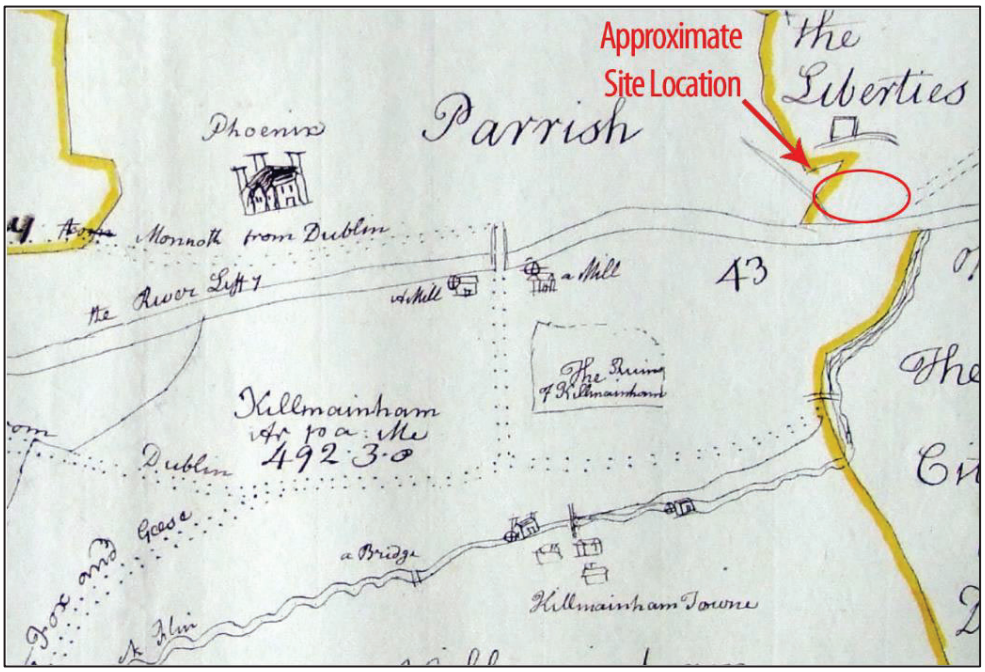

Figure 11.2: Down Survey map of the parish of Kilmainham, c. 1656

A slightly later seventeenth century map of the region is that of Thomas Taylor, dating to 1671 (not shown).

It demonstrates that part of the present Parkgate Street was encased within the large expanse of the Phoenix Park, which at that time stretched across the River Liffey. The scale of the park was reduced in 1680 and its southern boundary was defined by a wall (along the northern edge of the present Conyngham Road), leaving a strip of land between the road and the River Liffey. This can be seen on two 18th century maps of Dublin, Brooking's 1728 map (not shown)[30] and John Rocque's 1756 map (Figure 11.3). Both maps show the area to the south of the Phoenix Park as an open meadow, which is named on Rocque's map as 'Long Meadows'. Rocque's map also shows a small channel leading from the bend of the River Liffey towards the 'road from Chapel Izzod'. It appears to be culverted beneath the road and presumably represents the tail end of the Viceregal Stream that flows down from the park and feeds a pond on the other side of the road.

One of the first instances of the road being named Parkgate Street is on Wilson's 1804 map, on which 'Park Gate Street' and 'Conyngham Road' follow the line of the old Chapelizod/Islandbridge thoroughfare. On Campbell's map of 1811 (Figure 11.4), a ferry crossing is shown linking Steeven's Lane on the south side of the Liffey to the north bank of the river, immediately to the east of the proposed development site. The latter is defined as a triangular property plot, similar to its present form. A range of buildings occupies the northeastern side of the site (only the western end of the range is aligned with Park Gate Street), with one square structure extending southwards from it. The Camac river, culverted beneath Military Road, is shown entering the River Liffey on the south bank, opposite the proposed development site.

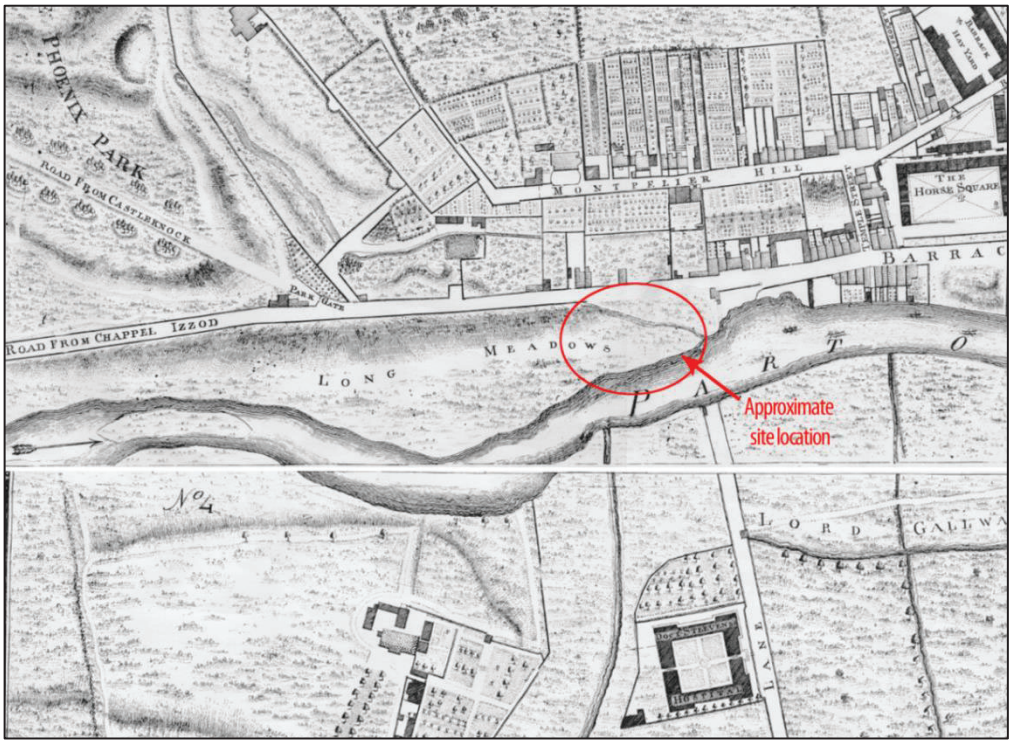

Figure 11.3: Rocque's map of Dublin City, 1756, showing approximate site location

[30] This map provides no additional detail and is a smaller scale than Rocque's map of less than 30 years later.

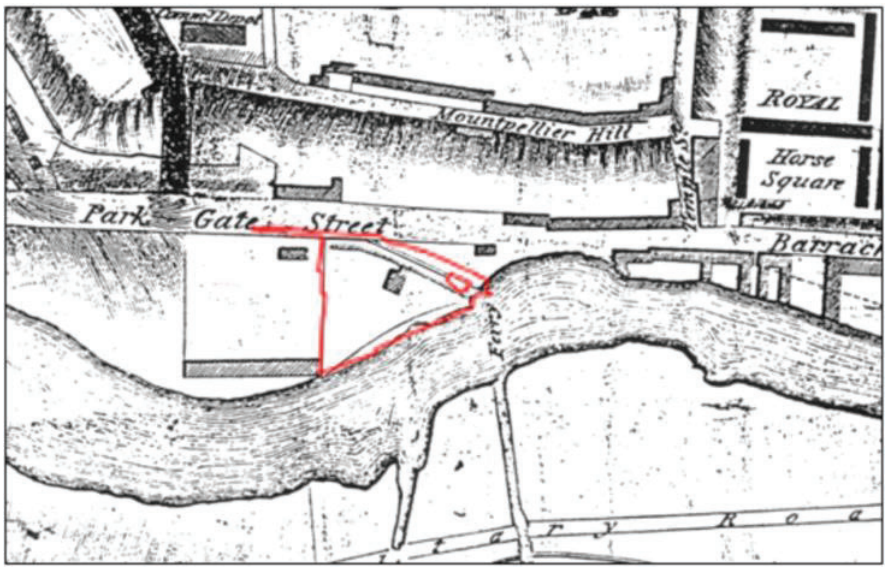

Figure 11.4: Thomas Campbell's map of the City of Dublin, 1811, with approximate site location in red

11.3.2.2 Ordnance Survey Maps

By the time of the first edition Ordnance Survey (OS) 1843 six-inch map (Figure 11.5), the Royal Phoenix Iron Works occupy a large plot on the north river bank, accessed via an entrance onto Parkgate Street (the proposed development site forms the eastern half of the original iron works site). The house near the northwest corner of the present site was already there in 1843, as was the gateway from Parkgate Street, and rounded turret at the eastern end of the site. A second turret at the southwestern corner of the original iron works site (now gone) is also depicted. A significant development in the vicinity is King's Bridge, which was erected in 1828 but is first depicted on this map.

The works can be seen in greater detail on the 1847 and 1864 OS five-foot plans (Figures 11.6 and 11.7). The eastern half of the plot appears to house the majority of the iron works buildings, with extensive gardens and open space dominating the western half (becoming more elaborate by 1864), where the main dwelling and workers' cottages were located. There appears to be a slipway from the central yard down to the river. The building directly abutting the river at the western end of the site is shown as much smaller than the present building, with the adjoining long building range extending westwards, parallel to but set back from the river. This indicates that the present river wall can only partly date from the time of the Royal Phoenix Ironworks (this is confirmed by the architectural survey detailed in **Chapter 12**).

The Kingsbridge Woollen Factory had replaced the irons works on the 1889 OS map (Figure 11.8) and in later editions the site was in use as a printing works. The layout of the buildings associated with the Woollen Factory, as shown on the 1889 map, are distinct from those shown on the earlier editions for the iron works. It is likely that many of the earlier buildings had been demolished (notably the range along the river side), making way for an expansive new factory building, occupying the space of the earlier buildings as well as the central yard.

There were also two smaller buildings to the southwest. This coincides with the available historical information, as discussed in **section 11.3.1.8**, and is similar to the layout on the site today.

The 1889 map also shows the tram lines running along Parkgate Street and across King's Bridge.

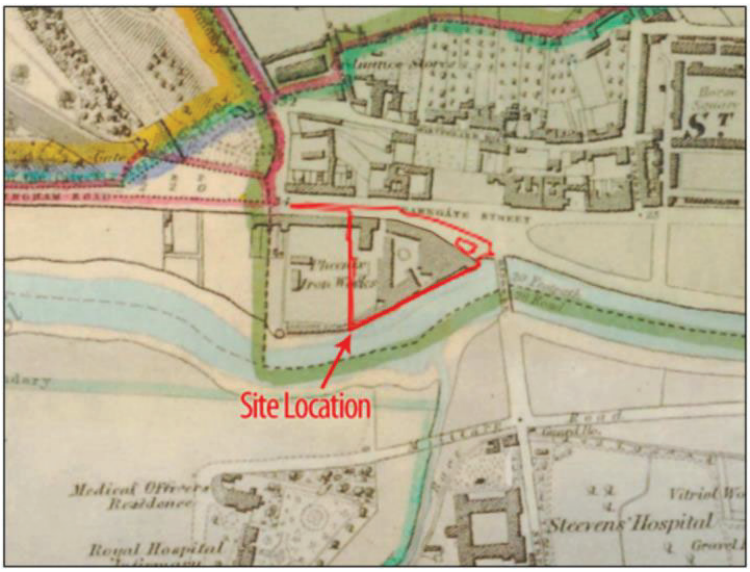

Figure 11.5: First edition OS map, 1843 (scale 1:10,560), showing approximate site location

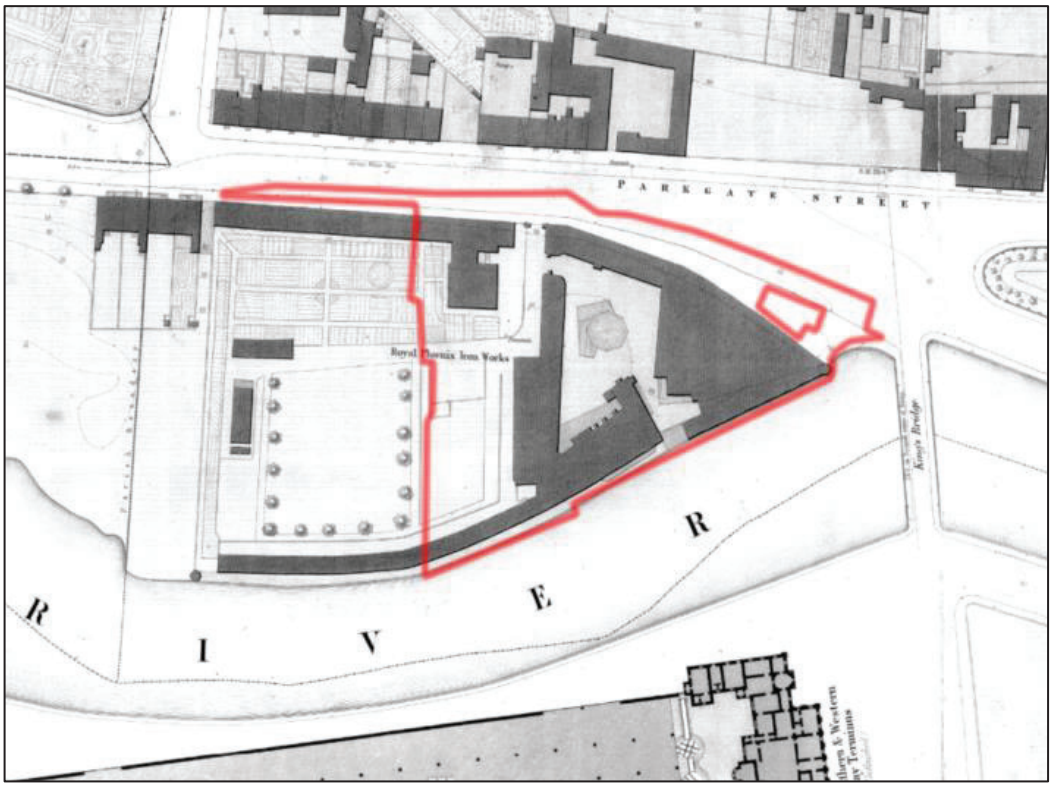

Figure 11.6: First edition OS map, 1847 (scale 1:1056), showing approximate site location in red

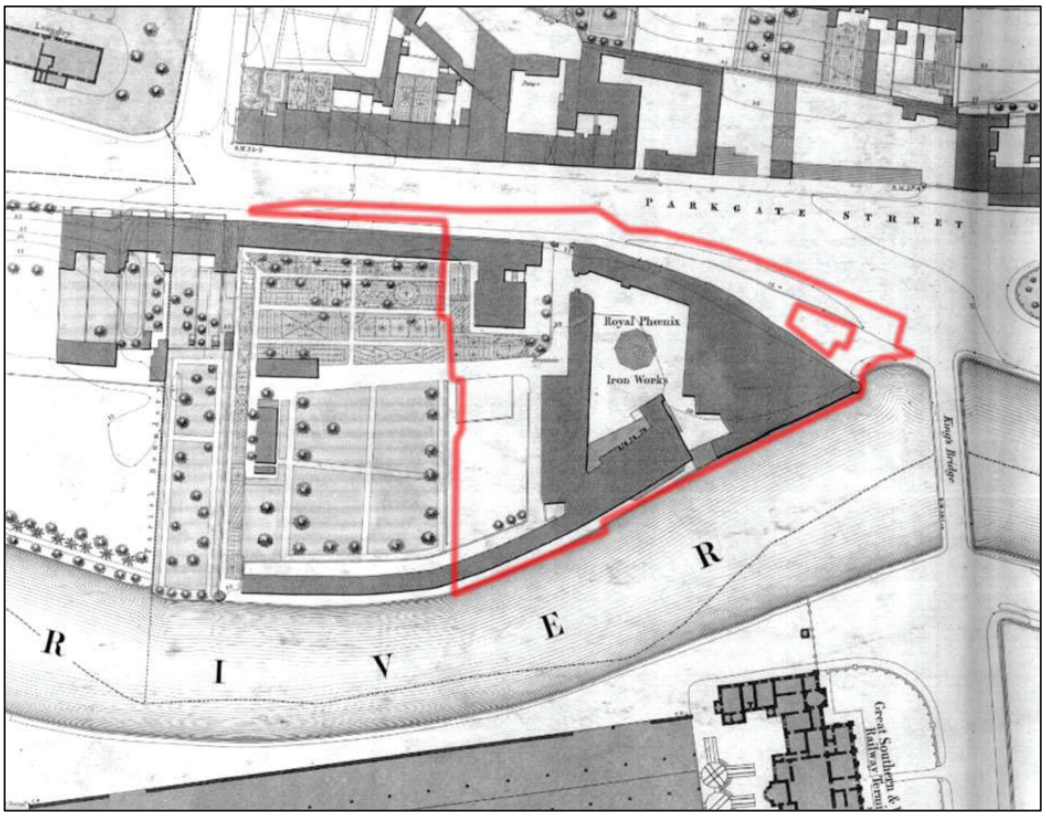

Figure 11.7: Revised edition OS map, 1864 (scale 1:1056), showing approximate site location

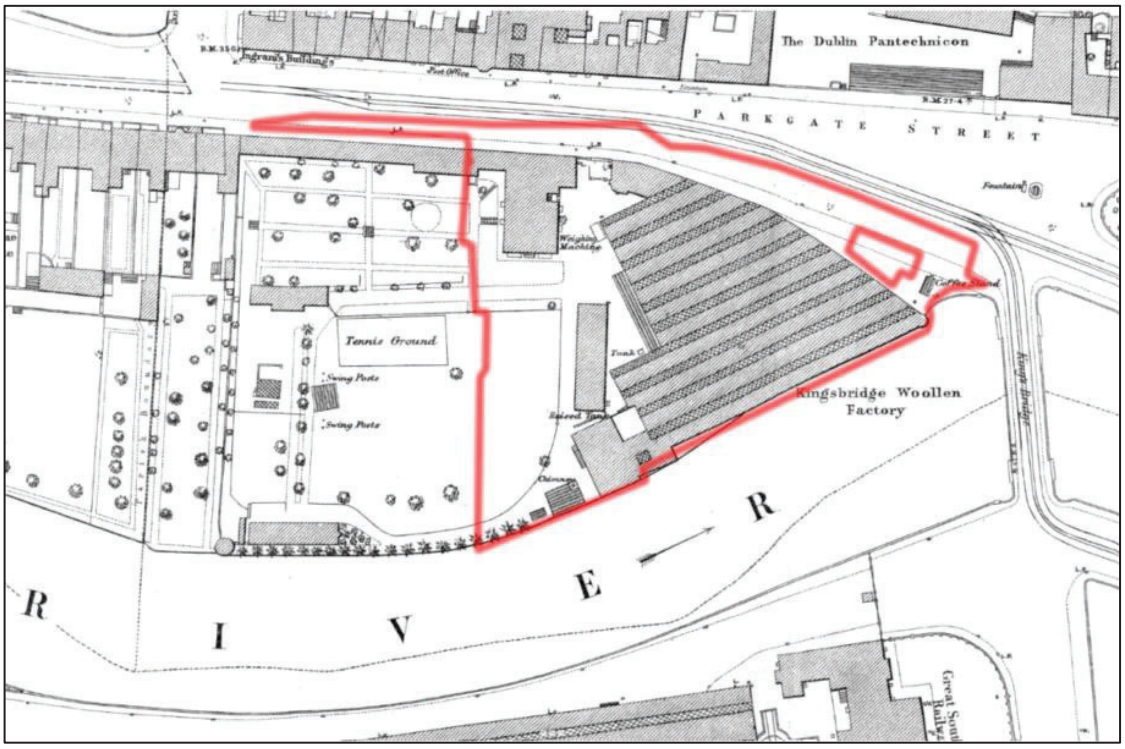

Figure 11.8: Revised edition OS map, 1889 (scale 1:1056), showing approximate site location

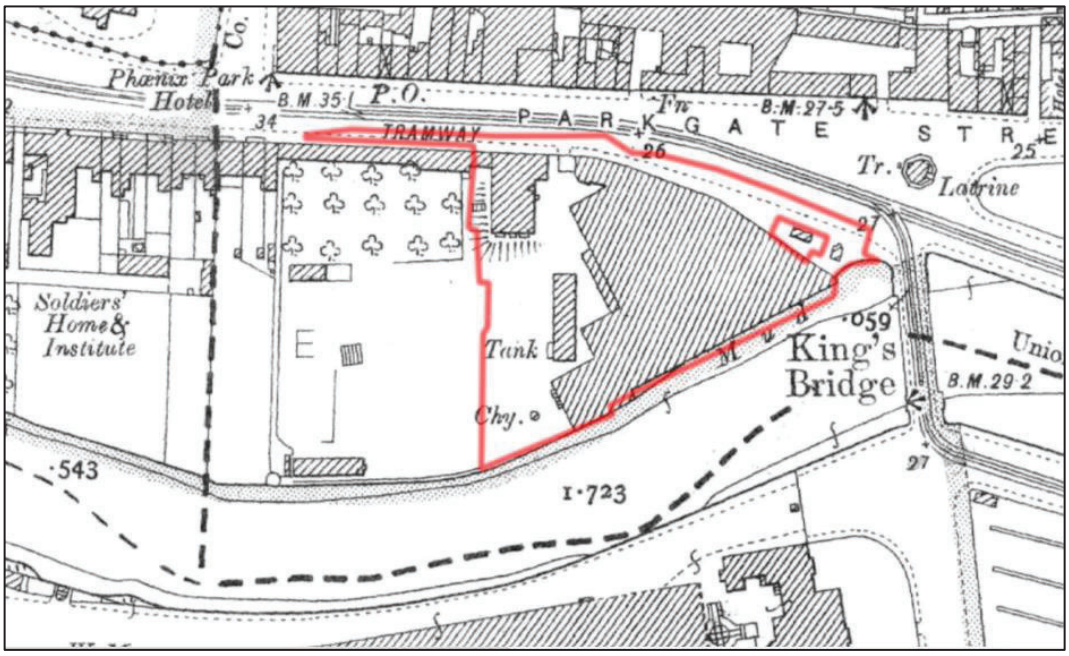

Figure 11.9: Revised edition OS map, 1907 (scale 1:2500), showing approximate site location

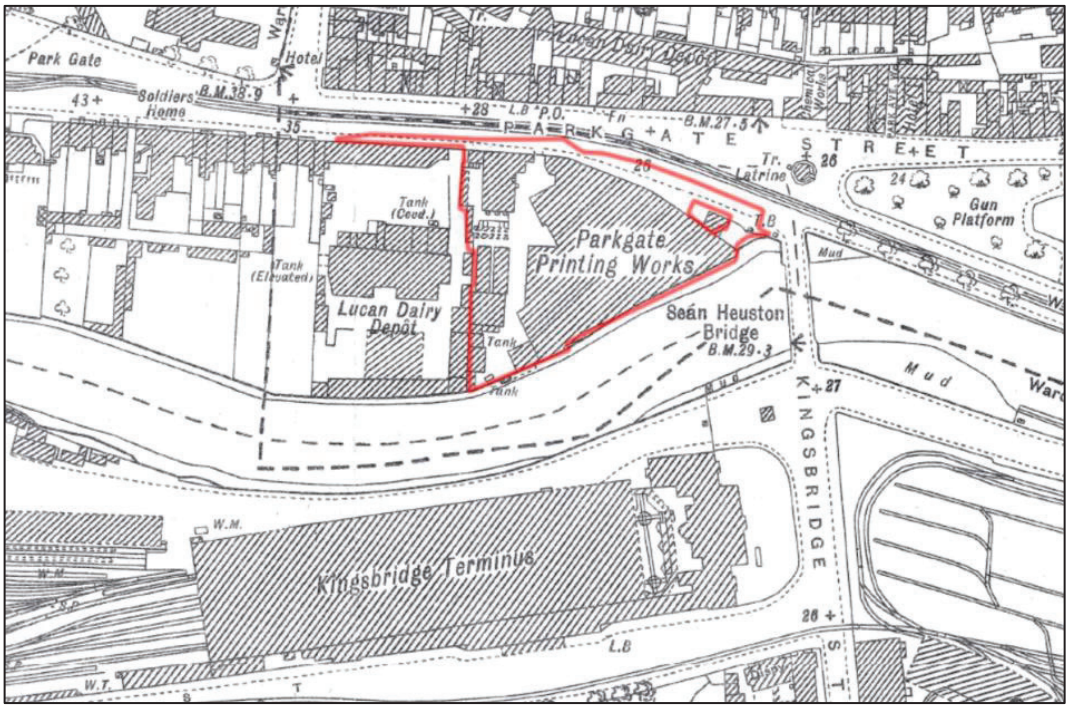

Figure 11.10: Revised edition OS map, 1943 (scale 1:1,560), showing approximate site location

The layout of the site was much the same in 1907 (Figure 11.9), though far more utilitarian in nature. The 'tennis ground' shown on the 1889 edition has been removed, as have the landscaped gardens and paths (though an enclosure of trees survives), and some of the ancillary buildings.

The 1943 revised OS map (Figure 11.10) shows that the original iron works site had been subdivided and was now in use for two separate industries, with the printing works in the eastern half (within the proposed development site) and the Lucan Dairy Depot in the western half (outside the proposed development site).

The development and significance of the buildings across the site is discussed in detail in **Chapter 12**, Architectural Heritage.

11.3.3 Recorded Archaeological Sites (RMP/SMR sites)

The proposed development site is situated within the statutory zone of archaeological potential for the '*Historic City of Dublin'*, RMP No. DU018-020 (Figure 11.11). There are no specific RMP/SMR sites recorded within the proposed development site, however its location on the south-facing bank of the River Liffey offers a vantage point of many of the monuments in this region of the city.

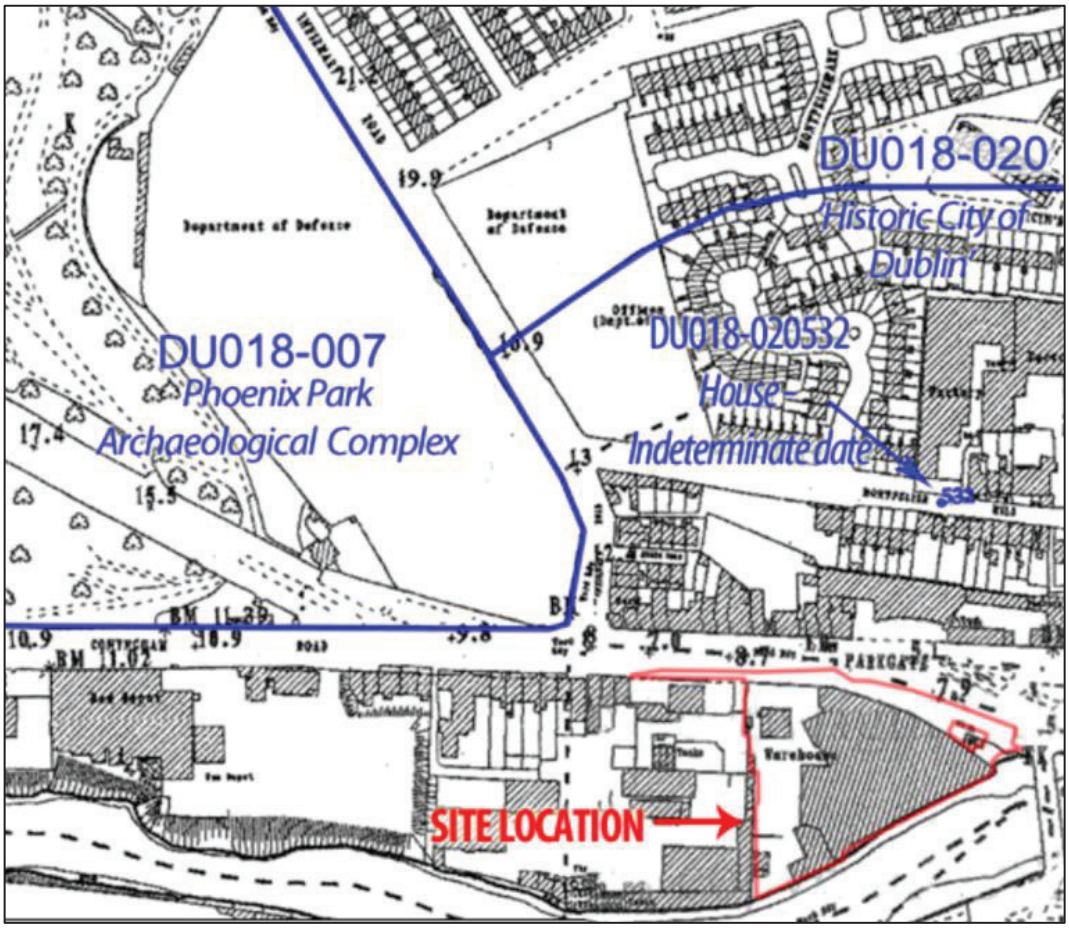

Figure 11.11: Published RMP map showing site location

The nearest recorded archaeological feature is the site of a dwelling, RMP DU018-020532, located on Montpelier Hill, c. 80m to the north (Figure 11.11).

The Phoenix Park archaeological complex (DU018-007, Figure 11.11) is located c. 105m northwest of the development site (c. 30m from the nearest drainage / transport works).

The complex is composed of a number of different sites, including the deer park (DU018-007001), a tower house (DU018-007002), a mound (DU018-007003), a house site of indeterminate date (DU018-007004), a possible well (DU018-007005), a possible enclosure (DU018-007007), a well (DU018-007008), a megalithic structure (DU018-007009), a road (DU018-007010), a cemetery mound (DU018-007011) and the star-shaped fort (DU018-007012). The closest of these sites is the megalithic structure (present location), c. 900m to the north-west.

The Royal Hospital Kilmainham (DU018-020285) and associated gardens (DU018-020528) are located c. 600m south-west of the proposed development site. Collin's Barracks (DU018-020306), along with the burial ground at the military recreation ground (DU018-020447), are situated c. 200m east of the proposed development.

11.3.4 Previous Archaeological Investigations in the vicinity of the site

Archaeological monitoring of ground investigation works took place within the proposed development site between March and May 2019 (discussed below in **section 11.3.7**.

Some investigations have been carried out in the environs of the site in the 1990s and 2000s (outlined below and shown on Figure 11.12), but none revealed any substantial findings that might illuminate the potential of the site.

Archaeological testing (Licence No. 98E0188; Halpin 1988) in advance of the development immediately west of the site (now the TII offices), did not reveal any features of archaeological significance. Post-medieval soils were identified, which lay directly on natural riverine silts and clays, and were probably the result of localised agricultural activity. There was also some evidence of reclamation from the river where introduced material was laid down.

Monitoring of drilling pits associated with the laying of a gas main from the junction of Infirmary Road/Parkgate Street along Conyngham Road (Licence No. 08E0483, Frazer 2008) did not reveal any archaeological features or remains.

Archaeological investigation to the north of the proposed development at 15/16 Parkgate Street (Licence No. 97E0217) revealed no archaeological features. The site lay upon a natural ridge overlooking the River Liffey and the assessment concluded that the terracing of the slope of the south-facing gravel ridge would have destroyed any pre-existing topsoil levels of archaeological potential. Remarkably, a small, naturally occurring cave was identified on the site in glacial gravel and sand deposits dating back to the last ice age (Corlett 1997). A second cavern, comprising a series of chambers, was found during the investigation in advance of an extension to the Aisling Hotel (Reid 1996); this cavern appeared to have been artificially enhanced for use.

Archaeological monitoring was carried out at the Criminal Courts Complex on the north side of Parkgate street (Licence No. 07E0488, Myles and McNerney 2007).

It followed a built heritage survey and documentary research into the above-ground structures, including a masonry wall along the Parliamentary Boundary, precinct walls of the Phoenix Park along Infirmary Road and Parkgate Street, Porter's Lodge, a Laundry Building, a drinking fountain, and the site of a chemical factory and a Research and Production Plant, which was in place from 1942–47. Whilst no archaeological features were identified, the possibility of the site having being a Viking 'longport' could not be discounted due to the significant truncation at subsoil level (this had been suggested on the basis of the course of the stream depicted on Rocque's map in relation to the Liffey and on the immediate topography).

The insertion of two 0.5m deep drainage trenches was archaeologically monitored at the rear of a house at 50 Montpelier Hill, a late eighteenth century building that may incorporate elements of an early eighteenth-century warehouse (Licence No. 02E1755; Simpson 2002). The excavation of the trenches revealed the remains of a brick surface or floor outside the house, at the south-east corner. This lay just beneath the existing concrete of the yard and presumably relates to a $3m^2$ square return which is depicted on the 1847 OS map.

Archaeological testing to the north of the site on 12 - 24 Montpelier Hill (Licence No. 95E0197; Murphy 1995) did not reveal any archaeological features; the only finds recovered were of eighteenth century date or later.

Figure 11.12: Archaeological investigations site locations (extracted from HeritageMaps.ie)

11.3.5 Site Visit

The site was inspected on 23rd May 2019, at which time the majority of the site was occupied by the existing offices and warehouse operated by Hickey & Co. Ltd.

The former arched entrance gateway to the Royal Phoenix Iron Works site survives, located on the east side of the present entrance gates. The survival of the dressed-stone entrance gateway provides a point of interest on Parkgate Street, adding historic character to an otherwise neglected boundary treatment along this side of the site (Figures 11.13 & 11.14). This late 19th century boundary wall contains decorative elements, but the grey paint covering the brickwork, with traces of old graffiti and patches of mismatched paints, does little to enhance its character (Figure 11.13). A blocked-up round-headed door in the eastern wing of the gateway once accessed a small former gate lodge or entrance building, which survives to the rear of the wing, inside the site. The now-derelict early 19th century house associated with the Iron Works is visible from the exterior of the site, standing to the southwest of the gateway (Figure 11.13).

Figure 11.13: View of early 19th century gateway and house, from Parkgate Street

Figure 11.14: View of northern boundary treatment along Parkgate Street, facing WNW

The interior of the site contains several buildings associated with the Iron Works and others associated with the later Kingsbridge Woollen Mills. The site itself has undergone changes of use, reconstruction and subdivision over the last two centuries. The derelict early 19th century house, for example, now stands isolated in the tarmac- and concrete-surfaced yard and car park. Its original setting included extensive landscaped gardens to the west and south west, and a row of terraced workers' cottages that extended westwards from it along Parkgate Street. The former Iron Works (and later mill) site had been divided in two by the 1940s. The western half of the site is now occupied by a modern office complex and a river-side apartment building, both of which overlook the site.

Figure 11.15: Gateway and former lodge/entrance building, facing north

Figure 11.16: Early 19th century house situated within yard/car park of site, facing north

The complex of buildings covering most of the site incorporates the large late 19th century warehouse, with the earlier former gate lodge/entrance building at its northwest corner and some low modern structures to the west and southwest. Two gabled industrial buildings and a square turret, which date to the late 19th century, stand at the southwest corner of the warehouse (Figures 11.17 & 11.18). They are mostly obscured from view inside the site, forming part of the river-side boundary, at the west end of the river wall. Although not contemporary with the earliest phases of industrial activity on the site, they are an integral part of its industrial heritage. Both the buildings and the boundary wall, with a rounded turret at its east end, are also an important aspect of the riverscape as viewed from Heuston Station and Sean Heuston Bridge. At present there is no relationship with the river from the interior of the site.

Figure 11.17: Late 19th century gabled buildings viewed from interior of site

Figure 11.18: Late 19th century gabled buildings, turret and river wall viewed from south side of the river, at Heuston Station

11.3.6 Archaeological monitoring of groundworks within the site

Archaeological monitoring of ground investigation (GI) works undertaken at the proposed development site was carried out by Courtney Deery Heritage Consultancy Ltd under Licence No. 19E0179, between March and May 2019. The full report as submitted to the National Monuments Service (Department of Culture, Heritage and the Gaeltacht) is contained in **Appendix 11.2** and a summary of the results is presented below.

The ground investigation works comprised of 18 no. window sample (WS) holes to a depth of 4mBGL, 7 no. bore holes and 2 no. cable percussive boreholes (BH) with rotary core follow on (scheduled depth 15mBGL). One slit trench (ST) was excavated along the footpath to the northeast of the site on Parkgate Street, and two test pits (TP) in the southwest corner of the site. These were excavated by hand and a mechanical auger and also by mini-digger fitted with a drill and grading bucket that alternated between toothed and toothless as appropriate.

Archaeological monitoring of the ground investigation works showed three main phases of deposition, buried beneath a meter of made-ground consisting of gravel and red-brick rubble which is sealed by a modern concrete slab.

The level of the original river and meadow (as depicted in the early cartographic sources) appears to be represented at c. 3.8 – 5m below the current ground levels. It was at these depths that deposits of riverine sands were encountered, as well as fragments of wood – possible root/branch material in BH102 – and a layer of peat in BH104, which would suggest that this level was either the original riverbank or the pre-reclamation river meadow ground surface.

Prior to the construction of the Iron works it appears that c. 2m of made-ground of brown clays was imported on to the site, in an effort at land reclamation or perhaps associated with agricultural improvements to the riverside meadow.

Cartographic sources from the 19th century onwards indicate a sequence of industrial installations on the site, commencing with the Royal Phoenix Iron Works. A spread of black rubble-rich material, which varies in depth across the site, appears to be associated with the final phase/shut down of the Iron Works (1880s) and represents the demolition material associated with the foundry. It is possible that demolition materials were spread across the site to infill structures and to level the site in preparation for the next phase of construction. A possible ground surface is evident at 1.5m below the current ground level. Possible walls and sub-surface structures were visible within WS116.

The presence of slag in the industrial soils was concentrated in the south-western part of the site. This corresponds with an area of enclosed yards outside of the main Iron Works building, with the landscaped gardens to the west and north (as shown on the 1847 OS map, Figure 11.6). It may indicate that slag – a waste product of iron smelting – was being dumped in this area after being cleared from the furnaces.

The nature of the quay wall was investigated in TP101 (to a depth of 3.80m), in the southwestern corner of the site, where four phases of construction were visible. The upstanding breeze-block wall had concrete foundation supports which extended 1.80m north of the wall. Incorporated into the foundations and the backfill were two large cut-granite blocks, one of which had two mortise holes and two perforations. It is possible that these were associated with the jetty or pier, the wooden elements of which are visible on the river side of the wall.

They were probably in use when the site was an ammunitions factory in the early 20th century. Ten courses of a red-brick wall survive beneath the breeze-block wall. This was set into a rubble and lime mortar foundation, lying directly on top of the remains of the original limestone quay wall.

The results of monitoring the ground investigation works appear to indicate foundations, possible wall and floor levels associated with the iron-working phase, and later phases on site (early 1800s onwards). In order to understand and ascertain the extent and nature of these industrial archaeological remains and potentially earlier deposits, it will be necessary to conduct further archaeological investigations once the site has been vacated and cleared.

In summary, the overview profile within the site is as follows (notwithstanding the localised variations to this):

- 0.0m - 0.80m Overburden
- 0.8m - 1.5m Evidence of iron works
- 1.5m - 3.8m Reclamation/agricultural soils
- 3.8m - 5.0mRiverine deposits/pre-reclamation river meadow deposits

11.3.7 Summary of Archaeological Potential

The subject site lies within the designated zone of archaeological potential for the RMP historic city of Dublin DU018-020. The historical background of the surrounding area suggests that while there is a rich history of occupation since at least the Early Christian period, the site itself survived as open pasture until the 19th century; it was shown on Rocque's map of 1756 as 'Long Meadows', sloping southwards towards the River Liffey. There are no specific recorded archaeological sites (RMP/SMR sites) within the boundary of the site or in its immediate vicinity.

The existence of ecclesiastical foundations in the Kilmainham area and the presence of fording points in the vicinity of Parkgate Street, suggest the possibility of activity north of the River Liffey during the early medieval period, though there is as yet no archaeological evidence of such (archaeological investigations in advance of development in adjacent and nearby sites have not identified any archaeological features). The retrieval of numerous finds from the Viking Period at King's Ford Islandbridge and in Phoenix Park points to an interaction between both banks of the Liffey during the Viking settlement. Indeed, Ó Floinn (1998, 137) makes the suggestion that "*grave fields are strung out on both sides of the Liffey, some of which were located on the sites of earlier pre-historic or Early Christian cemeteries, and which, for the most part, are located close to water*".

An examination of documentary sources and historical maps for the area indicates that there were several phases of development at the subject site from the late eighteenth century onwards (e.g. the Phoenix Iron Works in the early 1800s, followed by Kingsbridge Woollen Factory and the Parkgate Printing Works). This development first involved the reclamation of the meadow with the introduction of at least 2-5m of fill across the floodplain and the building of a boundary wall to the river. This would suggest that deep beneath the existing ground level and the reclamation deposits, the original ground surface may be relatively intact, with little disturbance occurring.

The evolution of the site from open meadow in the 18th century to the use of the site for industrial purposes from the early 19th century onwards was confirmed by the recent archaeological monitoring of GI works (Licence No. 19E0179). The monitoring confirmed the presence of riverine deposits and pre-reclamation river meadow deposits at 3.8m - 5m. It indicated the survival sub-surface of foundations and possible wall and floor levels associated with the iron-working and later industrial activities on the site. It also revealed evidence of the iron-working (slag deposits) and the foundation remains of the original quay wall. Industrial activity relating to the 19th century iron works occurs at a depth of 0.8m - 1.5m beneath the present ground level.

11.3.8 Industrial and Cultural Heritage

The site as a whole is listed in the Dublin City Industrial Heritage Record (DCIHR) and is recorded as forming a significant component within the city's industrial heritage.

In addition, the site is also important in the cultural landscape of this part of the city, as buildings and the activities within them, both past and present, are culturally meaningful and contribute to the cultural heritage of an area.

The DCIHR record is extracted below. As noted in the record description, the original iron works was rebuilt in the late 19th century. This phase of rebuilding related to the establishment of a woollen mill on the site and it appears that much of the early 19th century iron works was demolished to make way for the new enterprise (see **Sections 11.3.2, 11.3.7**, and **Chapter 12**, Architectural Heritage). Although the appraisal in the entry states that the early structures of the site are largely intact, this is contradicted by the most recent architectural heritage survey, see **Chapter 12**, Architectural Heritage). It has identified that the majority of the standing buildings date to the late 1880s, including the river wall; the only elements that survive of the Iron Works are the gated entrance, house (known as Parkgate House), round turret and the walls of a flat-roofed structure on the west side of the warehouse.

Reference	DCIHR 18 10021
Site function	Iron Works
Location	Parkgate Street
Name	Parkgate Printing works {Royal Phoenix Iron Works}
Description	
Former Royal Phoenix Ironworks originally built c.1800, rebuilt c.1880 and converted to printing works c.1920. Site now functioning as commercial premises. Site comprises variety of single-storey double-height brick buildings to southwest corner having differing roof profiles with some lit by rooflights and having brick corbelled chimneystacks and Flemish bonded brick walls. Two-storey smooth-rendered building adjoining to northwest with hipped slate roof and curved southwest corner containing large opening now functioning as window. Square-headed window openings with painted stone sills and replacement timber windows; tripartite window to ground floor west elevation; flat-roofed extension links buildings to main structures. Two-storey random coursed stone structures to southwest of site having pitched slate roofs, cast-iron rainwater goods and roof vents, dressed limestone quoins and segmental-headed window openings with brick block-and-start surrounds and replacement windows. Site bounded to north by painted Flemish bond brick wall with denticulated recessed panels and stone quoins; bounded to riverside (south) by random rubble stone wall having ashlar limestone turret with cornice to east and square tower with cut limestone quoins, pyramidal slate roof and segmental-headed openings with brick surrounds to west. Ashlar limestone entrance to northwest surmounted by cornice and stepped parapet and having round-arched gateway with dressed limestone voussoirs to north and concrete to arch to south; round-headed blocked openings to east of gateway formally giving access to interior or northwest building.	
Appraisal	
The Royal Phoenix Ironworks, also known as Robinsons Ironworks, appear to have been a substantial operation on the north bank of the Liffey and have left notable legacies on the riverscape with the parapet on Sarah Bridge (1816) and Sean Heuston Bridge (1827-28) both cast there. Of particular note is the site's solid riverside boundary wall with associated turret and tower which belie the buildings original function, though it was used in World War 1 as a bomb-making factory. With its brick northern boundary wall, ashlar entrance and largely intact early structures, the site forms an important component within the city's industrial heritage.	

11.4 Likely Significant Effects

In accordance with EPA guidelines, the context, character, significance and sensitivity of each heritage asset, was evaluated. The significance of the impact is then determined by consideration of the significance of the asset and the predicted magnitude of impact. A glossary of impacts as defined by the EPA is provided in **Appendix 11.1**.

11.4.1 Assessment of effects during the 'Do-Nothing' Situation

In the 'Do-Nothing' Situation the proposed site would not be redeveloped and therefore there would be no adverse impacts to any of the known or as yet undiscovered subsurface archaeological deposits, features or finds, and no adverse impacts on cultural heritage.

With regard to the surviving above-ground structures associated with the industrial heritage on the site and the setting of the historic buildings/monuments in the surrounding urban landscape, these are assessed in terms of the 'Do-Nothing' Situation in **Chapter 12**, Architectural Heritage and in **Chapter 13**, Landscape and Visual Impact.

11.4.2 Assessment of effects during construction

11.4.2.1 Direct effects on archaeological and cultural heritage

There will be no direct effects on any recorded archaeological sites. The subject site lies within the designated zone of archaeological potential for the historic city of Dublin RMP DU018-020, however, there are no specific recorded sites (RMP/SMR sites) within the boundary of the site or in its immediate vicinity.

With regard to cultural heritage, the site, its boundaries, and the buildings contained within it, are recorded in the Dublin City Industrial Heritage Survey as an important component within the city's industrial heritage. The present structures on the site largely date from the late 19th century, with several from the early 19th century, as well as some modern structures. Four of the buildings are protected structures – the river wall, round turret, square tower, and arched entrance gateway – while the early 19th century house (Parkgate House) is listed in the NIAH (these and other above-ground structures on the site are assessed in **Chapter 12**, Architectural Heritage). Parkgate House will be demolished, however, all of the protected structures will be retained, restored and adapted, in addition to which, it is also proposed to retain the larger of the two gabled industrial buildings on the river front for use as the residents gym and part of the smaller gabled building. All other structures are proposed for demolition, though it is proposed to retain some of the large cast iron structural elements from the warehouse for use in the new development. The development proposal will include works to the river wall, enlarging some openings in the wall and creating new ones, including one very large opening, to provide open views onto the River and towards Heuston Station from a new public plaza within the proposed scheme.

The removal of some of the existing heritage buildings and features, and the addition of new buildings and functions, will have a slight negative effect on the cultural heritage of the site. However, the majority of the architecturally or industrially significant buildings will be retained, restored and integrated into the new development (a best practice approach). In addition, the site itself will be partly opened up to the public and will receive new legibility in terms of the relationship of the historic structures with Parkgate Street and the river, their original context. This is considered an overall slight positive permanent effect on an otherwise hidden but historic site.

The results of the GI works monitoring appear to indicate the survival sub-surface of foundations and possible wall and floor levels associated with the iron-working and later industrial activities on the site (early 1800s onwards). It also revealed evidence of the iron-working (slag deposits) and the foundation remains of the original quay wall. These features would be directly affected by the proposed development. This would constitute a moderate negative permanent effect on the archaeological remains of 19th century industry on the site.

11.4.2.2 Potential effects on archaeological heritage

The archaeological monitoring of GI works on the site confirmed the presence of some riverine and pre-reclamation river meadow deposits at 3.8m-5m deep. This would suggest that beneath the existing ground level and the reclamation deposits, the original ground surface may be relatively intact, with little disturbance occurring. There is the potential that previously unknown archaeological sites, features or deposits may survive at this pre-reclamation level, giving rise to a potentially moderate/significant negative effect.

11.4.2.3 Indirect Effects

No indirect effects have been identified in relation to archaeology.

There are no indirect negative effects on cultural heritage. However, an indirect slight positive permanent effect will be the retention of much of the historic fabric and the partial opening up of the site to the public, retaining its relationship to the broader cultural heritage context and its industrial past, e.g. the interrelationship between the site and Sean Heuston Bridge, Heuston Station, Parkgate Street, and the river.

The surviving above-ground structures associated with the industrial heritage on the site are assessed in **Chapter 12**, Architectural Heritage. The setting of the historic buildings/monuments in the surrounding urban landscape are assessed in **Chapter 12**, Architectural Heritage and in **Chapter 13**, Landscape and Visual Impact.

11.4.2.4 Cumulative

The list of other developments contained in **Chapter 21** has been reviewed and no cumulative effects have been identified in relation to archaeology and cultural heritage.

11.4.3 Assessment of effects during operation

All archaeological issues will be resolved during the pre-construction and construction phase, therefore no effects on archaeology will occur during operation.

11.4.3.1 Indirect Effects

No indirect effects have been identified in relation to archaeology during operation.

As cultural heritage elements will have been restored and integrated into the new development, there will be no additional indirect effects on cultural heritage during the operational phase.

The surviving above-ground structures associated with the industrial heritage on the site and the setting of the historic buildings/monuments in the surrounding urban landscape are assessed for any indirect effects in **Chapter 12**, Architectural Heritage and in **Chapter 13**, Landscape and Visual Impact.

11.4.3.2 Cumulative

The list of other developments contained in **Chapter 21** has been reviewed and no cumulative effects have been identified in relation to archaeology and cultural heritage. The surviving above-ground structures associated with the industrial heritage on the site and the setting of the historic buildings/monuments in the surrounding urban landscape are assessed for any cumulative effects in **Chapter 12**, Architectural Heritage and in **Chapter 13**, Landscape and Visual Impact.

11.5 Mitigation Measures and Monitoring

11.5.1 Mitigation

The history of the site is significant for the cultural heritage of the immediate area and of Dublin City in general and this is recognised in the Dublin City Industrial Heritage Record. It is important that the changes to the cultural landscape as a result of the proposed development do not erase this history. The historic industrial fabric on the site is a tangible and integral part of this history, but one that is not well understood by, or visible to, the public. The site has not been publicly accessible and its history and importance are little known, both to the local community and to Dubliners in general. As the proposed development will include public open spaces, this offers an opportunity for the proposed development to remedy this and to make a cultural contribution to the area. The provision of information panels, placed in the communal lobby or public square of the development, could assist in the recognition and preservation of the history of the site. These could incorporate both the story of the industrial heritage of the site – providing context for the historic elements that will be retained – as well as the results of any new archaeological findings that may emerge from the archaeological testing and resolution on the site.

Archaeological test excavation is required in order to understand the nature, extent and significance of the below-ground deposits within the site. The testing will commence in January 2020 after the site has been vacated. The licence application and method statement have been submitted to and approved by the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht (DCHG) (Licence No. 19E0781).

Archaeological excavation in an urban environment, however, is challenging. This is especially so where there are existing buildings on site and when deposits have been identified up to 2m deep (as this creates a lot of spoil within a confined space). Therefore, it is critical that a phased approach to the archaeological investigation and mitigation takes place in consultation with the City Archaeologist and the National Monuments Service of the DCHG and that this is placed within the demolition and construction programme for the site. Subject to the approval of the National Monuments Service of the DCHG, this approach will inform the extent and the timing of the archaeological investigation required on site.

Following a meeting with the City Archaeologist (**Section 11.2.5**), the following test excavation strategy was devised:

- The programme of archaeological works will commence in advance of the main construction stage, at the site clearance/ground reduction/demolition stage;
- It is proposed to open trenches/pits in order to establish the presence of below-ground archaeological features and to determine the nature and extent of archaeological material;
- The test pits will be strategically placed and will concentrate on areas that are proposed for deep excavation, the location of former structures associated with the Iron Works, and where the GI monitoring revealed interesting stratigraphy;
- It is anticipated that six test pits will be opened across the site depending on access and environmental constraints (Figure 11.19 shows indicative locations). Throughout the years the site was used for industrial purposes (including an Iron Works, Woollen Factory and Printing Works) and as a consequence the made-ground across the site contains contaminants. This has implications for the location of archaeological test trenches within the site;
- If archaeological features are revealed, it is anticipated that resolution will be affected through consultation with the City Archaeologist and the National Monuments Service (NMS) of the Department of Culture, Heritage and the Gaeltacht (DCHG);
- Consultation will take place with the NMS and City Archaeologist throughout the test excavation process and the findings will be confirmed to the authorities by means of a licenced report.

The testing will be carried out by a fully qualified archaeologist under licence to the National Monuments Service (DCHG).

National Monuments Legislation (1930 – 2004) states that in the event of the discovery of archaeological finds or remains, the National Museum of Ireland should be notified immediately. Provision must be made to allow for, and fund any, archaeological work that may be needed if any remains should be noted during ground preparation works or during construction. As described above, if features are revealed, the area will need to be investigated, allowing no further development to take place until the site is fully identified, recorded and excavated or, alternatively, avoided.

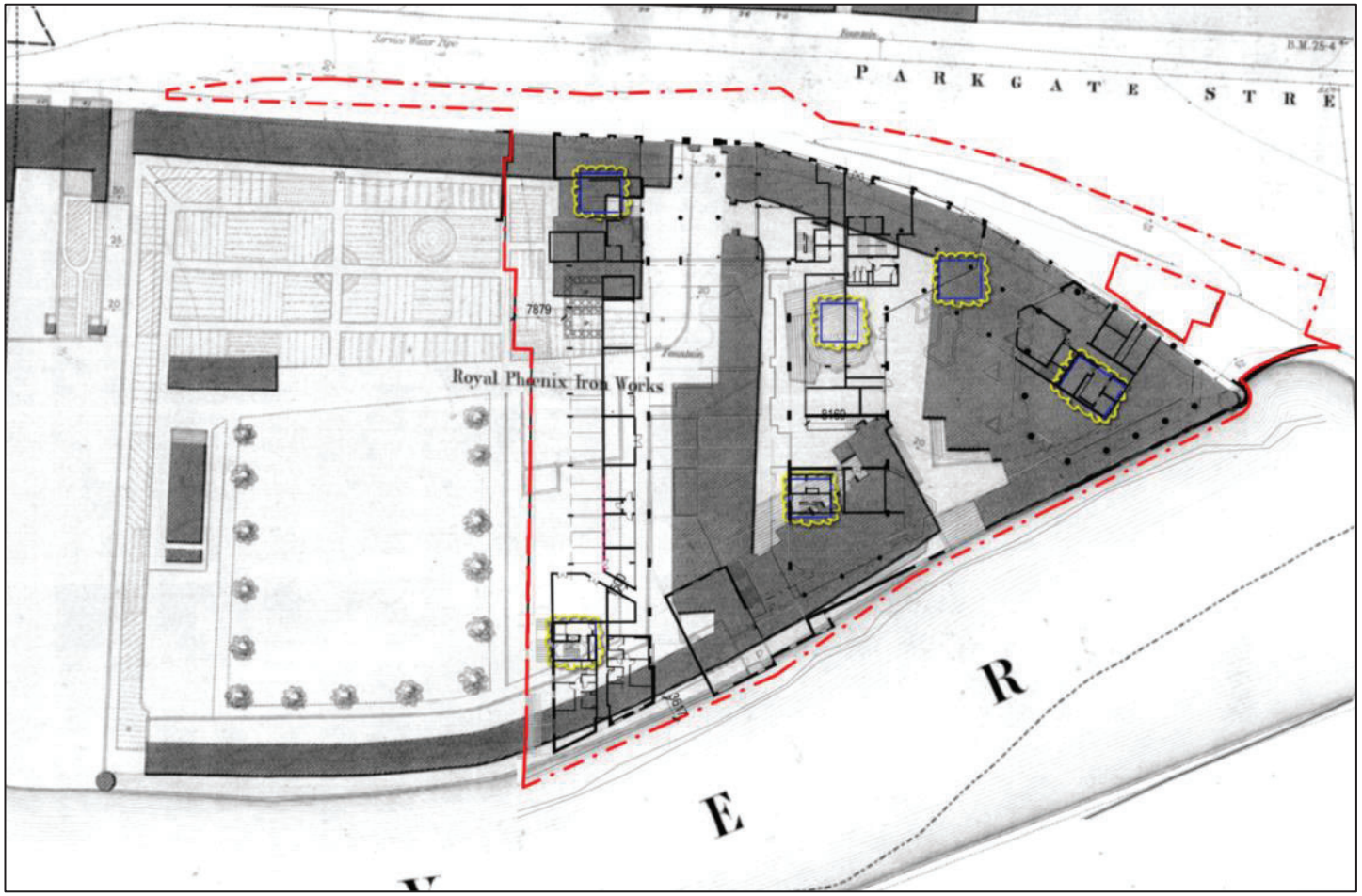

Figure 11.19: Indicative locations of archaeological test trenches within the proposed development layout, overlaid on to OS 1847 5-foot plan showing Royal Phoenix Iron Works

11.5.1.1 Mitigation During Construction

All archaeological and cultural heritage issues will be resolved during the pre-construction phase, or in advance of the main construction stage, during the site clearance/ground reduction/demolition stage (as outlined above in **Section 11.5.1**).

11.5.1.2 Mitigation During Operation

All archaeological and cultural heritage issues will be resolved during the pre-construction and construction phase.

11.6 Residual Effects

No residual effects were identified during the course of the assessment on archaeology. Should any archaeological remains be uncovered, they will be fully resolved prior to the main construction stage, either through preservation *in situ* or preservation by record (as detailed in **Section 11.5.1**). The provision of information panels will result in a slight positive residual effect on cultural heritage. Cumulative effects have also been considered.

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www.downsurvey.tcd.ie

www.excavations.ie

www.gsi.ie

www.logainm.ie

www.heritagemaps.ie

www.osi.ie

https://www.gracesguide.co.uk/Royal_Phoenix_Iron_Works

12 Architectural Heritage

12.1 Introduction

This section describes the likely significant effects on architectural heritage of a proposed development on former industrial lands at Parkgate Street, Dublin. These lands are currently occupied by the Hickey Home Focus fabric company.

A detailed description of the proposed development is provided in **Chapter 3,** Description of the Proposed Development and **Chapter 4,** Construction Strategy.

This Chapter has been prepared by W.H. Hastings of ARC Architectural Consultants Ltd. Refer to **Appendix 1.1** for details on relevant qualifications and experience. A stand-alone Architectural Heritage Impact Assessment by the same author is included in the documents lodged with the planning application.

12.2 Assessment Methodology

12.2.1 General

A desktop study of the *Dublin City Development Plan 2016-2022* and of the Record of Protected Structures, as set out therein, and the National Inventory of Architectural Heritage was carried out to identify structures and places of architectural heritage value in the vicinity of the proposed development and policies relating to the protection of Dublin's historic environment. ARC carried out considerable research of relevant books, historic documents and historic mapping as part of this assessment. In addition, a series of site visits was carried out to determine the likely impact of the proposed development on architectural heritage. This assessment was prepared with reference to the Department of Arts, Heritage and the Gaeltacht's Architectural Heritage Protection Guidelines for Planning Authorities.

12.2.2 Guidance and Legislation

This chapter has been prepared with due regard to the overarching EIA guidance as outlined in **Section 1.9.3**.

Chapter 11: Built Heritage and Culture of the *Dublin City Development Plan 2016-2022* sets out the Planning Authority's policies with regard to architectural heritage. Policy CHC1 provides that it is a policy of the Planning Authority *"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 CHC4 provides:

> *"It is the policy of Dublin City Council to protect the special interest and character of all Dublin's Conservation Areas. Development within or affecting*

a conservation area must contribute positively to its character and distinctiveness, and take opportunities to protect and enhance the character and appearance of the area and its setting, 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, shop-fronts, 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.*

Changes of use will be acceptable where, in compliance with the zoning objective, they make a positive contribution to the character, function and appearance of Conservation Areas and their settings. The Council will consider the contribution of existing uses to the special interest of an area when assessing change of use applications and will promote compatible uses which ensure future long-term viability."

The Development Plan acknowledges, under Section 11.1.5.8, that there may be circumstances under which the demolition of a protected structure must take place as follows: *"The City Council accepts that in some circumstances the loss of a heritage structure (protected structure or non-protected structure of merit) may be the only option and this may be permitted where it will secure substantial public benefit or where there is no other viable option. Decisions on the acceptability of demolition will be reached having regard to the significance of the structure and the guidance as set out in the Guidelines for Planning Authorities on Architectural Heritage Protection published by the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs (2011)."*

The *Architectural Heritage Protection Guidelines for Planning Authorities* (2011) set out comprehensive advice in relation to conservation and the management of the historic built environment. However, the Guidelines clearly advocate a balanced approach. For example, while the Guidelines state *"historic structures are a unique resource. Once lost, they cannot be replaced.*

If their special qualities are degraded, these can rarely be recaptured." (Section 7.2.1), the Guidelines also clarify that *"entry into the Record of Protected Structures does not mean that a structure is forever frozen in time. Good conservation practice allows a structure to evolve and adapt to meet changing needs while retaining its particular significance."* (Section 7.2.2).

The Guidelines advocate strongly for ensuring that heritage buildings are kept in active use as a mechanism for ensuring conservation of buildings of architectural heritage value, as set out at Section 7.3:

> *"It is generally recognised that the best method of conserving a historic building is to keep it in active use. Where a structure is of great rarity or quality, every effort should be made to find a solution which will allow it to be adapted to a new use without unacceptable damage to its character and special interest. Usually the original use for which a structure was built will be the most appropriate, and to maintain that use will involve the least disruption to its character. While a degree of compromise will be required in adapting a protected structure to meet the requirements of modern living, it is important that the special interest of the structure is not unnecessarily affected. Where a change of use is approved, every effort should be made to minimise change to, and loss of, significant fabric and the special interest of the structure should not be compromised."*

Section 7.7 is relevant to the subject application as it promotes minimum intervention with buildings of architectural heritage value:

> *"7.7.2 In granting planning permission, a planning authority should be satisfied that works are necessary, whether these be repair works to the fabric of the building or adaptations to the structure to allow it to perform a new or enhanced function. Over-restoration of historic buildings can be detrimental to their character and value. Old buildings both charm and inform for the very reason that they are old. Bulging or leaning walls, unevenness and bowing are not necessarily imperfections to be ironed out but are evidence of the building's antiquity. Such evidence of a patina of age is irreplaceable and should be preserved where possible with appropriate professional advice.*
>
> *7.8.2 In order to appreciate the integrity of a structure, it is important to respect the contribution of different stages of its historical development. Concentration on whether or not various parts of a building are 'original' can obscure the fact that later alterations and additions may also contribute to the special interest of the structure. Of course there may be alterations or additions which have not contributed to the special interest of the building, and which may in fact have damaged it.*
>
> *7.9.2 Many historic structures date from a time when the majority of building materials were wrought by hand. These materials have a variety and vitality that cannot be matched by machine-made materials.*

Tooling and chisel marks on stonework, undulations in blown-glass panes, and adze marks on timber elements supply a wealth of irreplaceable information about the people and the times that produced these structures. Also, through time, a structure and its components acquire a patina of age that cannot be replicated. The unnecessary replacement of historic fabric, no matter how carefully the work is carried out, will have an adverse effect on the character of a building or monument, seriously diminish its authenticity and will significantly reduce its value as a source of historical information. Replacing original or earlier elements of a building with modern replicas only serves to falsify the historical evidence of the building."

Section 8.3 relates to the repointing of stonework

"8.3.15 Repointing has the potential to cause physical damage to the fabric of the building, radically alter its appearance and substantially detract from its character and quality. A proposal to repoint stonework of a protected structure, which would materially alter its character, requires planning permission; and, where permitted, the work should be carried out by experienced people and under the direction of a specialist with a working knowledge and experience of historic buildings.

8.3.16 Repointing should be considered a repair which replaces lost or damaged fabric with that of a compatible and appropriate mix (or series of mixes), material and appearance, providing always that the existing pointing is not inappropriate or damaging to the stonework. Comprehensive repointing of a structure is rarely necessary, unless the existing pointing has deteriorated and is causing damage to the stonework or other fabric. It should be a condition that sound old pointing is left undisturbed as it is an essential part of the fabric and character of a historic building or structure and should not be removed unnecessarily."

and Section 13.1 regarding determining the curtilage of a protected structure:

"13.1.1 By definition, a protected structure includes the land lying within the curtilage of the protected structure and other structures within that curtilage and their interiors. The notion of curtilage is not defined by legislation, but for the purposes of these guidelines it can be taken to be the parcel of land immediately associated with that structure and which is (or was) in use for the purposes of the structure. It should be noted that the meaning of 'curtilage' is influenced by other legal considerations besides protection of the architectural heritage and may be revised in accordance with emerging case law…

13.1.3 It should be noted that the definition of curtilage does not work in reverse – a stable building may be within the curtilage of the main house which it was built to serve but the main house cannot be described as being within the curtilage of the stable building.

It should also be noted where a protected structure is an element of a structure, it may, or may not, have a curtilage depending on the degree to which is could in its own right be considered to be a structure. For example, a re-used doorway affixed to a later structure could not be said to have a curtilage."

12.2.3 Study Area

The assessment of the potential for effects on architectural heritage arising from the existence of the development examined the River Liffey Corridor from Dublin Port to west of Island Bridge, the Phoenix Park and the lands of the Royal Hospital Kilmainham, and areas of Dublin City north, east and south of the subject site up to a distance of 1 kilometre from the site.

12.2.4 Site Visits

A survey of the potential visibility of the proposed development was carried out by ARC on several dates in the summer and autumn of 2018. The area was revisited on a number of dates in 2019.

12.2.5 Consultation

Since the summer of 2018, there has been continuous consultation between ARC, the design team and the planning consultants in relation to the architectural heritage significance of structures on the application site and the potential effects of development on those structures. This process informed both the assessment of effects on architectural heritage and design of the proposed development.

As part of the Strategic Housing Development process, there has been a series of meetings with the Planning Authority and with An Bord Pleanála. ARC has attended a number of meetings with Dublin City Council, attended by the Planning and Conservation Departments. The first of these meetings was in October 2018 and the most recent on the 18th of November 2019. In addition to meetings attended by ARC, there have been numerous meetings between the Planning Authority and the design team and planning consultants. ARC has been kept informed on the content of and outcomes from these meetings.

Again as part of the Strategic Housing Development process material has been provided to An Bord Pleanála and there was a meeting with the Board, attended by the development team and the Planning Authority on the 18th of September 2019. ARC also attended this meeting. Subsequent to the meeting the Board issued a Pre-Application Consultation Opinion, and ARC's assessment has had regard to this opinion.

12.2.6 Categorisation of the Baseline Environment

In categorising the baseline environment, ARC sought first to identify structures and features of known architectural heritage merit with reference to the Dublin City Council Record of Protected Structures and to the National Inventory of Architectural Heritage.

ARC carried out a desktop review of relevant sources on the development of the area and conducted comparative assessment of relevant historic mapping and present day Ordnance Survey mapping in order to identify whether any other structures of architectural heritage value (i.e. structures not listed as protected structures or referenced in the NIAH) may be located on the site or in the vicinity of the application. ARC then undertook on-site assessment of the structures on the application site (internal and external) and surrounding the application site (external only) to inform the categorisation of the architectural heritage importance of the baseline environment.

12.2.7 Impact Assessment Methodology

Section 51(1) of the *Planning and Development Act 2000* (as amended) states:

> *For the purpose of protecting structures, or parts of structures, which form part of the architectural heritage and which are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest, every development plan shall include a record of protected structures, and shall include in that record every structure which is, in the opinion of the planning authority, of such interest within its functional area.*

Therefore, the Act defines architectural heritage as connected to architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. It is for each Planning Authority to decide if a structure is of sufficient special interest with regard to any or all of these eight indicators to warrant that structure being entered in the Record of Protected Structures. Structures that are not Protected Structures may still be of heritage value because they are considered as having some level of interest under one or more of the eight indicators. It follows, therefore, that the extent of impact or effect on the architectural heritage of a structure will be measured by extent to which its heritage interest is altered or removed. The effect can be positive if the heritage interest is enhanced or negative if the heritage interest is diminished.

The assessment effects on Architectural Heritage had regard to the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* prepared by the Environmental Protection Agency (Draft of 2017), and to Directive 2011/92/EU (as amended by Directive 2014/52/EU) on the assessment of the likely effects of certain public and private projects on the environment.

The list of definitions given below is taken from *Table 3.3: Descriptions of Effects* contained in the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* prepared by the Environmental Protection Agency. Some comment is also given below on what these definitions might imply in the case of architectural heritage. The definitions from the EPA document are in italics.

- *Imperceptible: An effect capable of measurement but without significant consequences.* The definition implies that there would be minor change to an aspect of the heritage interest of a structure, but not one that would be readily noticeable to the casual observer; and not a change that would materially alter the overall heritage interest of the structure or its surroundings.

- *Not Significant: An effect which causes noticeable[2] changes in the character of the environment but without significant consequences* (the footnote '*2'* to the word *'noticeable'* is: *'for the purposes of planning consent procedures'*). The definition implies that there would be changes to aspects of the heritage interest of a structure capable of being noticed by an observer who is actively assessing the effects of changes to the heritage interest of a structure for the purposes of planning consent, and, although there may be changes to aspects of the heritage interest of a structure, these changes would not be considered material with reference to planning consent.
- *Slight: An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.* The definition implies that there would be changes to aspects of the heritage interest of a structure or part of that structure. However, apart from such changes, the overall heritage interest of the structure, and/or its contribution to its surroundings, would remain substantially intact.
- *Moderate: An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.* In this case, there would be material changes to the heritage interest of a structure or part of that structure. These changes must be consistent with a pattern of change that is already occurring, is considered acceptable, and is envisaged by policy.
- *Significant: An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.* The definition implies that there would be material changes to aspects the heritage interest of a structure or part of that structure and that these changes would not be consistent with an acceptable pattern of change that is already occurring, nor are envisaged by policy.
- *Very Significant: An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.* The definition implies that the heritage interest of a structure would be changed to a considerable degree and these changes would not be consistent with an acceptable pattern of change that is already occurring or envisaged by policy. For example, a "very significant" effect would occur where the heritage interest of a structure or structures would be substantially removed as a result of a proposed development, though parts of the structure might remain intact.
- *Profound: An effect which obliterates sensitive characteristics.* The definition implies that a development would result in the loss of the heritage structure, or all of its heritage significance.

The above *Descriptions of Effects* relate to effects on Architectural Heritage. This assessment relates solely to effects on Architectural Heritage, and does not concern itself with other effects, beneficial or adverse.

The extent of effects on the architectural heritage of the surrounding area resulting from the complete loss of a structure of heritage interest will depend on the importance of the structure.

The removal of a heritage structure might result in a whole range of potentially significant beneficial effects in terms of planning gain and sustainable development; but these are not of themselves positive effects on architectural heritage and are not evaluated as part of the assessment of effects on architectural heritage.

It is noted that there are a number of scenarios in which substantial alteration to heritage structures is supported by heritage policy. Giving a heritage building a new and sustainable use would be one such situation. In such circumstances the degree of intervention in the heritage structure must be only the minimum necessary to provide for the new use. Unnecessary interventions would have to be assessed as resulting in negative effects on architectural heritage.

12.3 Baseline Conditions

The site of the proposed development, currently occupied by the Hickeys fabric company, is at the eastern end of a strip of land along the north bank of the River Liffey sloping down from Conyngham Road and Parkgate Street and the River. This strip of land is referred to on Rocque's Map of 1773 and on other maps of the late 18th and early 19th centuries, as the Long Meadows. The first buildings on the Long Meadows appear to have been the buildings of the Phoenix Ironworks, founded by Richard Robinson in 1808. The Hickeys site occupies the eastern half of the lands of the former ironworks. The entry for Richard Robinson in the Dictionary of Irish Architects is as follows:

> *Engineer and ironfounder of the Phoenix Iron Works, Parkgate Street. Richard Robinson, a native of Hull, settled in Dublin in 1800. His Phoenix foundry was responsible for casting King's Bridge, designed by GEORGE PAPWORTH to commemorate the visit of George IV to Dublin in 1823. The foundry acquired the designation 'Royal' in this year. Robinson died in 1848 and is buried in St Michan's Church of Ireland church. By 1844 he had been succeeded in the business by William Robinson who carried on until 1858 or later. By 1863 the foundry had been taken over by Edward Toomey.*

Edward Toomey ran the Royal Phoenix Ironworks until his death in the late 1870s.

The entry in Thoms Directory for the Royal Phoenix Ironworks for 1880 shows that it was vacant at that date. There was a long advertisement for the sale of the Ironworks in the Freemans Journal of the 24th of January 1880, part of which is as follows:

> *CITY OF DUBLIN.TRUSTEES' SALE OF EXTENSIVE PREMISES, PLANT, STOCK. &c. IMPORTANT TO IRON FOUNDERS, ENGINEERS, DISTILLERS,*
>
> *C. JAMES CONNOLLY and SON have been instructed by the Trustees of the late Edward Toomey.*
>
> *TO DISPOSE OF BY PUBLIC AUCTION, On the Premises, on WEDNESDAY, 4th February, 1880, Their Interest in all that and those the extensive concerns known as the Royal Phoenix Iron Works, adjoining the King's-bridge at Parkgate-street, and close to the terminus of the Great Southern and Western*

Railway, together with the superior Dwellinghouse, Out- offices, Pleasure Grounds, Gardens, &c., the entire containing 3a 6r 38p statute measure, with a handsome entrance from Parkgate-street, the river Anna Liffey being its boundary in the south. There are also eight two-storied Cottages for workmen, with foundry workshops, forge, &c. where a considerable trade was successfully carried on for many years; there being also a great facility of water carriage up and down the river Liffey for the export and import of heavy articles connected with the trade.

This advertisement, together with the evidence of early Ordnance maps indicates what structures were on the site prior to 1880. The First Edition Ordnance map of 1837, though at the small scale of 6 inches to the mile indicates that the house near the north west corner of the present site was there in 1837, as was the gateway from Parkgate Street. The larger scale 1847 Ordnance map tends to confirm this. The round turret at the eastern point of the site is shown on both maps. A second turret, some distance west of the present site and now gone, is also shown. The building directly abutting the river is shown as much smaller than the present building, otherwise buildings of the Royal Phoenix Ironworks are set back from the river. The present high stone wall to the river can only in part date from the time of the Royal Phoenix Ironworks, and the pattern of the stonework on the present wall shows that it has been altered many times.

The entry on Thoms Directory for 1882 is: *Royal Phoenix Ironworks*., with a rateable valuation of £10 and on a second line: *The Kingsbridge Woollen Works*. This is the last mention of the Phoenix Ironworks. In Thoms Directory the name of the business operating at the address continues to be *The Kingsbridge Woollen Works* until 1888. From 1885 to 1888 the name is: *Guinness, Edward C, Cloth Manufacturer*. In 1885 he is plain *Guinness, Edward C,* in 1888 *Guinness, Sir Edward C, Bart.*

In Thoms Directory the valuation for the Royal Phoenix Ironworks falls from £130 in 1870 and 1880 to just £10 in 1882. By 1886, under the direction of Edward C. Guinness, the valuation had risen to £405. The evidence from Thom's Directory, taken together with the evidence of Ordnance mapping and other historical evidence, strongly indicates that the present main warehouse on the site and the two gabled buildings to the south west of it were built between 1882 and 1886 under the direction of Edward C. Guinness for the Kingsbridge Woollen Works.

Evidence from Ordnance mapping indicates that most of the buildings and structures that formed part of the Royal Phoenix Ironworks were demolished and replaced between 1864 and 1889. On the 1889 Ordnance map the layout of the buildings on the Hickeys site is shown to be largely similar to the present layout. The disposition of the buildings of the Royal Phoenix Ironworks was quite different. On the 1889 map the extensive new eastern building is shown with a northlight roof.

Edward Cecil Guinness, later to become the 1st Earl of Iveagh, had been the sole owner of the Guinness Brewery since 1876. In 1881 he bought the premises of the Royal Phoenix Ironworks and established the Kingsbridge Woollen Works in order to provide employment for young girls, which was scarce in Dublin at the time.

He spent some £50,000 on constructing the new works, an enormous sum. The Kingsbridge Woollen Works employed around 150 women; but the experiment failed, with the Woollen Works losing between £3,000 and £4,000 per year.

For the year 1889, the entry in Thoms Directory is as follows:

> *The Kingsbridge Mills, Clayton F. & J. and Co (Limited), Woollen Worsted Manufacturers, and Navan, £405 Kingsbridge House, Fred Clayton M.D. M.A. F.S.A. Ph.D. Woollen Manufacturer.*

The firm of F & J Clayton and Co, owned by Frederick and John Clayton was established in Navan in 1837. In 1867 they took over a large mill at Millbrook on the river Blackwater just outside Navan. The Clayton family had been running mills at Horton in Yorkshire for the previous 200 years. Clayton's Woollen Mills at Navan was a very large concern. It continued in business until the 1960s.

Claytons only operated the woollen mills at Parkgate Street for a relatively short period. Thoms Directory for 1900 refers to the premises as the *Phoenix Park Works*, operated by Charles McDonnell and Son, Manufacturers. In 1910 and 1916 the Phoenix Park Works are listed as being vacant. In 1917, the premises are listed as the *Dublin National Shell Factory*, a munitions factory, and continue to have that listing until 1920. In 1921 and 1922 the premises is listed as Government Stores. In 1924 the premises is listed as Cahill and Co. Ltd: Printers, Etc. Cahill Printers remained at Parkgate Street till the 1970s, when the premises was taken over by Hickeys.

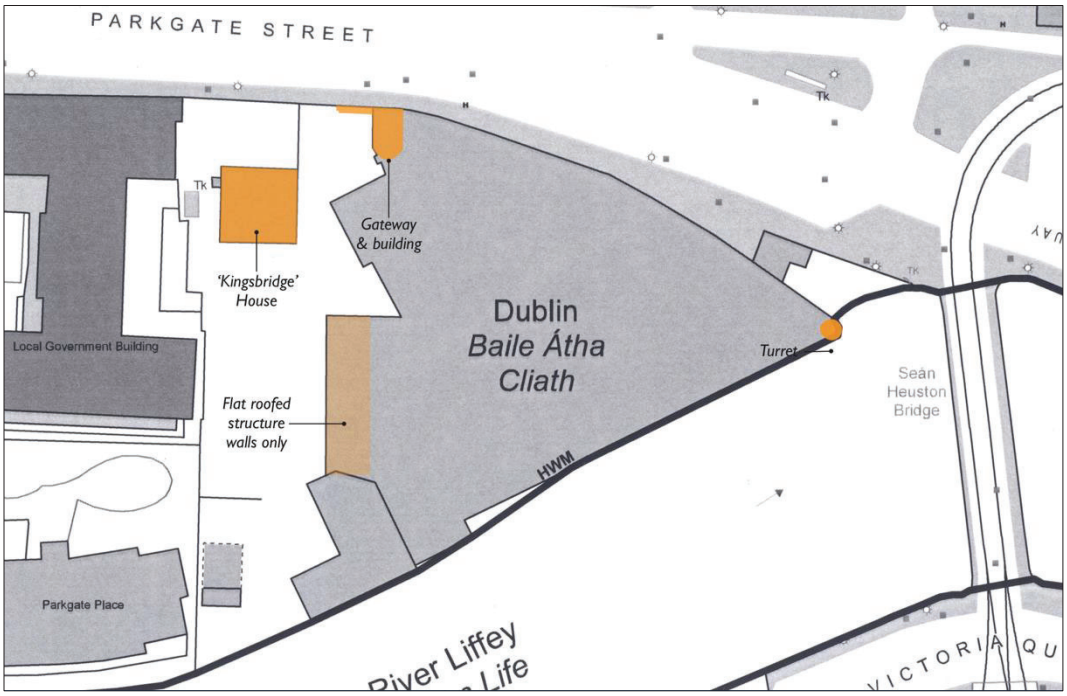

Figure 12.1: Extract from the current Ordnance map, indicating, in orange, structures on the site that predate the 1837 First Edition Ordnance map. Most of the other structures date from the mid 1880s. Some low elements on the west side of the buildings are modern, as are structures in the south west corner of the site.

Extracts from Thoms Directory for the Subject Site

1861	**Phoenix Ironworks, Wm Robinson, Engineer and Ironfounder**
1870	Royal Phoenix Ironworks, Edward Toomey, Millwright, Engineer and Iron Founder. £130
1880	Royal Phoenix Ironworks. Vacant. £130
1881	Royal Phoenix Ironworks. Mrs Toomey. £130
1882	Royal Phoenix Ironworks. £10 The Kingsbridge Woollen Works
1883	The Kingsbridge Woollen Works
1884	The Kingsbridge Woollen Works
1885	Guinness, Edward C, Cloth Manufacturer The Kingsbridge Woollen Works
1886	Guinness, Edward C, Bart, Cloth Manufacturer The Kingsbridge Woollen Works £405
1887	Guinness, Edward C, Bart, Cloth Manufacturer The Kingsbridge Woollen Works £405
1888	Guinness, Sir Edward C, Bart, Cloth Manufacturer The Kingsbridge Woollen Works £405 (Premises Closed)
1889	The Kingsbridge Mills, Clayton F. & J. and Co (Limited), Woollen Worsted Manufacturers, and Navan £405 Kingsbridge House, Fred Clayton M.D. M.A. F.S.A. Ph.D. Woollen Manufacturer
1890	The Kingsbridge Mills, Clayton F. & J. and Co (Limited), Woollen Worsted Manufacturers, and Navan Kingsbridge House, Fred Clayton M.D. M.A. F.S.A. Ph.D. Woollen Manufacturer
1900	Phoenix Park Works, McDonnell, Charles and Son, Manufacturers Kingsbridge House, Cussen, Mr E, £225 £40
1910	Phoenix Park Works. Vacant. £225 £40 1916 Phoenix Park Works. Vacant. £225 £40
1917	Dublin National Shell Factory. Directors: Kelly, Capt. R. C; Downie, Capt. F; Grey, Lewis C., C.A.; Sec: Shaw, Crawford. £366
1920	Dublin National Shell Factory; Inspector of Stores and Clothing, Receiving Depot and Pattern Room.
1921	Government Stores, Inspector of Stores and Clothing, Receiving Depot and Pattern Room.
1922	Government Stores, Inspector of Stores and Clothing, Receiving Depot and Pattern Room.
1923	No Listing
1924	Cahill and Co. Ltd: Printers, Etc

Extracts from Thoms Directory for the Subject Site

1925	Cahill and Co. Ltd: Printers, Etc £490
1930	43. Cahill and Co. Ltd: Printers, Etc £545
1941	43. Cahill and Co. Ltd: Printers, Etc £545 46. Kiosk £4'10'0
1950	43. Cahill and Co. Ltd: Printers, Etc £545 46. Kiosk £4'10'0
1960	43. Cahill and Co. Ltd: Printers, Bookbinders, Publishers. £525 Parkside Press Ltd: Publishers
1971	43. Cahill and Co. Ltd: Letterpress and Lithographic Printers and Bookbinders. £525 Parkside Press Ltd: Publishers, Mellifont Press Ltd: Publishers
1980	43. Hickey and Co. Ltd : Fabrics. £525

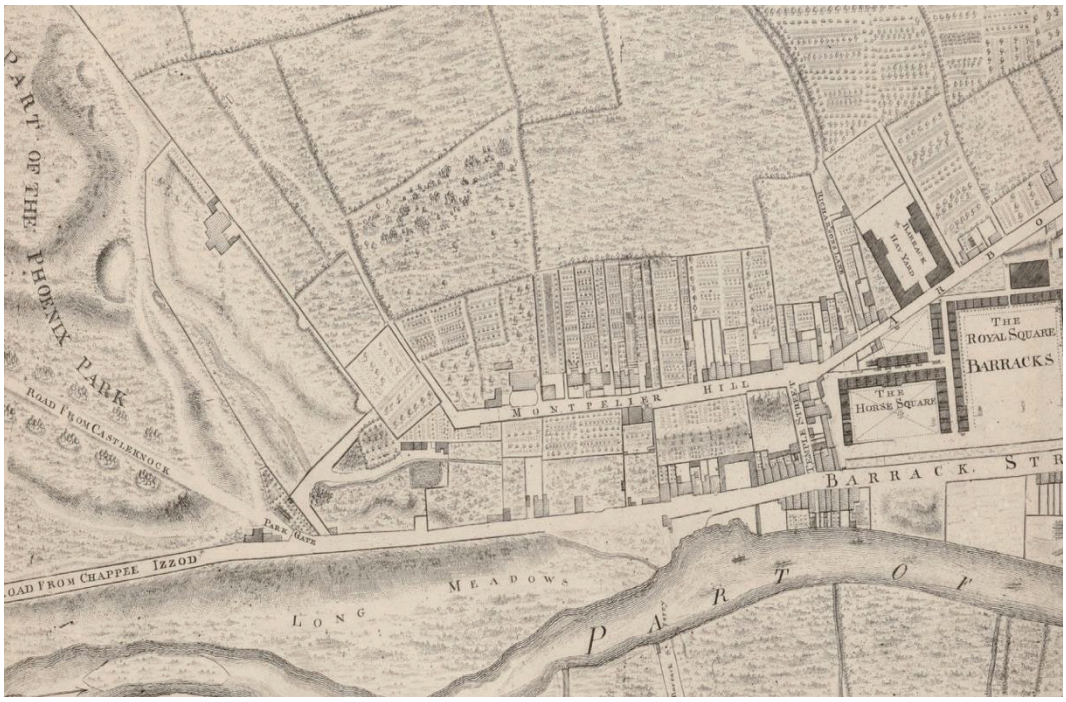

Figure 12.2 Extract from John Rocques map of Dublin of 1773. Conyngham Road and Parkgate Street are not named. The 'Long Meadows' are shown on the north side of the River Liffey. Kingsbridge is not yet there. The Viceregal Stream is shown running into the Liffey at the east end of the Long Meadows. Where the Stream meets the River is the approximate location of the Turret at the east end of the subject site.

Figure 12.3 Extract from Duncan's Map of Dublin of 1821.The map indicates a triangle of buildings and two other small buildings on the subject site. At that date the surrounding area of the city and all the lands to the south and west are dominated by military buildings and institutions. The Wellington Testimonial, construction of which would only have just started, is shown in the centre of a group of military buildings: the Magazine Fort, the Royal Infirmary, the Royal Barracks, The Royal Hospital and the Artillery Barracks.

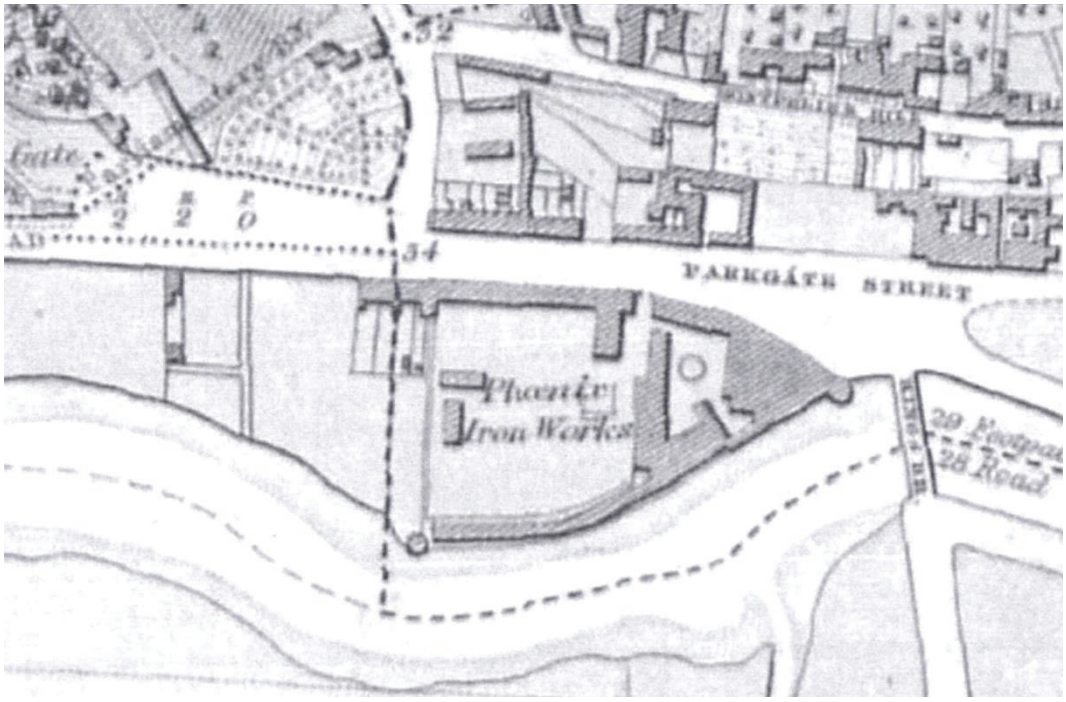

Figure 12.4 Enlargement of part of the First Edition Ordnance map of 1837, showing the original extent of the Phoenix Iron Works, which was approximately twice the area of the present Hickeys site. The map shows round turrets at the eastern and western end of the river frontage. Though 'Kingsbridge' House is not clearly defined because of the small scale of the map, it is likely that it was there by 1837.

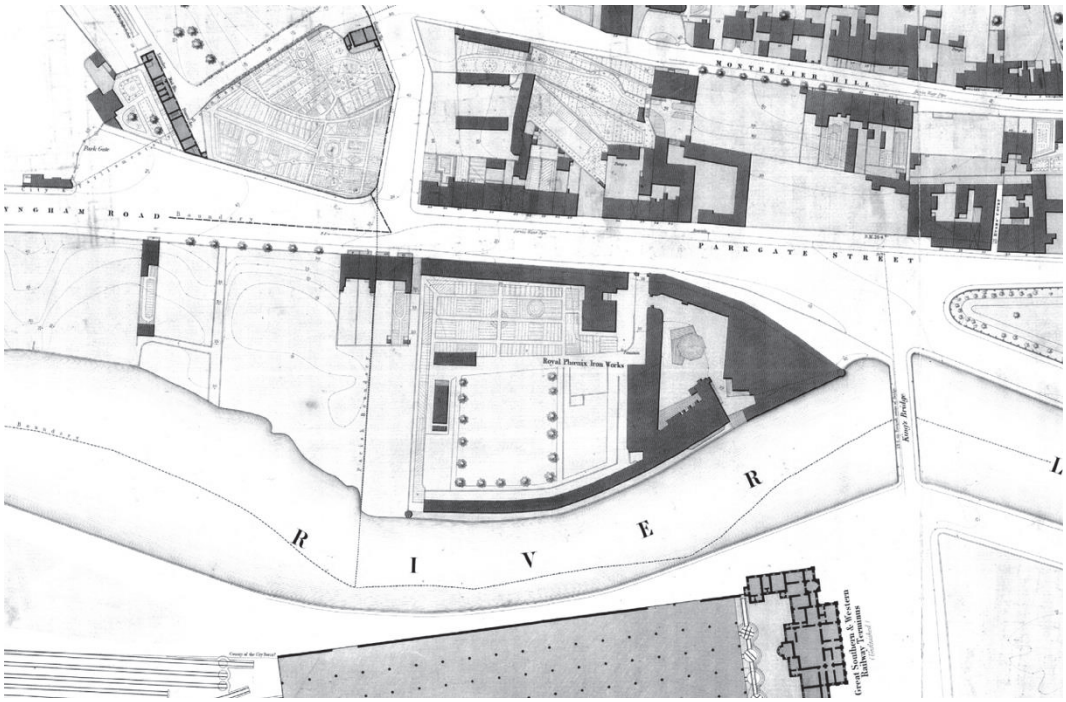

Figure 12.5 Extract from the Ordnance map of 1847. Kingsbridge station is shown on the south side of the river, though marked as 'unfinished'. The production buildings of the now Royal Phoenix Ironworks would appear all to have been at the east end of the site, and the western end is shown laid out as gardens. Only the most easterly building on the site abuts the River. The rest are set back. There appears to be a slipway from the centre yard of the works down to the River. Where walls are shown on the map, these were probably of the nature of garden walls, and unlikely to have been more than 2 metres in height.

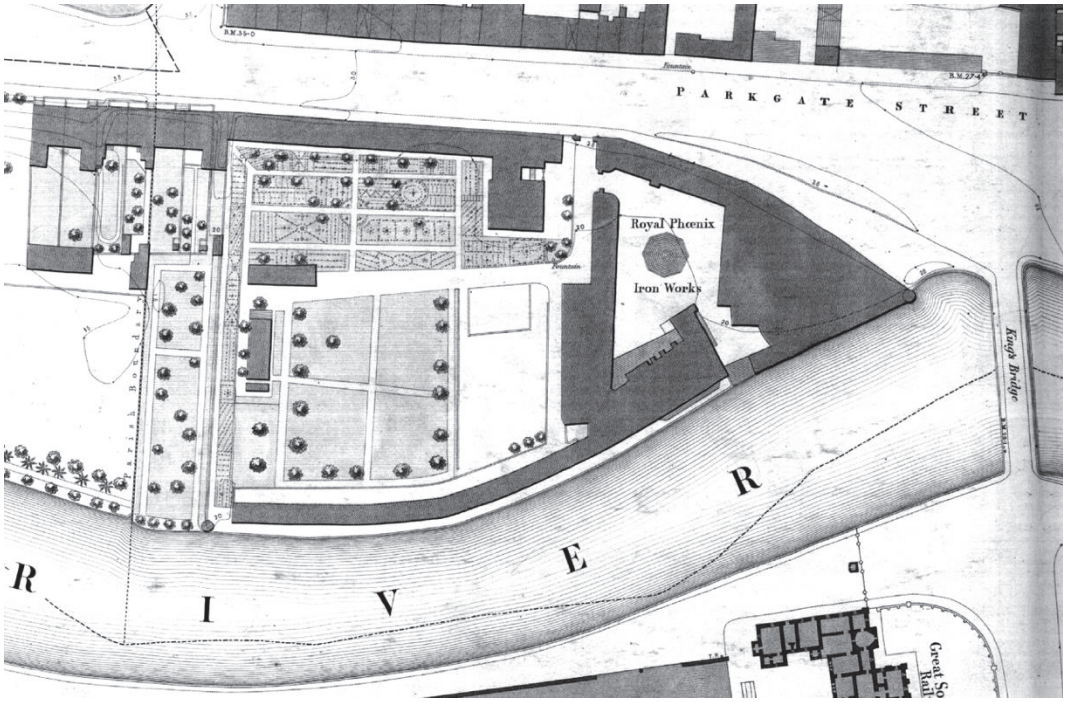

Figure 12.6: Extract from the Ordnance map of 1864.The layout of the Royal Phoenix Ironworks is little changed from the 1847 map. This map provides more detail of the layout of the extensive gardens. 'Kingsbridge' House is clearly defined and is shown with buildings on Parkgate Street north of the house, separated from the house by a small yard on the north east.

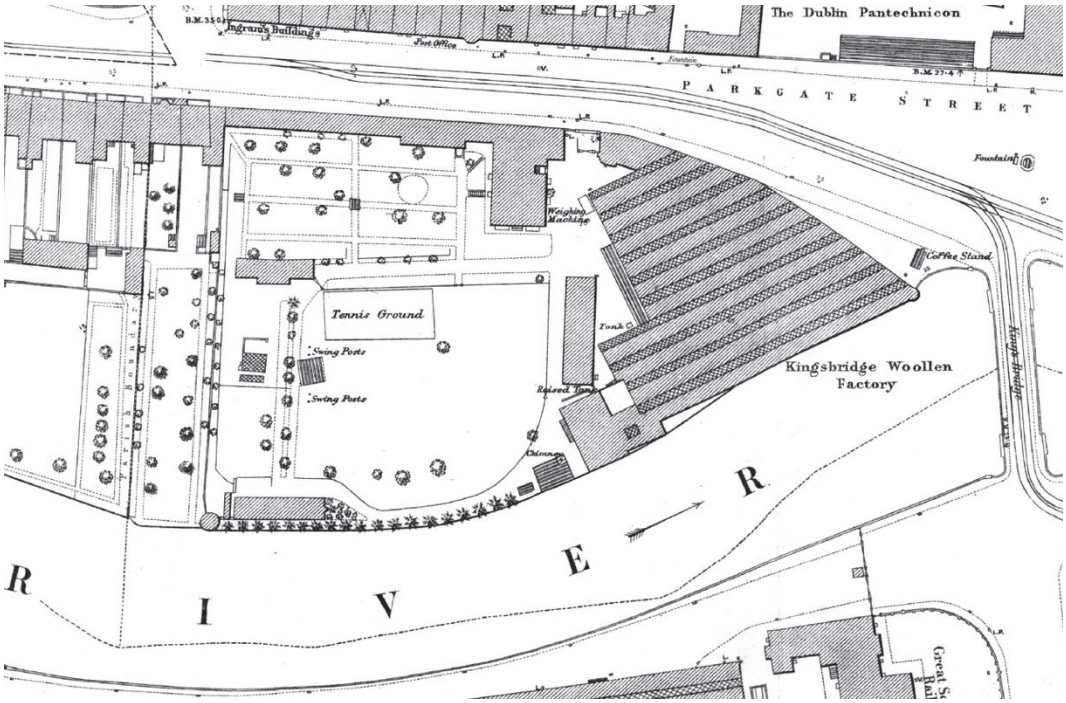

Figure 12.7: Extract from the Ordnance map of 1889.The layout of buildings on the east and south of the site has been completely changed. The present warehouse with its northlight roof is clearly defined on the map. The range of buildings near the River at the south west of the has been largely removed, and trees are shown at the River's edge. For an auction advertisement in 1880, it is known that the buildings to the north west along Parkgate Street are workers cottages. The entire is now titled 'Kingsbridge Woollen Factory.

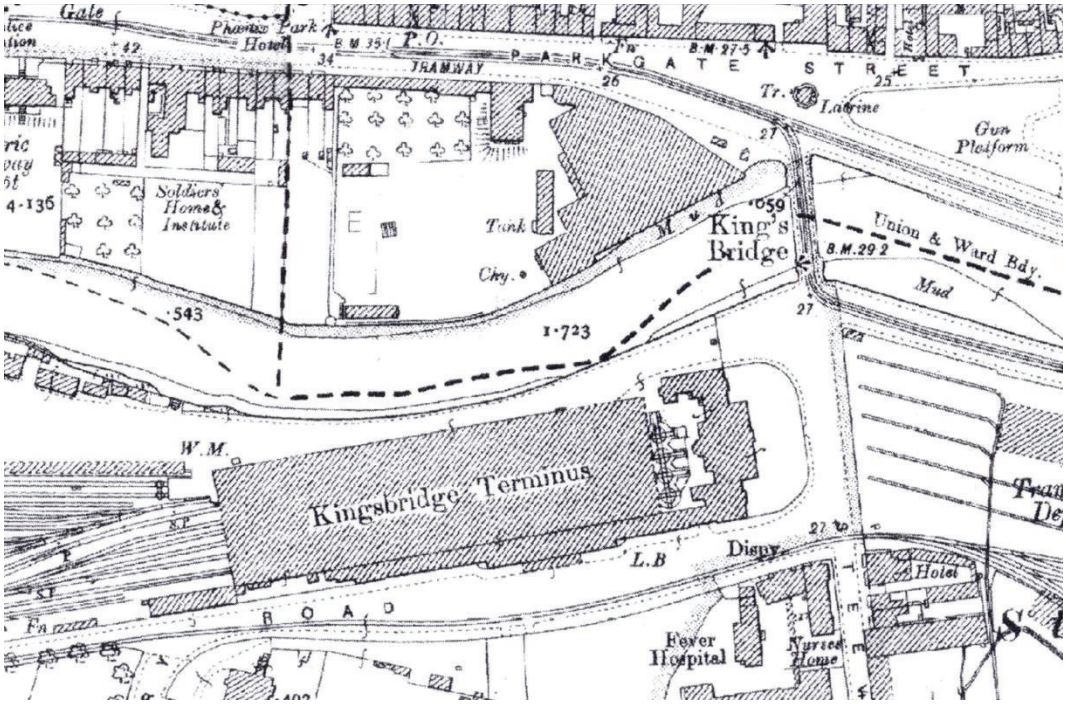

Figure 12.8: Extract from the Ordnance map of 1907.This map is at a smaller scale than the 1889 map, but shows little change in the layout since that time.

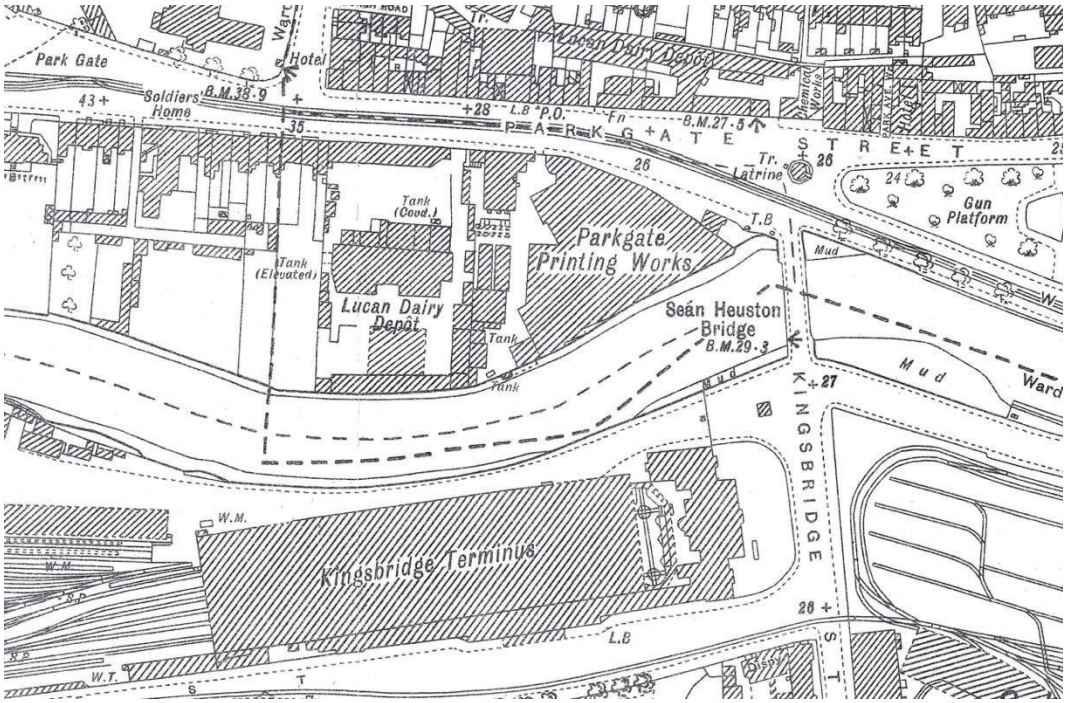

Figure 12.9: Extract from the Ordnance map of 1943.The premises is now the 'Parkgate Printing Works'. The western half of the original site is now shown separated from the eastern end and occupied by a depot for the Lucan Dairy. A number of buildings. are shown south of 'Kingsbridge' House in the present yard and buildings are also shown north of the house, between it and Parkgate Street.

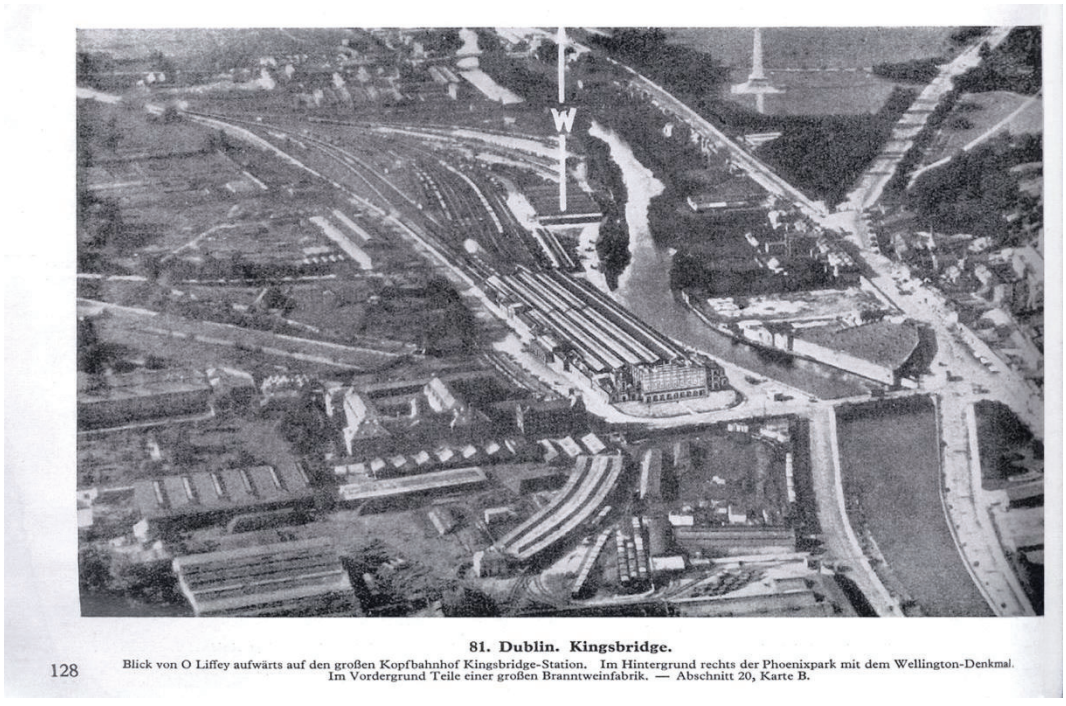

Figure 12.10: A somewhat enhanced aerial photograph of the Kingsbridge area from a booklet provided to the Luftwaffe during the Second World War as a guide to wayfinding. It will be noted that the western half of the subject site is shown clear of buildings. The eastern end of the site was occupied by Cahill Printers at the time.

Figure 12.11: The cover of the Luftwaffe booklet, bearing the date 1941, though the date of the actual aerial photograph is probably somewhat earlier. A pilot colleague has indicated that the above photograph was taken from quite a low altitude, probably around 1000 feet.

12.4 Likely Significant Effects

In the scenario where the proposed development does not proceed as planned, none of the construction or operational impacts as set out in this chapter would occur.

12.4.1 Assessment of effects during construction

There are a number of structures on the site of the proposed development that have heritage value. Some structures on the site are listed in the Record of Protected Structures, but other structures are not. The wording of the Record in the Record of Protected Structures specifically excludes some of the larger structures on the site. The wording is as follows:

> *(43) Parkgate Street, Dublin 8*
>
> *Former Parkgate Printing Works, now known as Parkgate House. Only the following structures are included in the Record of Protected Structures: (a) riverside stone wall; (b) turret at eastern end of site; (c) square tower on the riverfront; and (d) entrance stone arch on the Parkgate Street frontage.*

In using the words: '*Only the following structures are included in the Record of Protected Structures',* the Planning Authority has restricted the listing on the site to four structures that are all boundary structures.

Items a) and d) in the RPS are also listed in the National Inventory of Architectural Heritage (NIAH). Items b) and c): the round turret and the square tower are not. Structures that are not listed in the Record of Protected Structures include:

- *The large warehouse building at the eastern end of the site that covers almost half the overall site.*
- *A ruinous late Georgian house towards the north west corner of the site.*
- *Gabled industrial buildings on the River front at the west end of the river wall.*
- *A small two storey building attached to the inside of the eastern side of the arched entrance gateway.*
- *The long curved wall of the warehouse facing onto Parkgate Street.*

Of these six structures, only the ruinous Georgian house is listed in the NIAH. The NIAH descriptions contain inaccuracies.

As part of the proposed development, it is proposed to retain all the structures listed in the Record of Protected Structures. This will involve restoration and other works to all the structures. It is proposed to alter the river wall by enlarging some of the existing and former openings in the wall and by creating some new openings. It is proposed to retain the larger of the two gabled industrial buildings on the River front and part of the smaller gabled building. While it is proposed to demolish the rest of the remaining structures, it is proposed to retain some of the large cast iron structural elements from the warehouse for use in the new development.

All the proposals for these structures have the potential to give rise to direct effects on the architectural heritage of the structures themselves and indirect effects on the architectural heritage of the surrounding area. Where structures are proposed to be retained there is the potential for positive effects on architectural heritage. Where structures are proposed to be removed, this will result in negative effects on architectural heritage, though beneficial effects in areas other than architectural heritage may occur.

On the following pages, a brief description and assessment is provided in the case of each of the 10 main structures of heritage value on the development site beginning with the 4 structures listed in the Record of Protected Structures. The following is provided in each case:

- *An outline of the history of the structure and an assessment of its value.*
- *A brief outline of the works proposed as part of the current development application.*
- *As assessment of the effects of the works on the architectural heritage of the structure itself and on the surrounding architectural heritage.*

Riverside Stone Wall

Figure 12.12: Riverside Stone Wall

The wall is listed in the Record of Protected Structures as *(a) riverside stone wall*. It is also listed in the National Inventory of Architectural Heritage at Record No 50060349. The text of the NIAH description begins:

> *Boundary wall originally enclosing Phoenix Iron Works, erected c.1820. Composed of roughly coursed granite rubble with areas of brick repair, cement skirting over river bank. Terminated at east by round-plan turret in granite ashlar having cornice and blocking course. Shortened to west end terminated by brick and stone buildings.*

The NIAH appraisal continues:

> *A well-constructed boundary wall, once forming part of the Phoenix Iron Works and related to Dublin's industrial history. The extent of the wall is much shorter than it was when originally constructed in the early nineteenth century, and only one of two attractive terminating circular piers now remains.*

What is stated in the NIAH record is largely incorrect. Firstly, both the wall and the turret are built almost entirely of limestone, not granite. The way the wall abuts the east turret strongly indicates that the wall is later than the turret. Evidence from Ordnance mapping strongly indicates that there was never a continuous wall along the river bounding the Phoenix Iron Works, and so the wall is not a fragment of a much longer wall. Evidence also suggests that this wall is part of the 1880s reconstruction of buildings on the site, with numerous later changes to the wall; and so is not from circa 1820.

The quality of the stonework in the wall varies. There is good quality coursed rubble stonework at the eastern end of the wall, particularly towards the bottom of the wall, but the coursing tends to break down moving up the wall and towards the western end. Some of the wall is relatively crude random rubble work rather than coursed rubble. Parts of the wall tilt back away from the River. The greatest extent of this tilt is 160mm.

The dimensions of the coursed rubble stonework in the wall are unusual. Typically, horizontal courses – dayworks – would be about 18 inches high, some 460 mm. However in the River wall, the courses are more frequent, varying between 380 mm and 400 mm. this could be an indication of the wall being built of stone reused from previous buildings on the site.

As part of the proposals for the new development, its proposed to alter the riverside wall, a Protected Structure.

The alterations include partial demolition of the wall so as to create new openings, including one very large opening, see Figure 12.13 below.

The purpose of the new openings is to provide open views south onto the River and towards Heuston Station from a new public plaza within the proposed scheme. It is also proposed to enlarge some existing openings in the wall and to repair others, including filling existing openings with new coursed rubble limestone stonework to match the pattern of the existing wall. Approximately 24% of the superstructure of the wall above the water line will be removed to make the new openings. It is also proposed to repair the existing parapet of the wall replacing any decayed parapet stones with new stones of the same profile

The loss of substantial areas of original fabric from the wall will result in significant negative effects on the architectural heritage of the wall. The repair works to the riverside wall are likely to give rise to positive effects on the heritage of the wall.

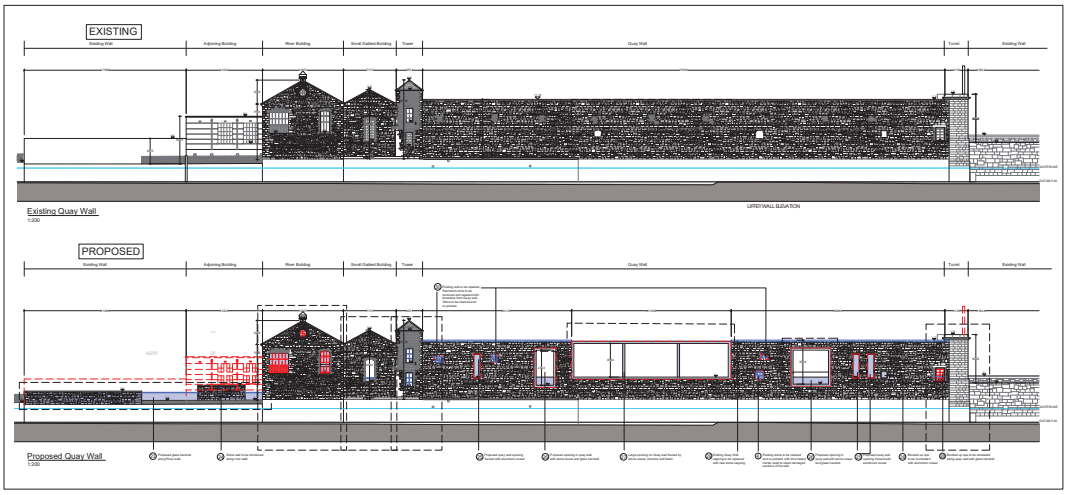

Figure 12.13: Architects drawing showing the proposed works to Riverside Stone Wall

In the Planning Report and Statement of Consistency lodged as part of the planning application documents, the question of the partial demolition of the Riverside Stone Wall is discussed, and it is suggested that the creation of the new openings in the Wall is occasioned by particular exceptional circumstances.

The proposed development has the potential to contribute to placemaking in the new Heuston Quarter. In the text of SDRA 7 the Heuston Quarter is described as a potential *'western counterpoint to the Docklands'*. As is stated in Section 1.2 of the Development Plan: '*Place making is particularly important in the strategic development and regeneration areas' (SDRAs).* Public space is central to placemaking, and the location of the proposed public plaza offers the potential of celebrating the enjoyment of a relationship with the River Liffey and with the great public concourse in front to Heuston station. No other location for a public space on the development site or, for that matter, anywhere else in the Heuston area, offers the same potential for relationships with both the River and the public space in front of Heuston Station. Leaving the Riverside Stone Wall unaltered, a barrier, would prevent such relationships being realised.

The Heuston area is one dominated by the tumult of transport and traffic: trains, trams, trucks and taxis; buses and bicycles, scooters and segways. The proposed public plaza will be an island among all this bustle; a place of safety, a protected public space; a place made for pedestrians; a south facing space for public enjoyment not mediated by the 'roaring traffic's boom'; a space for looking out over the silent River. There is no other possible location for a public space in the Heuston area where the public can enjoy protection and yet be at the centre of all the activity of Dublin's great western transport hub.

The circumstance of the location and potential of the proposed public plaza is not just exceptional; it is unique. If the wall remains unaltered this potential will be lost.

Turret at eastern end of Site

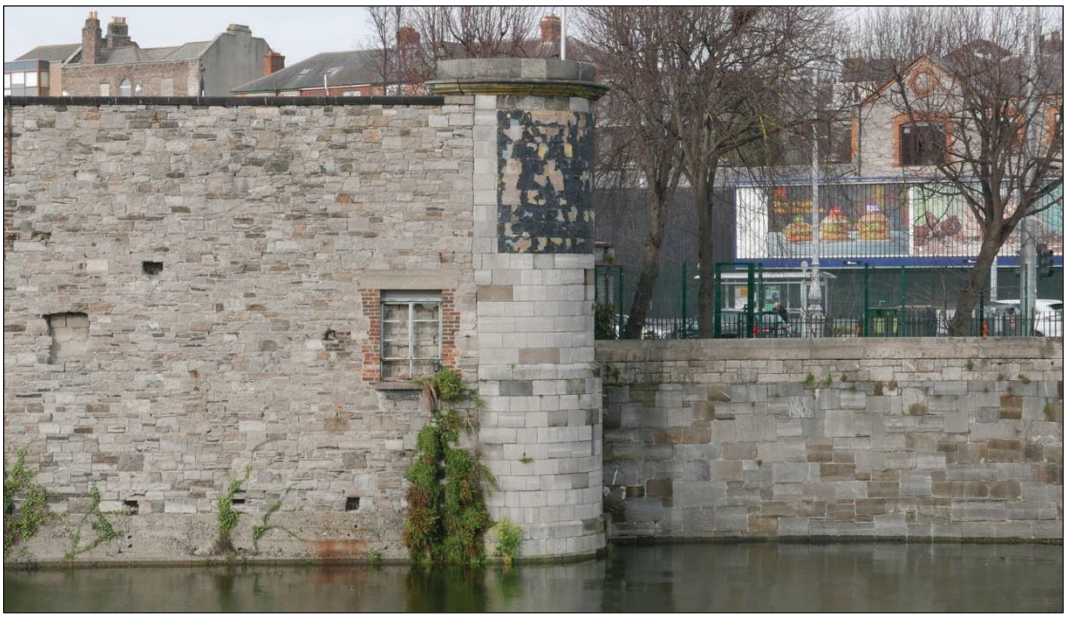

Figure 12.14: Turret at the eastern end of the site

This Turret appears on the First Edition Ordnance map of c.1837 as the eastern turret of a pair of turrets marking the eastern and western end of the river boundary of the Phoenix Ironworks. The western turret, located well west of the current development site, was fully circular on plan. This turret may also have been fully circular when first built, but currently extends to only a little more than a semicircle. The Turret is listed by Dublin City Council in the Record of Protected Structures as one of four protected boundary features on the site.

The two walls that attach to it, the river wall and the curving grey painted brick wall on Parkgate Street, both date from the construction of the Kingsbridge Woollen Works in the mid 1880s and are, therefore probably some 75 years younger than the Turret. The NIAH mentions the two turrets as part of its assessment of the River wall, assuming the River wall and the Turret to be contemporary, which is repeatedly contradicted by the mapping evidence.

The turret is constructed in the main of cut limestone in an ashlar pattern. The cornice and blocking course are in granite.

The Turret appears visually to be in relatively good condition though there is a need for some careful non aggressive stone cleaning, removal of plants, and minor stone and pointing repair. Any appropriate repair works to the Turret are likely to give rise to positive effects on the heritage of the Turret, and on the surrounding architectural heritage.

Square Tower on the Riverfront

Figure 12.15: Square Tower on the Riverfront – seen here to the right of the image

The Square Tower on the Riverfront first appears on the 1889 Ordnance map together with the small and large gabled industrial buildings immediately to the west of the Square Tower. All three are part of the Kingsbridge Woollen Works constructed by Edward C Guinness in the mid 1880s. The Square Tower is a protected structure.

The Tower appears visually to be in relatively good condition though there is a need for some careful non aggressive stone cleaning, removal of plants, and minor stone and pointing repair. The roof will need to be examined but may need only maintenance. Any appropriate repair works to the Tower are likely to give rise to positive effects on the heritage of the Tower, and on the surrounding architectural heritage.

It can be noted from the steel brackets projecting from the tower and gabled buildings, and from the general relationship of these buildings with the River, that these buildings had a direct use in connection with the river. It would be important that in their new uses as part of the proposed development, that these buildings would retain uses directly connected with the River.

Entrance Stone Arch on the Parkgate Street Frontage

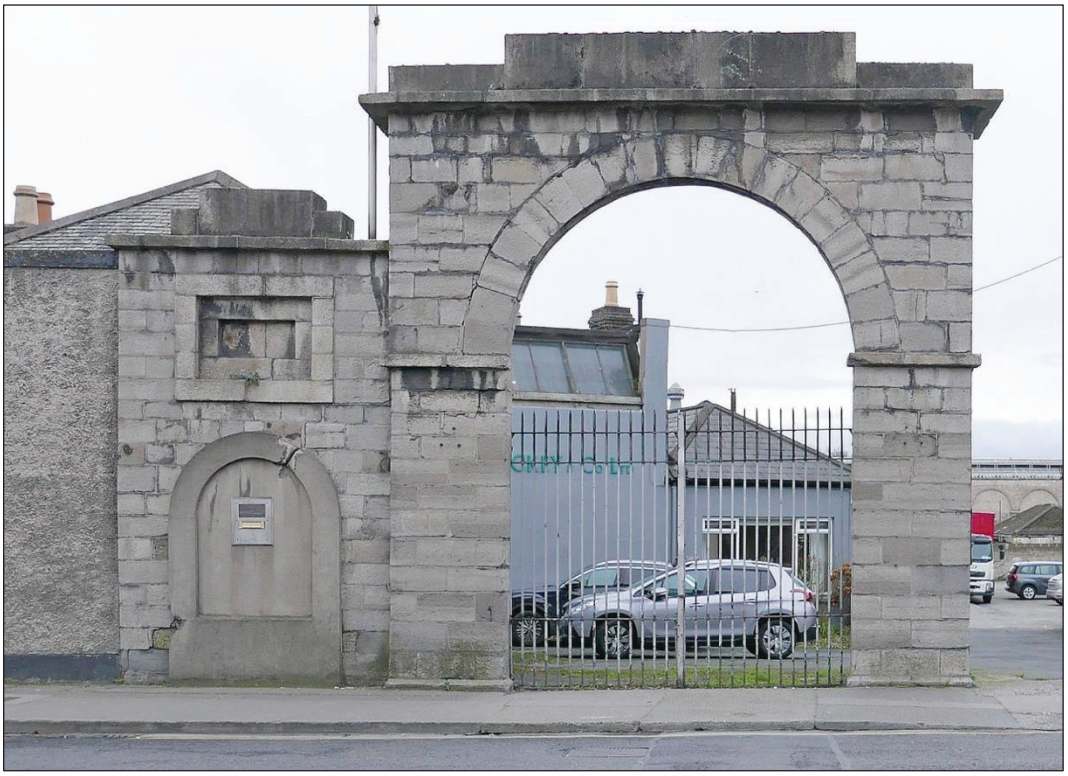

Figure 12.16: Entrance Stone Arch on the Parkgate Street Frontage

The Phoenix Ironworks were established by Richard Robinson in 1808. It is likely that the entrance gateway dates from a little later. The gateway is listed in the National Inventory of Architectural Heritage at Record No 50060346. The NIAH record begins:

> *Attached arched granite gateway, formerly to Phoenix Iron Works, built c.1820. Formerly symmetrical, comprising double-height arched entrance with lower flanking wings. Only eastern wing remains. Walls are tooled ashlar granite throughout.*

The gateway is constructed mainly of limestone, not granite, though there are granite details. There is a rendered area in the western flank of the gateway that would suggest that it was intended to be symmetrical, but the evidence of Ordnance mapping would suggest that there was never a western wing to the gateway. The rendered area in the eastern wing covers granite dressed stonework in a distressed condition, surrounding a former round headed opening that perhaps gave into a building behind. The gateway is listed in the Record of Protected Structures as part of Record No 6320 as: *(d) entrance stone arch on the Parkgate Street frontage.*

The Entrance Arch shows significant evidence of stone damage, particularly to the granite detail. It will not be possible to determine the extent of necessary stone repair and replacement without opening up. There is a clear need for some careful non-aggressive stone cleaning, major and minor local stone repair and local pointing repair.

Any appropriate repair works to the Entrance Arch are likely to give rise to positive effects on the heritage of the Entrance Arch, and on the surrounding architectural heritage.

The Large Warehouse Building

Figure 12.17: The Large Warehouse Building

The evidence from Thom's Directory, taken together with the evidence of Ordnance mapping, strongly indicates that the present main warehouse on the site and the two gabled buildings to the south west of it were built between 1882 and 1886 under the direction of Edward C. Guinness, later the 1st Earl of Iveagh.

The roof structures of the original Phoenix Ironworks buildings, were, given their date, most probably timber framed. The proposal to manufacture cloth called, not just for large internal spaces, but also for a change to structures of iron or steel.

Processes for the manufacture of cloth give rise to the presence of fine fibres in the air. This mixture of air and fibres is explosive, and flash fires in early cloth mills tended to ignite timbers in the building, causing the mill buildings to burn to the ground. To combat this mill owners in England began to frame the interiors of their mills in iron rather than timber. The first such iron-framed building was Ditherington Mill at Shrewsbury completed in 1797. It made sense, therefore, that the roof structure and interior structures in the new Kingsbridge Woollen Works would be in iron and steel.

The warehouse roof structure consists of cast iron columns, for the most part at 24 foot centres, carrying cast iron beams running in a northerly direction at right angles to the River; These cast iron beams in turn carry large iron gutter beams running east-west at 12 foot centres, these gutter beams carrying a timber framed northlight roof.

The northlight roof consists of 16 'A' shaped sections of roof extending east-west, with the feet of the 'A' resting on the cast iron gutter beams. The north facing side of each 'A' is glazed while the south facing side is solid; hence the term northlight.

The cast iron columns and beams used to support the warehouse roof are quite clearly standard components available at the time, rather than a structure specifically designed for the building. The warehouse is surrounded by high walls and the north-south cast iron roof beams and east-west cast iron gutter beams run into and are supported by these walls. The surrounding walls, therefore, provide lateral bracing to the warehouse roof structure.

On the southern side, there is an inner brick wall, parallel to but not as long as the Riverside Stone Wall; and this inner wall supports the southern ends of the north-south cast iron roof beams, except for two cast iron roof beam near the south east corner of the warehouse that continue to the outer Riverside Stone Wall. The inner brick wall is separate to and independent of the outer Riverside Stone Wall. On the east side, and curving around to the north, the high grey painted brick wall along Parkgate Street carries the ends of the east-west cast iron gutter beams, which pass through the wall to discharge into a continuous large cast iron gutter on the outside of the wall. The ends of some of the north-south cast iron roof beams are also carried by the grey brick Parkgate Street wall. On the western side, a high brick wall stops the western ends of the northlight roof. On the northern side, the glazed northern side of the most northerly and shortest of the 16 northlight 'A' roof elements of the warehouse roof runs down onto a short length of lower brick wall that forms the northern external wall of the warehouse.

The western and northern walls of the warehouse are largely concealed from view by various structures that abut the outside of the western and northern sides of the warehouse. These structures are for the most part lower than the warehouse walls and are of a variety of different dates. Some are, in part, older than the warehouse, some are very modern, and some, like the gabled buildings on the River front, appear to have been built at the same time as the warehouse.

The manufacturer of the cast iron columns in the main warehouse has not yet been identified, but the beams are stamped with the name *'Courtney Stephens & Bailey'*, who had a foundry in nearby Blackhall Place.

As well as the main columns and beams supporting the northlight roof, there are secondary iron and steel structures, particularly in the gabled and other buildings attached to the south west end of the warehouse. Some of these secondary structures may be contemporary with the mid 1880s construction of the small tower and two gabled buildings on the river front. Others are definitely later. Rolled steel of various dimensions, and in various parts of the buildings, are stamped with the following names: *'Glengarnock Steel', 'Lanarkshire Steel Co Ltd Scotland', 'Cargo Fleet England'*. All of these companies produced rolled steel. It is noted in *Grace's Guide to British Industrial History* that Glengarnock Steel pioneered the production of rolled steel joists around the year 1885. The production of rolled steel joists in the other steelworks mentioned was probably later.

The manufacture of cloth would have required belt driven machinery, and it has been suggested that the slots at the top of each of the four sides of the columns in the warehouse were to take brackets that might support belts or other equipment. Towards the south east corner of the main warehouse there is a raised mezzanine level supported on steel. The horizontal members supporting this raised floor are tram tracks. Some are stamped: *'105 PHX R 1905 Made in Germany*', others *'1908 Made in Belgium*'. The date of the construction of the mezzanine is not clear.

The warehouse is relatively grand in scale, but it is not a feat of 19th century engineering elegance. It is an ad-hoc building made of components that were available, including, probably, stone from the demolished buildings of the Phoenix Ironworks. It is proposed to demolish the warehouse, including its surrounding walls, ie:- the inner brick wall inside the protected Riverside Stone Wall, the brick wall to Parkgate Street, and the western and northern warehouse walls. The protected Riverside Stone Wall will be retained, but alterations to it are proposed which are detailed above. The loss of the warehouse will be a heritage loss, but without this loss there will be no real prospect of development on this site. The loss of the warehouse is regarded as giving rise to a moderate effect on architectural heritage. The proposed reuse of some of the cast iron elements from the warehouse as features in the open spaces of the proposed development, has the potential to give rise to positive effects on architectural heritage.

Ruinous Late Georgian House

Figure 12.18: Ruinous Late Georgian House • 'Kingsbridge' House

The house was probably constructed at some time after the Phoenix Ironworks were established by Richard Robinson in 1808. It is not listed in the Record of Protected Structures, but is listed in the National Inventory of Architectural Heritage at Record No 50060347. The wording of the Record in the Record of Protected Structures specifically excludes this house and most of the other structures on the site. The wording is as follows:

> *(43) Parkgate Street, Dublin 8*
>
> *Former Parkgate Printing Works, now known as Parkgate House. Only the following structures are included in the Record of Protected Structures: (a) riverside stone wall; (b) turret at eastern end of site; (c) square tower on the riverfront; and (d) entrance stone arch on the Parkgate Street frontage.*

As can be seen from the Ordnance mapping, the house was originally located in a formal relationship with the western half of the original Phoenix Ironworks property which was laid out as extensive landscaped gardens with a terrace of two storey workers cottages at the north side of the gardens along Parkgate Street. It would appear that the western half of the original Phoenix Ironworks lands were severed from the present property at some time in the early 20th century. The house is now entirely isolated from its original setting, including structures that once continued north from the house to Parkgate Street.

The NIAH appraisal states as follows:

> *A fine symmetrical late Georgian house with links to Dublin's industrial past, located within the site of the former Royal Phoenix Iron Works. Despite later interventions, the house is characterized by fine proportions and symmetry, and evidence remains of the former fine doorcase and original fenestration, as well as former balcony to the west.*

The NIAH appraisal makes no reference to the fact that the house has lost its original setting, or that it probably never had a relationship to Parkgate Street. Since there is no reference to the interior or its condition, it is assumed that, as is the usual practice, the NIAH assessment was made on the basis of the external appearance only.

The house is in poor structural condition and is unsafe with areas of structural collapse internally. There is extensive water damage. Internally some plain late Georgian features remain. An inspection report prepared in January 2019 by Gordon Knaggs & Associates concludes:

> *It is clear that this building has been subject to ingress of water for many years, particularly from roof level. Decay of the timberwork is extremely extensive and severe. There is little prospect of significant areas of sound or useable timber remaining in the building.*

The loss, of what remains of 'Kingsbridge' House will be a heritage loss. However, given how little is left of the original house, and given that most of the original heritage interest of the building has already been lost, the extent of effects on architectural heritage of the surrounding area arising from the loss of what remains of 'Kingsbridge' House must be regarded as 'slight'.

Gabled Industrial Buildings on the River Front

Figure 12.19: Gabled Industrial Buildings on the River Front

These three buildings date from the 1880s reconstruction. These three structures appear to have been built as part of the Kingsbridge Woollen Works. What their function might have been as part of the woollen works is as yet unclear. The fact that there are steel beams projecting from the buildings and that there are timbers below rising out of the river bed would suggest that these buildings were used in the loading and unloading of goods from a wharf along the River. The present internal layout of the buildings does not offer much information as to their former use. The square tower is listed in the Record of Protected Structures.

It is clear that the location of the Phoenix Ironworks, the later Kingsbridge Woollen Works and the yet later Dublin National Shell Factory all depended on the river for transport, the transport of raw materials and of finished goods.

It is intended to retain the larger of the two gabled buildings and the River façade of the smaller gabled building. The retention of these unlisted buildings will retain some of the historic Riverfront character of the site and must result in positive effects on the architectural heritage of the site and its surroundings. The loss of the upper level, roof and north and east walls of the smaller gabled building, retaining the River façade, will be a heritage loss, slight in the overall context. Precise detail of restoration works will only emerge during the works, when a full assessment of the condition of the buildings can be made following opening up.

It would be important in the context of the proposed development, that these buildings would retain uses directly connected with the River. It is noted in this regard that the riverside gable of the smaller of these two buildings will be a feature at the side of a proposed public River walk, and the River walk will pass through the larger of the two buildings, as described **Chapter 2**, Alternatives. A space at the upper level of the larger of the two buildings is proposed as looking out onto the River.

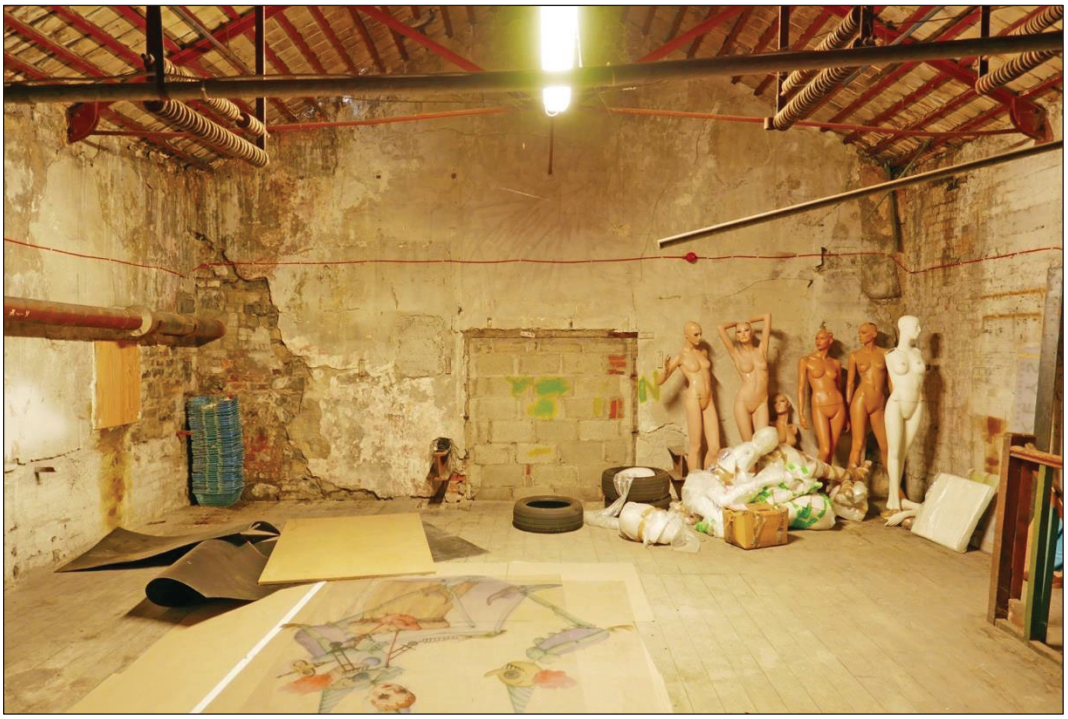

Figure 12.20: Interior of the first floor of the Smaller Gabled Industrial Buildings on the River Front

Two storey building attached to the inside of the arched entrance gateway

Figure 12.21: Two storey building attached to the inside of the arched entrance gateway

Evidence from Ordnance mapping would suggest that this little building was built at the same time as the main gateway from Parkgate Street. It is not listed in the Record of Protected Structures nor is it listed in the National Inventory of Architectural Heritage. It is not quite clear how this building was used when first built, or indeed during the variety of uses that the site was put to over the last 200 years. Ordnance mapping suggests that the building was inside and to the east of the stone arched entrance gateway from Parkgate Street, but that there was a second gateway immediately to the south of this little building, the second gateway being the entrance into the inner yard of the Phoenix Ironworks.

There may have been a doorway from the public street into this building through the flank wall of the main stone arched gateway, but only opening up will reveal exactly what was there. There is evidence from Ordnance mapping and from the building itself that it has been altered numerous times. At present the ground floor is in use as a canteen and the upper floor as some form of drawing office. There are no internal walls, and it is likely that the building originally had internal walls. There is what appears to be a chimney breast on the east side of the building, and at present there is a stair running against the chimney breast from the lower to the upper level, and this could not possibly be original. There is clear physical evidence of changes to the fenestration of the building, and it would appear that only one of the present window openings could possibly be original.

The loss of this small building represents a heritage loss. The extent of effects on architectural heritage of the surrounding area arising from the loss of the building is considered to be ‘slight’.

The long curved Wall of the Warehouse facing onto Parkgate Street

Figure 12.22: The long curved Wall of the Warehouse facing onto Parkgate Street

This wall, which is brickwork painted grey, was constructed with the rest of the warehouse between 1882 and 1886 under the direction of Edward C. Guinness, as part of the enterprise called Kingsbridge Woollen Works. The wall is not listed in the Record of Protected Structures, nor in the NIAH. It is a fine wall, or at least it was once, before the grey paint concealed its original character. Having been there for some 135 years it must have achieved the status of a rather dull local landmark. The loss of the wall will be a heritage loss, but without this loss there will be no real prospect of development on this site. The removal of the wall will permit the architecture of the new development to be expressed along Parkgate Street and will permit access from the street into a new public plaza facing south over the River.

The loss of this wall will be a heritage loss, likely to give rise to 'moderate' negative effects on the architectural heritage of the surrounding area.

12.4.1.1 Indirect Effects

The loss of historic built fabric from the application site has the potential to result in effects on the architectural heritage of the area as follows:

- *Riverside stone wall:* The loss of substantial areas of original fabric from the wall will result in moderate negative effects on the architectural heritage of the wall. The opening up of views across the River from Heuston Station are likely to give rise to positive effects on the setting of Heuston Station.

- *Two storey building attached to the inside of the arched entrance gateway:* The loss of this little building is likely to give rise to slight negative effects on the architectural heritage of the surrounding area.
- *Ruinous Georgian House:* The loss of 'Kingsbridge' House will be a heritage loss, but given how little of the original building is left and the poor condition of the remains of the building, the extent of effects on the architectural heritage of the surrounding area arising from the loss must be regarded as 'slight'.
- *Large Warehouse Building:* The loss of the warehouse will result in moderate effects on the architectural heritage of the surrounding area. The proposed reuse of some of the cast iron work in the open spaces in the proposed development, has the potential to give rise positive effects on architectural heritage.
- *The long curved Wall of the Warehouse facing onto Parkgate Street:* The loss of this wall is likely to give rise to moderate negative effects on the architectural heritage of the surrounding area.

In addition to the above, appropriate repair works to buildings proposed for retention on the application site is likely to give rise to positive effects on the surrounding architectural heritage.

ARC's analysis of impacts arising during the construction phase, further indicates a potential for the proposed development to result in visual impacts when viewed from buildings of architectural heritage importance or from the historic built environment. These impacts are described in more detail in **Chapter 13, Landscape and Visual**.

12.4.1.2 Cumulative

A review the existing granted planning applications in the vicinity of the site as detailed in **Appendix 21.1**, Cumulative and Interactive Effects, did not identify any developments for which permission has been granted, which, in combination with the development now proposed, would have the potential to result in material cumulative impacts on the architectural heritage.

12.4.2 Assessment of effects during operation

The existence of retained and repaired heritage structures is a permanent, positive effect on architectural heritage and will continue throughout the operational phase. The loss of heritage features, which has been considered already above, is a permanent loss and will continue throughout the operational phase, giving rise to permanent 'slight' to 'moderate' negative effects on the architectural heritage of the surrounding area.

In addition to this, it would be important that, in their new uses as part of the new development, riverside buildings (such as the Square Tower and the Gabled Industrial Buildings) would retain uses directly connected with the River, or, indeed, be kept in continuous use at all.

12.4.2.1 Indirect Effects

The existence of retained and repaired heritage structures is a permanent, positive effect on architectural heritage and will continue throughout the operational phase. The loss of heritage features is a permanent loss and will continue throughout the operational phase, giving rise to permanent 'slight' to 'moderate' negative effects on the architectural heritage of the surrounding area.

ARC's analysis further indicates a potential for the proposed development to result in visual impacts when viewed from buildings of architectural heritage importance or from the historic built environment. These impacts are described in more detail in **Chapter 13**, Landscape and Visual.

12.4.2.2 Cumulative

A review the existing granted planning applications in the vicinity of the site as detailed in **Appendix 21.1**, Cumulative and Interactive Effects did not identify any developments for which permission has been granted, which, in combination with the development now proposed, would have the potential to result in material cumulative impacts on the architectural heritage.

12.5 Mitigation Measures and Monitoring

12.5.1 Mitigation

12.5.1.1 Mitigation During Construction

As is detailed above, repair and refurbishment works are proposed in the case of all the protected structures on the site and the retained historic structures. No other mitigation measures have been proposed with respect to effects from the construction of the proposed development.

12.5.1.2 Mitigation During Operation

The public will have access to the retained and refurbished historic structures, and these structures will be maintained into the future. No other mitigation measures have been proposed with respect to effects from the operation of the proposed development.

12.5.2 Monitoring

12.5.2.1 Monitoring During Construction

No monitoring has been proposed with respect to effects from construction of the proposed development.

12.5.2.2 Monitoring During Operation

No monitoring has been proposed with respect to effects from operation of the proposed development.

12.6 Residual Effects

12.6.1 Residual effects during construction

The residual effects of the proposed development on the architectural heritage will be as described under Section 12.4 above. Cumulative effects have also been considered.

12.6.2 Residual effects during operation

The residual effects of the proposed development on the architectural heritage will be as described under **Section 12.4** above. Retained and repaired historic structures will be maintained in sustainable use. Cumulative effects have also been considered.

12.7 References

ARC referenced the following documents above:

Council Directive 14/52/EU (amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment) (Official Journal No. L 124/1, 25.4.2014).

Dublin City Council, 2016. *Dublin City Development Plan 2016-2022.*

Environmental Protection Agency, 2002. *Guidelines on the Information to be Contained in Environmental Impact Statements*. Wexford, Ireland.

Environmental Protection Agency, 2003. *Advice Notes on Current Practice*. Wexford, Ireland.

Environmental Protection Agency, 2015. *Advice note for Preparing Environmental Impact Statements DRAFT.* Wexford, Ireland.

Environmental Protection Agency, 2017. *Guidelines on information to be contained in Environmental Impact Assessment Reports DRAFT*. Wexford, Ireland.

Freeman's Journal (24th January 1880).

Government of Ireland, 2011. *Architectural Heritage Protection Guidelines for Planning Authorities.* Dublin, The Stationery Office.

Irish Architectural Archive. *Dictionary of Irish Architects 1720 – 1940*.

National Inventory of Architectural Heritage.

Thoms Street Directory.

Grace's Guide to British Industrial History

Gordon Knaggs & Associates, 2019. *Assessment of Timber Decay to Parkgate House.*

13 Landscape and Visual

13.1 Introduction

This section describes the likely significant visual effects of the proposed development on the environment surrounding the application site in relation to a proposed development on former industrial lands at Parkgate Street, Dublin. These lands are currently occupied by the Hickey Home Focus fabric company.

A detailed description of the proposed development is provided in **Chapter 3,** Description of the Proposed Development and **Chapter 4,** Construction Strategy.

This Chapter has been prepared by W.H. Hastings of ARC Architectural Consultants Ltd. Refer to **Appendix 1.1** for details on relevant qualifications and experience.

13.2 Assessment Methodology

13.2.1 General

A survey of the potential visibility of the proposed development was carried out having regard to the contents of the *Dublin City Development Plan 2016-2022* (including in particular the location of key views and prospects, protected structures, conservation areas and Strategic Development and Regeneration Areas). A survey of the potential visibility of the proposed development was carried out by ARC on several dates in the summer and autumn of 2018. Before visiting the surrounding area, ARC carried out mapping analysis to identify locations surrounding the application site, which would be representative of the extent of visibility of the proposed development, including locations from which views of the proposed development were likely. ARC's initial selection of views was discussed in meetings with Dublin City Council, beginning with a meeting in early October 2018. Following this and other meetings with Dublin City Council, 19 view locations were finally selected, and photomontages were prepared from these view locations by Model Works. These photomontages are appended to this document. ARC had regard to these photomontages in the preparation of this assessment of the visual effects of the proposed development on the built environment.

13.2.2 Guidance and Legislation

Chapter 1 of the *City Development Plan 2016–2022* is titled '*Strategic Context for the City Development Plan*'. Within that chapter under Section 1.2 A: New Approach, and the heading: '*Achieving a more sustainable and resilient city'*, are the following provisions:

The application of the following principles at all levels, from plan making to urban projects and development management, will help to deliver a better quality of life for all. The principles constitute inter-related and essential elements of a sustainable approach to future development of the city:

a) Economic – Developing Dublin as the national gateway at the heart of the Dublin region and the engine of the Irish economy, with a network of thriving spatial and sectoral clusters, as a focus for employment and creativity.

...

d) 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).

In Chapter 2: Vision and Core Strategy, Section 2.3.2 Shaping the City – Urban Form and Structure, includes the following:

The strategy of extending the inner city eastwards and westwards, towards the Docklands and Heuston respectively, is now complemented with a strategy for the quality consolidation of the inner city, protecting heritage while promoting diversity. The structure of the city will be augmented by the development of the SDRAs and the KDCs. There is an emphasis on the contribution that good streets and architecture can make to regeneration and a re-affirmation that Dublin will remain a predominantly low-rise city with defined height in limited locations

Section 2.3.12 Guiding Principles for Strategic Development and Regeneration Areas, adds the following:

The plan designates 18 strategic development and regeneration areas (SDRAs), see Table E, in addition to the inner city. These represent significant areas of the inner and outer city with substantial development capacity and the potential to deliver the residential, employment and recreational needs of the city. For each of these 18 SDRAs, guiding principles are provided, setting out how to optimise on the potential, the city role and the character of each area.

In Chapter 15: Strategic Development and Regeneration Areas: Guiding Principles for Development, Section 15.1.1.10: SDRA 7 Heuston and Environs, begins as follows:

An urban design land-use framework plan for the regeneration of the Heuston area was produced in 2003. This plan provided a regeneration framework for key development sites addressing issues of spatial layout, urban grain, massing, height and land-use and the need to interface such sites successfully with the Phoenix Park, the River Liffey and cultural institutions. The vision for the area as set out in this study is: 'to create a coherent and vibrant quarter of the city that captures the public imagination with high quality services, development, design and public spaces that consolidate and improve the existing strengths of the area.'

The Section goes on to outline principles apply within SDRA 7. SDRA 7 is a relatively large area with varying characteristics, and not all the principles set out in Section 15.1.1.10 would apply to the development site discussed in this report. The most relevant principles in terms of potential visual impacts are:

1. *To develop a new urban gateway character area focused on the transport node of Heuston Station with world class public transport interchange facilities, vibrant economic activities, a high-quality destination to live, work and socialise in, a public realm and architectural designs of exceptional high standard and a gateway to major historic, cultural and recreational attractions of Dublin City.*
2. *To incorporate sustainable densities in a quality contemporary architecture and urban form which forges dynamic relationships with the national cultural institutions in the Heuston environs.*
3. *To ensure the application of best practice urban design principles to achieve:*
    - *A coherent and legible urban structure within major development sites*
    - *A prioritisation on the provision of public space*
    - *A successful interconnection between the development site and the adjacent urban structure*
4. *To protect the fabric and setting of the numerous protected structures and national monuments, many of which are major national cultural institutions*

7. *As a western counterpoint to the Docklands, the Heuston gateway potentially merits buildings above 50 m (16-storeys) in height in terms of civic hierarchy.*
9. *Other important visual connections to be respected include Chesterfield Avenue to Guinness Lands and from key parts of the City Quays to the Phoenix Park (Wellington Monument).*

Paragraph 8, not quoted above, refers to the 'Cone of Vision' between the Royal Hospital Kilmanham and the Phoenix Park. The site of the proposed development is well outside the 'Cone of Vision'. The visual connections referred to in Paragraph 9 are referred to as 'other' because they are not those mentioned in Paragraph 8.

The 'Cone of Vision' and the 'visual connections' mentioned in Paragraph 9, above, are indicated on the map for SDRA 7, Figure 27 in the City Development Plan. In Chapter 4: 'Shape and Structure of the City', Figure 4 of the City Development Plan, titled 'Key Views and Prospects (indicative)' indicates views and prospects in a City wide context. The 'Cone of Vision' is one of the views and prospects shown in the Figure 4 map. The two 'visual connections' listed on Paragraph 9 of the SDRA 7 text are not included in Figure 4. These two 'visual connections' are stated by the Planning Authority as being of importance in relation to SDRA 7. However, their omission from Figure 4 of the Development Plan suggests that these two 'visual connections' are not of importance in a City wide context .

The map for SDRA 7, Figure 27, indicates the 'Cone of Vision' and the two 'visual connections' as bounded by dotted yellow lines, and in the key to the map these lines are labeled as 'Important Views and Prospects'. The map is quite diagrammatic, and the yellow dotted lines do not accurately replect the reality on the ground of the 'Cone of Vision' or, in particular, the 'visual connections' under Paragraph 9.

For instance the map shows a visual corridor for what is referred to in Paragraph 9 as views '*from key parts of the City Quays to the Phoenix Park (Wellington Monument)'.* However, views of the Wellington Monument from City Quays are for the most part well outside the visual corridor shown on the map, an example being views from Victoria Quay, which are the most open views of the Monument from the Quays.

Chesterfield Avenue in the Phoenix Park has two distinct alignments. The short section of Chesterfield Avenues between the first roundabout and Parkgate Street aligns somewhat more towards the north and east than the main alignment of the Avenue, which runs dead straight from the Castleknock Gate the whole way to that first roundabout, the roundabout nearest the City. The view corridor of the first short alignment of the Avenue touches the south west corner of the site of the proposed development, but the visual corridor of the main alignment passes well west of the subject site. These different alignments are not reflected in Figure 27.

As is discussed further on in this chapter, there is no historic relationship between Chesterfield Avenue and Guinness Lands, nor is there any historic relationship between the Wellington Monument and the City Quays.

The site of the proposed development lies within a Conservation Area and there is extensive discussion of policies relater to Conservation Areas in Chapter 11: Built Heritage and Culture of the Development Plan. In Section 11.1.5.4 it is stated that:

> *Dublin City Council will thus seek to ensure that development proposals within all Architectural Conservation Areas and Conservation Areas complement the character of the area, including the setting of protected structures, and comply with development standards.*

At Section 11.1.5.6 Conservation Area – Policy Application it is stated that:

> *All new development must have regard to the local context and distinctiveness and the contribution to the local scene of buildings, landmarks, views, open spaces and other features of architectural, historic or topographical interest. The general design principles are set out in a separate policy but it is particularly important within Conservation Areas that design is appropriate to the context and based on an understanding of Dublin's distinctive character areas.*
>
> *New development should have a positive impact on local character. In seeking exemplary design standards, the planning authority will require development in Conservation Areas to take opportunities to enhance the area where they arise.*

It is noted that, since the adoption of the Development Plan, the Department of Housing, Planning and Local Government published the *Urban Development and Building Height Guidelines for Planning Authorities* (December 2018). Those guidelines seek to address concerns that setting building height limits in local planning policy may hinder the implementation of national planning policy by setting out performance-based criteria for the assessment of taller buildings. However, the area of the application site has already been identified for increased building heights in statutory planning policy. Nonetheless, the criteria under the *Building Height Guidelines* must be considered as Section 3.2 provides:

> *3.2 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:"*

The Building Height Guidelines goes on to list 17 criteria under 4 headings. Aspects of 6 of these 17 criteria are considered relevant to visual impact and are discussed in this chapter of the EIAR. These 6 criteria and the other 11 are addressed in the Planning Report that has been included in the Planning Application documentation. The 6 headings considered to be relevant to this chapter are:

At the scale of the relevant city/town

- *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.*

It is noted that these 6 criteria from the *Build Height Guidelines* use key words and phrases such as: '*enhance the character and public realm', 'make a positive contribution to place-making', 'makes a positive contribution to the urban neighbourhood', 'enhances the urban design context for public spaces',* and *'the improvement of legibility'.* These words and phrases, and the general thrust of the 6 criteria above, echo the stated objectives under SDRA 7. In terms of visual character and likely visual effects the 6 criteria above are broadly consistent with the objectives of SDRA 7 and with the Vision and Core Strategy for the City as set out in Chapter 2 of the *Dublin City Development Plan 2016-2022*.

Section 13.8: Other Development Affecting the Setting of a Protected Structure or an Architectural Conservation Area of the Architectural Heritage Protection Guidelines for Planning Authorities (2011) states the following:

13.8.1. When dealing with applications for works outside the curtilage and attendant grounds of a protected structure or outside an ACA which have the potential to impact upon their character, similar consideration should be given as for proposed development within the attendant grounds. A visit to the site should be considered an essential part of the assessment.

13.8.2. New development both adjacent to, and at a distance from, a protected structure can affect its character and special interest and impact on it in a variety of ways. The proposed development may directly abut the protected structure, as with buildings in a terrace. Alternatively, it may take the form of a new structure within the attendant grounds of the protected structure. A new development could also have an impact even when it is detached from the protected structure and outside the curtilage and attendant grounds but is visible in an important view of or from the protected structure.

13.8.3. The extent of the potential impact of proposals will depend on the location of the new works, the character and quality of the protected structure, its designed landscape and its setting, and the character and quality of the ACA. Large buildings, sometimes at a considerable distance, can alter views to or from the protected structure or ACA and thus affect their character. Proposals should not have an adverse effect on the special interest of the protected structure or the character of an ACA.

The proposed development is in a Conservation Area, but not an Architectural Conservation Area. However, there are numerous Protected Structures in the general area, and, since the proposed development includes a tall structure, there is the potential for the existence of the proposed development to give rise to visual effects on the setting of some surrounding protected structures. This is discussed further in this chapter.

13.2.3 Study Area

The assessment of the potential for visual effects arising from the existence of the development examined the River Liffey Corridor from Dublin Port to west of Island Bridge, the Phoenix Park and the lands of the Royal Hospital Kilmanham, and areas of Dublin City north, east and south of the subject site up to a distance of 1 kilometre from the site. The assessment concentrated on the more important public streets and spaces.

13.2.4 Site Visits

A survey of the potential visibility of the proposed development was carried out by ARC on several dates in the summer and autumn of 2018. The area was revisited on a number of dates in 2019.

13.2.5 Consultation

Since the summer of 2018, there has been continuous consultation between ARC, design team and the planning consultants in relation to the significance of views towards and from the subject site. This consultation included discussion of view locations suggested by ARC and of views of the proposed development as seen from various viewpoints. This process informed both the assessment of visual effects and design of the proposed development.

As part of the Strategic Housing Development process, there has been a series of meetings with the Planning Authority and with An Bord Pleanála. ARC has attended a number of meetings with Dublin City Council, attended by the Planning and Conservation Departments. The first of these meetings was in October 2018 and the most recent on the 18th of November 2019. In addition to meetings attended by ARC, there have been numerous meeting between the Planning Authority and the design team and planning consultants. ARC has been kept informed on the content of and outcomes from these meetings.

Arising from these meetings there appears to be agreement as to which view locations are most critical in terms of the potential for visual effects on the surrounding City. During the long sequence of meetings, the Planning and Conservation Departments have expressed reservations about aspects of the design of the proposed development; and this has given rise to an iterative process whereby concerns expressed have informed a series of design changes to the scheme. This gradual refinement of the design is relevant to the assessment of visual effects.

Again as part of the Strategic Housing Development process material has been provided to An Bord Pleanála and there was a meeting with the Board, attended by the development team and the Planning Authority on the 18th of September 2019. ARC also attended this meeting. Subsequent to the meeting the Board issued a Pre-Application Consultation Opinion, and ARC's assessment has had regard to this opinion.

13.2.6 Categorisation of the Baseline Environment

In order to categorise the baseline visual environment, ARC conducted numerous visits to the application site and the surrounding area. ARC referenced the contents of the *Dublin City Development Plan 2016-2022* (including in particular the location of key views and prospects, protected structures, conservation areas and Strategic Development and Regeneration Areas). ARC also carried out significant research into the historic and visual character of the area, as detailed in Section 13.3 below.

ARC also had regard to paragraphs 6.32- 6.34 of the UK *Guidelines for Landscape and Visual Impact Assessment* (Third Edition), published by the Landscape Institute and Institute of Environment Management & Assessment, in relation to the susceptibility of visual receptors to change. The Guidelines state:

The susceptibility of different visual receptors to changes in views and visual amenity is mainly a function of:

- *the occupation or activity of people experiencing the view at particular locations; and*
- *the extent to which their attention or interest may therefore be focused on the view and the visual amenity they experience at particular locations.*

The visual receptors most susceptible to change are generally likely to include:

- *residents at home…*
- *people, whether residents or visitors, who are engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focused on the landscape and on particular views;*
- *visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience;*
- *communities where views contribute to the landscape setting enjoyed by residents in the area.*

Travellers on road, rail or other transport routes tend to fall into an intermediate category of moderate susceptibility to change. Where travel involves recognised scenic routes awareness of views is likely to be particularly high.

Visual receptors likely to be less sensitive to change include:

- *people engaged in outdoor sport of recreation which does not involve or depend upon appreciation of views of the landscape;*
- *people at their place of work, whose attention may be focused on their work or activity, not on their surroundings, and where the setting is not important to the quality of working life (although there may on occasion be cases where views are an important contributor to the setting and to the quality of working life.*

13.2.7 Impact Assessment Methodology

The assessment of visual impacts on landscape and on the built environment had regard to the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* prepared by the Environmental Protection Agency (Draft of 2017), and to Directive 2011/92/EU (as amended by Directive 2014/52/EU) on the assessment of the likely effects of certain public and private projects on the environment.

The list of definitions given below is taken from *Table 3.3: Descriptions of Effects* contained in the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* prepared by the Environmental Protection Agency. Some comment is also given below on what these definitions might imply in the case of visual impact or landscape and visual impact. The definitions from the EPA document are in italics.

- *Imperceptible: An effect capable of measurement but without significant consequences.* The definition implies that the development would be visible, capable of detection by the eye, but not noticeable to the casual observer. If the development were not visible, there could be no impact.
- Not Significant: An effect which causes noticeable[2] changes in the character of the environment but without significant consequences (the footnote '2' to the word 'noticeable' is: 'for the purposes of planning consent procedures'). The definition implies that the development would be visible, capable of detection and of being noticed by an observer who is actively looking for the development with the purpose of assessing the extent of its visibility and visual effects.
- *Slight: An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.* For this definition to apply, a development would be both visible and noticeable, and would also bring about a change in the visual character of the environment. However, apart from the development itself, the visual sensitivity of the surrounding environment would remain unchanged.
- Moderate: An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends. In this case, a development must bring about a change in the visual character of the environment; and this change must be consistent with a pattern of change that is already occurring, is likely to occur, or is envisaged by policy.
- *Significant: An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.* The definition implies that the existence of the development would change an important characteristic of the visual environment in a manner that is not '*consistent with existing and emerging baseline trends'.* Whether an effect might or might not be significant can depend on the response of individual observers, since what one person might regard as a sensitive aspect of the visual environment, another might not.

- Very Significant: An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment. The definition implies that the existence of the development would substantially change most of the visual characteristics of the environment in a manner that is not 'consistent with existing and emerging baseline trends'.
- *Profound: An effect which obliterates sensitive characteristics.* In visual terms, profound impacts are only likely to occur on a development site, in that it is only on the site that all previous visually sensitive characteristics could be obliterated. Outside the site, some visual characteristic of the original environment is likely to remain.

The range of possible impacts listed above deal largely with the extent of impact; and the extent of the impact of a development is usually proportional to the extent to which that development is visible. The extent of impact will also, in part, depend on the sensitivity of the spaces from which the development is seen. This proportionality may be modified by the extent to which a development is regarded as culturally or socially acceptable. The character of the impact: positive, negative or neutral, will depend on how well a development is received by the public, and on the general contribution of the development to the built environment. The character of a visual impact, and even the duration of a visual impact, is very dependent on the attitude of the viewer. If a viewer is opposed to a new building for reasons other than visual, that viewer is likely to see the building in a negative light, no matter how beautiful the building might be. Though buildings are intended to be permanent, and will be permanently visible, the extent of visual impact associated with a building often diminishes with time as further development in the area takes place.

13.3 Baseline Conditions

The site of the proposed development is located in an historic area of the City, and there are important locations in the surroundings that are both historic and play a role in shaping the present character of the area. These locations include; the River Liffey both east and west of the development site, the Phoenix Park and features within the Park, Collins Barracks, the Guinness Brewery, Heuston Station, Dr Steeven's Hospital (HSE), and the Royal Hospital Kilmanham. There is likely to be visual interaction between each of these historic locations and the proposed new development, and objectives of the *Dublin City Development Plan 2016-2022* call for development in the Heuston and Environs Strategic Development and Regeneration Area, SDRA 7, to play a role in reshaping the character of the area.

In order to understand the significance of likely visual interactions between the proposed development and each of the historic areas listed above, it is important first to understand the significance of these historic locations in themselves, and how they contribute to existing urban form and character. What these places are like now is not how they always were, and how they are now perceived is not how they might have been perceived in the past, or were intended to be perceived.

Understanding the role these places played in the Dublin of the past enriches our understanding of their present contribution to the City, and how it might be appropriate for new development to interact with them.

The Phoenix Park and the Royal Hospital Kilmanham came into being in the 17th century. Collins Barracks, Dr Steeven's Hospital and the Guinness Brewery are all from the 18th century. Mapping evidence shows that the River Liffey had no crossings close to the development site until well into the 19th century, and until the 19th century the quay walls along the river did not extend as far west as they do now. Heuston Station, originally Kingsbridge is mid 19th century. The development site itself was part of open ground on the north bank of the River, the Long Meadows, until the Phoenix Ironworks were founded on the site in 1808.

There are many written references to these historic locations, modern references and references from the past. Extracts from some of these references are reproduced below so as to provide insight into these historic places, their development and their significance. Several extracts from one particular early 19th century book are quoted below This is Warburton Whitelaw and Walsh's *History of the City of Dublin*, published in 1818. This large reference book is particularly useful because it was published just a few years after the first buildings of the Phoenix Ironworks were erected on the development site, and provides a contemporary account of Dublin at that time. This book is not merely a history but also, as detailed on the title page, contains descriptions of the City's *'Present Extent, Public Buildings, Schools, Institutions, Etc.*', in 1818. Other reference books and sources are also cited below.

The Phoenix Park

In the medieval period lands now associated with the Royal Hospital Kilmanham and part of the lands north across the River Liffey that are now within the Phoenix Park were in the possession of the Knights Hospitallers of St. John of Jerusalem. A footnote in Warburton Whitelaw and Walsh's *History of the City of Dublin* states:

> *A priory dedicated to John the Baptist was founded on or near the site of the ancient abbey of Kilmaignend, about the year 1174, for Knights Templars, by Richard Earl of Pembroke, the famous Strongbow. On the dissolution of that order in 1312, their possessions of every kind were conferred on the Knights of St. John of Jerusalem.*

With the Suppression of the Monasteries in the 1530s, these lands became the property of the crown. According to Weston St John Joyce in his book, *The Neighbourhood of Dublin,* first published 1912. These lands together with additional lands north of the River were ceded to Sir Richard Sutton in 1611 in exchange for certain lands in Cornwall. Sutton later sold the lands to Sir Edward Fisher, who built a house he called 'The Phoenix' on an elevated site, later occupied by the Magazine Fort. In 1618, the Crown reacquired the lands from Sir Edward Fisher. The Crown then went on to purchase adjacent lands so as to assemble lands for a Viceregal demesne and deer park. In the 1660s, sufficient lands having been assembled, it was decided to build a wall around the main part of the lands north of the River to enclose the deer park, which became the Phoenix Park.

The Crown still held lands outside the wall, lands on the north side of the Liffey between the Park and the River and extensive lands south of the River.

In 1745, Philip Dormer Stanhope, later Earl of Chesterfield was appointed Viceroy, a post he held for less than 2 years. However during his short time as Viceroy he, according to Weston St John Joyce:

> *ornamentally planted and laid it out the Park, constructed the Main Road, and erected the Phoenix column; besides opening the greater portion of the Park to the public.*

The Main Road through the Park as laid out by Lord Chesterfield is not the current Chesterfield Avenue. Its current alignment, which dates from the mid 19th century was part of recommendations made by the great architect and urban designer Decimus Burton, who played a major role in the design of some of London's great parks.

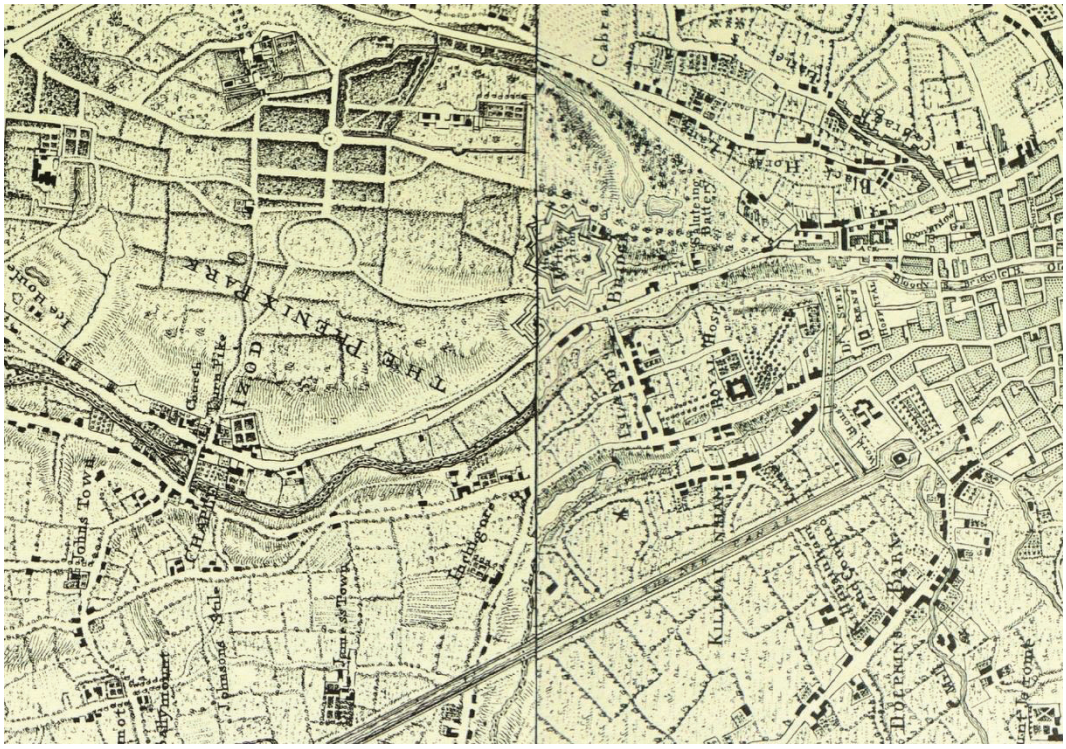

Figure 13.1: Extract from John Rocque's map of the County of Dublin, 1760, showing the layout of the Phoenix Park following the improvements introduced by the Earl of Chesterfield in the late 1740s. The Star Fort proposed by the Earl of Wharton in 1710, never finished, is seen near the east end of the Park

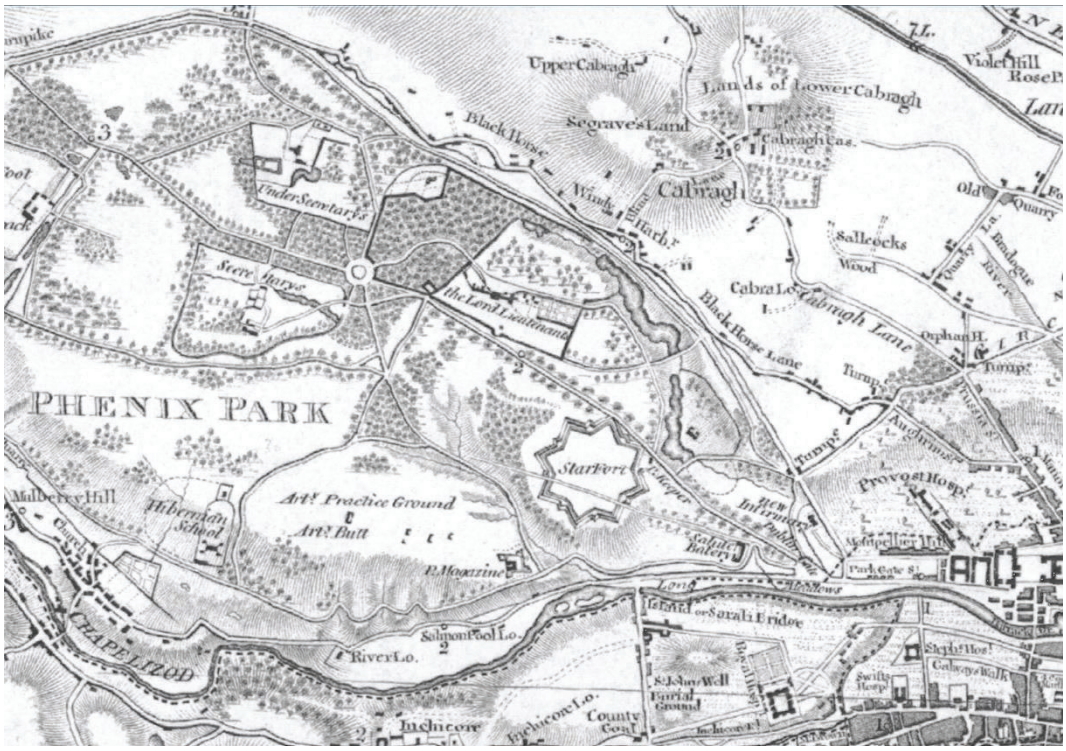

Figure 13.2 Extract from Taylor's map of 1816, showing the state residences to the north of the Park and a line of military establishments along the south side including the Hibernian Military School, an Artillery Practice Ground, the Magazine Fort, the Salute Battery and the Infirmary. (SDCC)

It is important to point out that the Phoenix park was a deer park and demesne, outside the city of Dublin, and does not appear to have been designed to have a relationship with the urban form of Dublin. In 1660, when the Phoenix Park was enclosed, it surroundings were rural not urban. This is clearly shown on the First Edition Ordnance map of 1837. In 1818 Warburton Whitelaw and Walsh describe the view from the Park as follows:

> *The exterior views from the Park are grand and beautiful. In the fore ground the river Liffey meanders through rich meadows, until it flows beneath the magnificent arch of Sarah's-bridge. The city itself terminates the horizon on the east. In front is a rich landscape highly embellished with country seats, through which the Grand Canal passes, marked in its course by fine rows of elms; and beyond all, the soft contour of the Wicklow mountains forms a suitable frame to the picture.*

The city is seen on the horizon, not in the foreground. Even now, views from the Park towards the City are limited. There are pictorial views from the Magazine Fort towards Dublin from the late 18th and early 19th century, but these views are now obscured by mature tree planting within the Park. Chesterfield Avenue, which has two slightly different alignments, seems to point in a general way towards the City, but it is not oriented towards any significant monument or building in the City. From each of the Avenue's two alignments the view to the City is terminated by structures in the Guinness Brewery. But these structures were not there when the Avenue was laid out, and Guinness have made regular changes to what is seen from the Avenue in order to meet the Brewery's needs.

The Phoenix Park, the residence, demesne and deer park of the Viceroy, was set up as part of the apparatus of the British Crown in Ireland. It was a focus of state and military establishments and institutions, both within the park and in the surrounding area. In the park there were the Viceregal Lodge, the Chief Secretary's Lodge the Under Secretary's Lodge, Mountjoy Barracks - Ordnance, the Magazine Fort, the Constabulary Barracks, the Royal Military Infirmary, the Hibernian Military School and the Wellington Monument, originally referred to as the Wellington Testimonial. or Trophy. There was even a star fort in the middle of the Park, part constructed but never finished, a bastion as a place of refuge in the event of invasion or insurrection. Outside the Park were the Royal Barracks, the Royal Artillery Barracks, and the Royal Hospital - for old soldiers.

Warburton Whitelaw and Walsh describe Barrack Bridge, crossing the Liffey well east of the Phoenix Park, which was rebuilt in 1859 as Victoria & Albert Bridge and is now renamed as Rory O'More Bridge:

> *The bridge was first constructed of wood in 1671, and in consequence of an affray on it, in which four persons lost their lives, was called Bloody-bridge. Being afterwards built of stone, and situated not far from the barracks, it has been since named BARRACK-BRIDGE. It is a plain structure of four semi-circular arches, but at the south end, there has been lately erected a grand Gothic gateway leading to the Royal Hospital of Kilmainham.*

This gateway, named on the First Edition Ordnance map as the Richmond Guard Tower, is shown on that map leading to a road called Military Road that ran west from Barrack Bridge, crossing lands now occupied by part of the Guinness Brewery, on to the line of St John's Road West and then to a wide expanse of open land entirely surrounded by military establishments on the south side of the Liffey. This military arena extended north across the River to include the Royal Barracks, the Royal Military Infirmary and the Magazine Fort. On high ground at the centre of this military panorama there was gun battery, the Salute Battery, where salutes were fired at times of celebration. This was the location eventually chosen for the Wellington Testimonial, a focus at the centre of a military world. Warburton Whitelaw and Walsh speak of the Salute Battery as follows:

> *The Salute Battery, situated on the highest ground in the Park. It mounts twelve pieces of cannon, twelve pounders, which are fired on rejoicing days; but as such are not likely to occur as often as formerly, its site has been given by the Board of Ordnance to the Wellington Committee, for the erection of the Grand Trophy.*

The John Rocque's maps of 1756 and 1760, Taylor's map of 1816, Duncan's map of 1821 and the First Edition Ordnance map of 1837 all confirm the enormity of the military complex surrounding the site of the Wellington Monument at the time of its construction. Some of the military buildings have retained their names and purposes; others have changed. The Royal Military Infirmary is now the Department of Defence, the Royal Barracks is now Collins Barracks; the Artillery Barracks is now Clancy Quay; the Hibernian Military School is St Mary's Hospital.

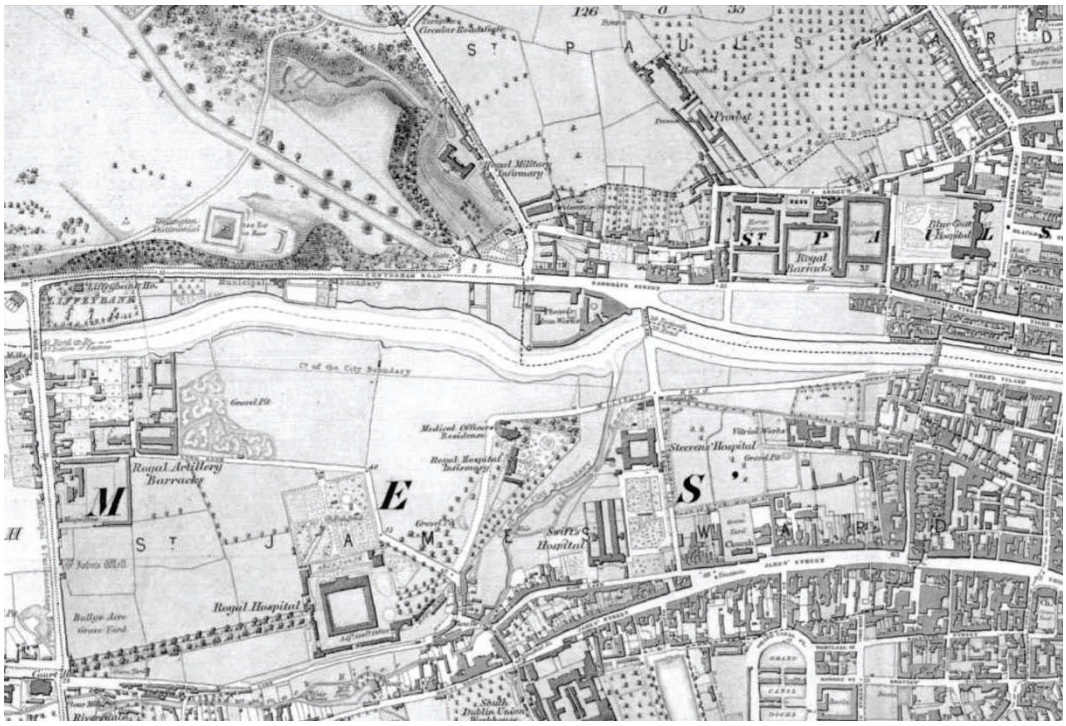

Figure 13.3 Extract from the First Edition Ordnance map of 1837, showing the expanse of open land north of the Royal Hospital Kilmanham between it and the River Liffey, stretching from Watling Street at the east to the Artillery Barracks at Island Bridge at the west. The confluence of the Camac with the Liffey is shown where Heuston Station now stands.

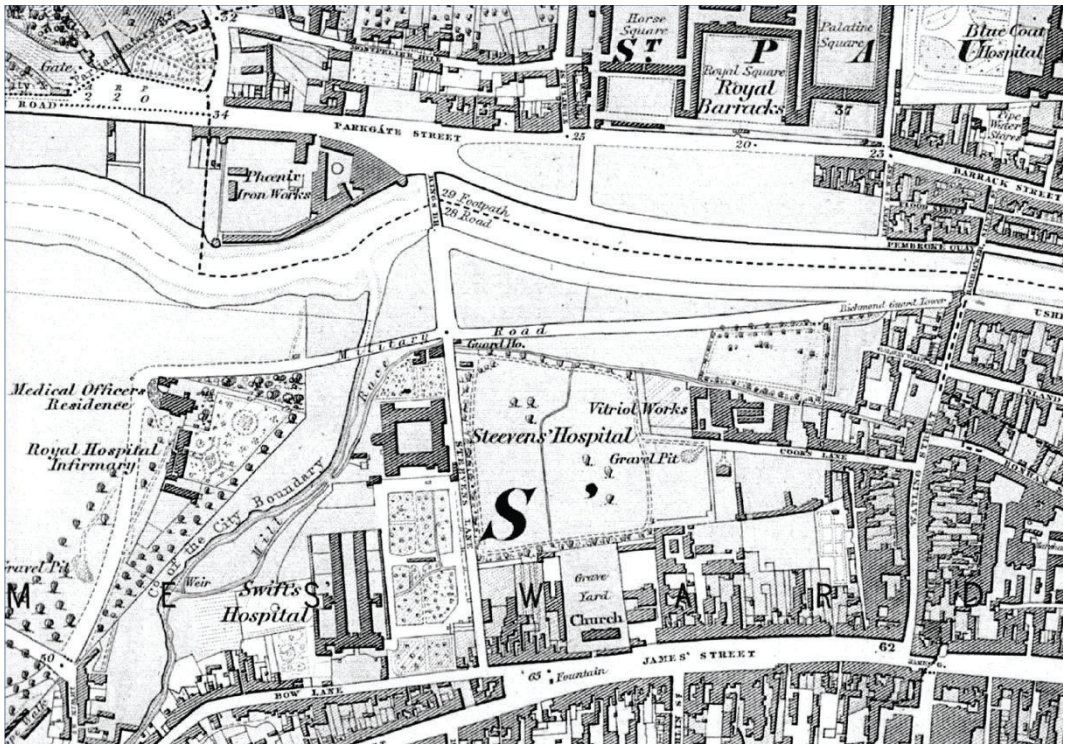

Figure 13.4: Detail from the First Edition Ordnance map of 1837 showing the Richmond Guard Tower, the gateway to the Royal Hospital at the river end of Watling Street. The map also shows no evidence of the Guinness Brewery between James's Street and the River.

The Wellington Monument

What is now referred to as the Wellington Monument was initially called the Wellington Testimonial or Trophy. There was a competition for the design of the monument. The Dictionary of Irish Architects lists 10 of the entrants including George Papworth. The winning design was by Sir Robert Smirke. The foundation stone was laid on the 18th of June 1817, the anniversary of the Battle of Waterloo. The Wellington Testimonial was not popular, and aspects of the design had to be abandoned. The original design included an equestrian statue of the Duke on a plinth standing to the side of the monument. The monument took many years to build and was not finally completed until the 1860s

Commentary on the design monument is found in Warburton Whitelaw and Walsh's History of the City of Dublin, published just a year after the foundation stone was laid. Parts of the commentary by Warburton Whitelaw and Walsh, quoted below, are in the present tense. The commentary is on the design not the actual monument, since construction had only just begun.

THE WELLINGTON TROPHY, OR," TESTIMONIAL."

Before offering a remark, let the reader judge from a just and exact description of the chosen model, (of which the annexed vignette is a correct figure), how far it is likely to produce the effect and promote the design intended.

On the summit platform of a flight of steps, of an ascent so steep and a construction so uncouth, that they seem made to prohibit instead of to invite the spectator to ascend them, a pedestal is erected of the simplest square form, in the die of which, on the four sides, are as many pannels, having figures in basso-relievo emblematic of the principal victories won by the Duke. Before the centre of what is intended for the principal front is a narrow pedestal insulated, and resting partly on the steps and partly on the platform. This pedestal supports an equestrian statue of the hero. From the platform, a massive obelisk rises, truncated and of thick and heavy proportions. On the four façades of the obelisk are inscribed the names of all the victories gained by the Duke of Wellington, from his first career in India to the battle of Waterloo. The whole structure is to be of plain mountain granite, without any other decoration whatever.

...

The figure, simple as it is, betrays a great poverty of invention. The model seems to have been borrowed from those little obelisks made of spar, the common ornaments of chimney pieces, which the monument in question resembles in everything but size and polish. But the obelisk form is not the only objection to the Wellington Testimonial. Its base, composed of an inclined plane of inconvenient steps, is abrupt and unsightly. The pedestal, with the basso-relievos, though the least exceptionable part, resembles a huge tomb-stone, to which a minor pedestal is attached, like an excrescence, on which is placed the Equestrian Statue, that contrives to conceal the figures sculptured on the front entablature, whilst the shaft of the obelisk is remarkably clumsy. Judging therefore from the model, the tout ensemble produces an effect singularly heavy, bald, and frigid.

This monument was proposed to be erected in the middle of Stephen's Green, or of Merion-square, but the inhabitants seeing that its inelegant form, and lumpish shape, making its huge unadorned base equal in magnitude to the highest house, refused to give it admission. Upon this rejection, the site of the Salute Battery in the Phoenix Park has been given for its erection, and this change of place is fortunate.

It is to be noted, therefore, that the Wellington Monument was located in the Phoenix Park as an afterthought, on a site behind the Salute Battery. There does not appear to be any evidence for the location of the Monument having been part of any intended or designed relationship with the City.

John D'Alton writing 20 years later in his book *the History of the County of Dublin*, published in 1838, doesn't differ greatly:

The Wellington testimonial next engages attention an ill-proportioned structure, of plain unornamented mountain granite. On the summit platform of a flight of steep steps, a simple square pedestal is erected, designed to present pannels at the sides, commemorating the Duke's achievements, but they have never been put up. In front of this pedestal is a much smaller pediment, resting partly on the steps, and partly on the main platform, and which was intended to support an equestrian statue of his Grace, also unaccomplished. From the main platform a massive obelisk rises truncated, and of thick and heavy proportions.

It would appear that the 'pannels' referred to by D'Alton were eventually put up in the 1860s.

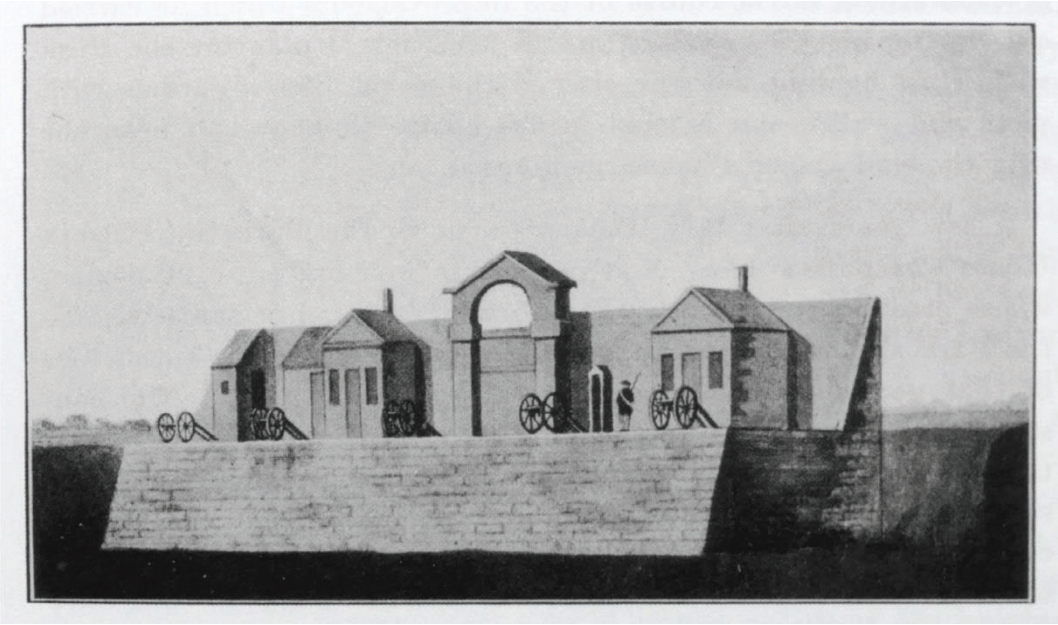

Figure 13.5 The Salute Battery in 1795 as illustrated in Francis Elrington Ball's '*History of the County of Dublin, Part 4'*, 1906. After proposed sites in the City had been rejected by residents, the Board of Ordinance offered a site for the Wellington Testimonial behind the Salute Battery.

Figure 13.6 Extract from Duncan's map of 1820 showing the location of the Wellington Testimonial beside the Salute Battery surrounded by military establishments: Three Barracks, The Magazine, the Royal hospital, the Royal Infirmary and the War Secretary's house. (SDCC)

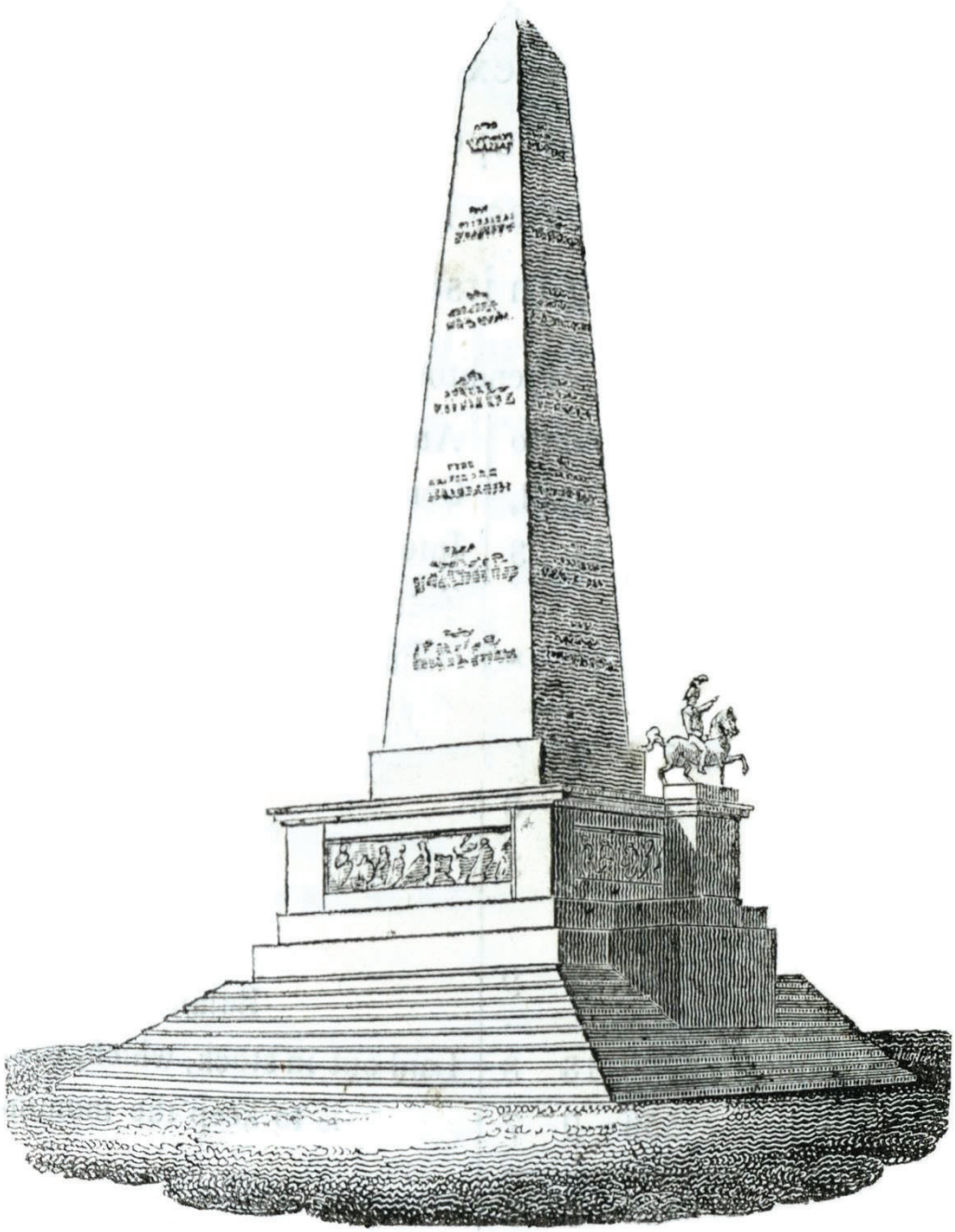

Figure 13.7: Illustration of the Wellington Testimonial from Warburton, Whitelaw & Walsh's *'History of the City of Dublin'*, published in1818, a year after the foundation stone for the monument was laid. The monument was not completed until the 1860s.

The Royal Infirmary

The Royal Military Infirmary, now the Department of Defence is at the edge of the Phoenix Park on Infirmary Road, behind and just north of the Criminal Courts of Justice. The design of the building is credited to James Gandon, who designed the Custom House and the Four Courts. Warburton Whitelaw and Walsh's account of the building begins as follows:

> *ROYAL MILITARY INFIRMARY.*
>
> *The Royal Military Infirmary is a well built fabric of Portland stone. Its front consists of a centre surmounted by an handsome cupola and clock, and two returning wings 90 feet in depth. The whole extends 170 feet, exhibiting a façade by no means inelegant in itself, and adding a striking feature to the surrounding beautiful scenery.*
>
> *It is delightfully situated on a high ground in the south-east angle of the Phœnix Park, commanding extensive and uninterrupted prospects over the Park, and a fine country; which lavishly displays a great variety of land richly embellished with wood and water, assisted with various works of art: thus deriving all the advantage that can be desired from a free and salubrious air. Over against this building to the south, on an equally elevated situation, stands the Old Soldier's Asylum at Kilmainham. Between the two buildings, at the bottom of a valley, runs the river Liffey, whose pleasing winding's for a considerable extent enriches the beauty of the scene; to which Sarah's Bridge, consisting of one elegant and light arch, some short distance up the river, contributes not a little.*

Warburton Whitelaw and Walsh Credit William Gibson with the design of the Infirmary and do not mention Gandon. However, it would appear that both Gandon and Gibson played a part in its design.

The Magazine Fort

The building of the Magazine Fort was ordered by the Duke of Dorset in 1734 with the intention of it being a 'retreat from disturbance, Christine Casey identifies John Corneille as the designer, and notes that additional buildings within the fort were constructed in 1801 to the design of Francis Johnston. Warburton Whitelaw and Walsh's description is as follows:

> *The Powder Magazine, erected in 1738. This is a regular square fort, with demi-bastions at the angles, a dry ditch, and drawbridge; in the centre are the magazines for ammunition, well secured against accidental fire, and bomb proof, in evidence of which no casualty has happened since their construction. The fort occupies two acres and thirty-three perches of ground, and is fortified by ten twenty-four pounders : as a further security, and to contain barracks for troops, which before were drawn from Chapel-izod, an additional triangular work was constructed in 1801.*

Warburton Whitelaw and Walsh and several other authors note that when Johnathan Swift saw the Magazine Fort while visiting the Phoenix Park, he was moved to pen the following lines:

Behold a proof of Irish sense,

Here Irish wit is seen,

When nothing's left that's worth defence,

We build a magazine

The Royal Barracks

The Royal Barracks, now Collins Barracks, was built in the beginning of the 18th Century. Christine Casey in *The Buildings of Ireland: Dublin*, published in 2005 begins here description of the buildings:

> *By virtue of their site and scale, the former Royal Barracks rank among the city's most conspicuous c18 buildings. Large-scale residential barracks were a thoroughly new building type, pioneered by the Irish establishment in the wake of the Williamite wars and funded by a tax on tobacco and beer. The Dublin barracks, the first and grandest of their kind in Europe, were instigated by the 2nd Duke of Ormonde who had acquired the site. The Surveyor General, Thomas Burgh, prepared plans; building was ongoing in 1706 and payments for completion were made in 1709–10. The original front comprised three three-sided squares open to the river, together constituting a monumental composition some 1,000 ft (304.8 metres) wide. The smallest and most westerly of the three was Horse Square, which accommodated stabling for 150 horses below housing for cavalry officers and men. At the centre was the largest, Royal Square, and to the east, later Brunswick, Square, both of which housed infantry officers and men. Behind Brunswick Square was the larger Palatine Square, which remained open to the east until the construction of a fourth range in the 1760s.*

It appears that the Royal Barracks was originally simply called the Barracks, probably because, as Christine Casey points out, barracks were a new concept. In 1818 Warburton Whitelaw and Walsh provide the following description:

> *BARRACKS.*
>
> *The city of Dublin has to boast of the most noble erections of this kind perhaps in Europe, whether considered in reference to salubrity of situation extent of building, or excellence of architecture. These barracks were erected in 1706, at the expence of the crown ; they stand at the western extremity of the city, on an airy and elevated eminence which overhangs the Liffy, and commands an extensive view of the town and the country contiguous to the river. They consist of several squares, three of which are built only on three sides, leaving the fourth open to the fine view and wholesome breeze. In the rere of these is the Palatine square, which forms a very noble quadrangle; it is built of hewn granite, and ornamented with a cornice and pediments at the opposite sides; at the western extremity is the horse barrack. The whole is capable of containing four battalions of foot and one of horse, or about 5000 men.*

Other 19th century commentators put the capacity of the Royal Barracks at closer to 2000 men. There appears the have been regular outbreaks of disease among the men billeted at the Royal Barracks, and that as a result of this problem, the central square, Royal Square, was demolished in the latter part of the 19th century, thereby removing the core of the original grand composition. Where the great central square once stood is now a car park.

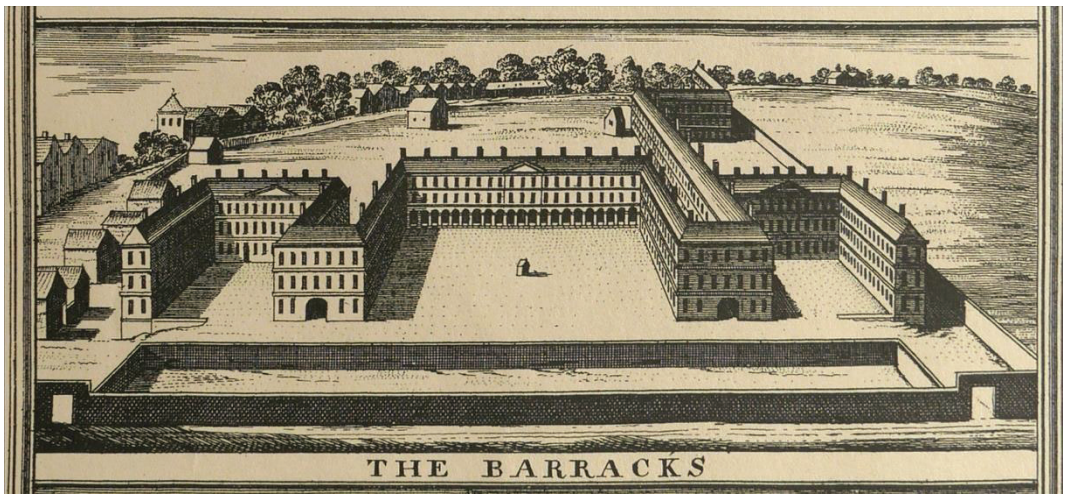

Figure 13.8: An Illustration of the Barracks, later the Royal Barracks, from Charles Brooking's Map of Dublin of 1728

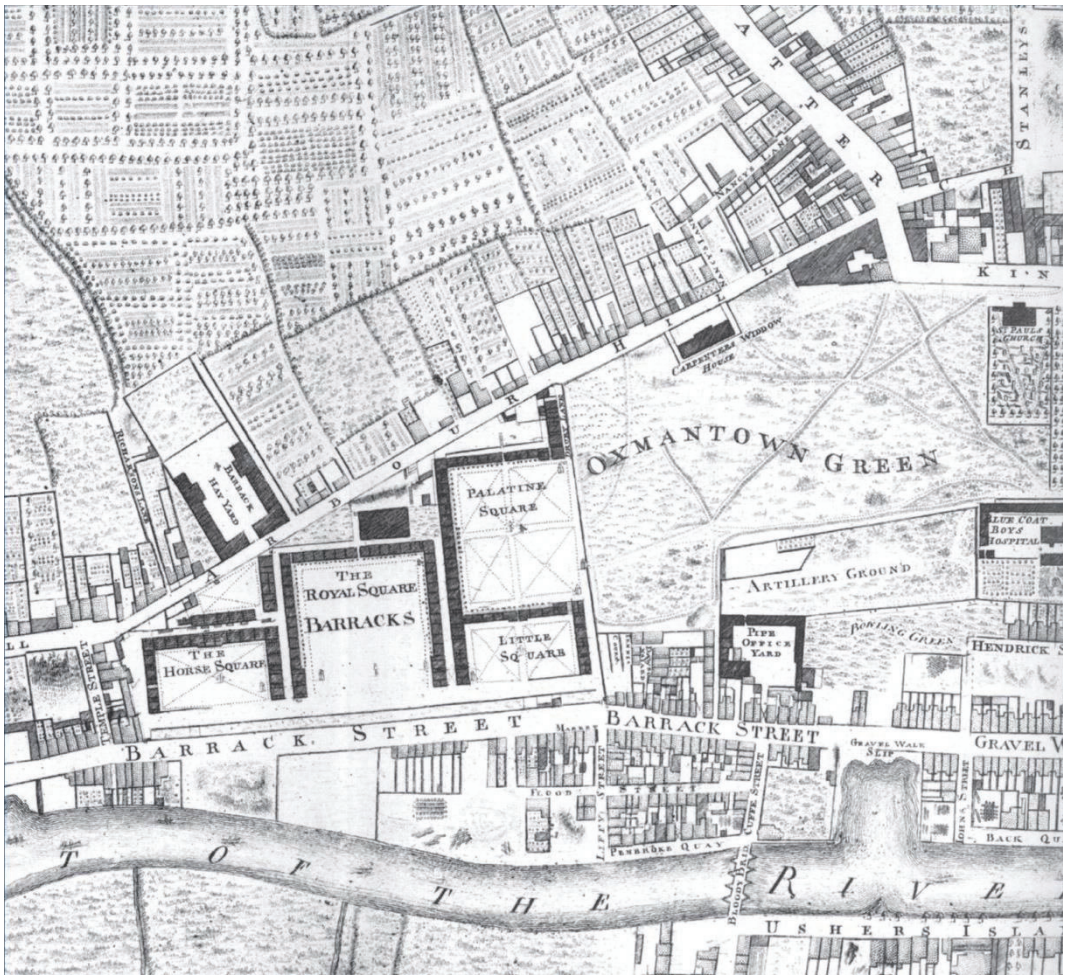

Figure 13.9: Extract from John Rocque's map of the City of Dublin of 1756, showing the Barracks. Arbour Hill is seen running from the south west to the north east across the back of the Barracks. The Blue Coat School is seen at the edge of the map to the right. Bloody Bridge is shown at the present location of Rory O'More Bridge. and there are no quays along the River west of Liffey Street West.

Dr Steeven's Hospital

Dr Steeven's Hospital, which now houses the headquarters of the Health Service Executive, was also designed by Thomas Burgh, architect of the Royal Barracks and was built only a few years later. Warburton Whitelaw and Walsh provide the following outline:

> *DR. STEEVENS'S HOSPITAL.*
>
> *Dr. Richard Steevens, a physician of Dublin in 1710, bequeathed his real estate, situate in the county of Westmeath and King's County, and set for lives, renewable for ever, at the yearly rent of £604..4..0. to his sister, Grisilda Steevens, during her life, and after her decease vested it in trustees, for the purpose of erecting and endowing an hospital near Dublin, for the relief and maintenance of curable poor persons, and to be called Steevens's Hospital.*
>
> *Mrs. Steevens becoming possessed of the estate, was extremely desirous to see her brother's intention executed, and with a disinterestedness truly*

Christian, soon after his death purchased ground for the purpose, situate near the southern bank of the Liffey, to the north-eastward of the Royal Hospital, on which she commenced the present spacious edifice in 1720.

The Royal Hospital Kilmanham

The building of the Royal Hospital Kilmanham was begun in 1680 on lands that were once belonging to the Knights Templar and later the Knights Hospitallers of St. John of Jerusalem. The founding of the Royal Hospital Kilmanham is amply described by Warburton Whitelaw and Walsh:

ROYAL HOSPITAL KILMAINHAM

Ireland having enjoyed many years of peace during the reign of Charles II, the army, living without action, produced in about twenty years many old soldiers, who, unfit for service, ignorant from long disuse, of any arts or trades, and incapable of hard labour, must have perished, if dismissed without any provision: to make some competent provision was, therefore, an object of humanity, and the plan of founding an hospital for this purpose, seems to have originated with Arthur Earl of Granard, marshal-general of the army in Ireland, in or about the year 1675, who probably conceived the idea from that noble establishment, the Hospital of Invalids founded by Lewis XIV. at Paris. The Earl of Essex, then Lord Lieutenant, took some preparatory steps towards furthering the plan, but being removed from the government, nothing further was done till the arrival of the Duke of Ormond in the year 1677

The foundation stone of this edifice was laid by his grace the Duke of Ormond, on the 29th of April, 1680, and the second by Francis Earl of Longford, master-general of the ordnance. The foundation-stone is the lowermost in the north-west quoin of the north-west flanker, and bears his Grace's name, and day of the month, and year when laid. The foundations are on a dry, firm, ponderous clay, mixed with gravel ; and the work was carried on with such expedition, that on the 25th of March 1684, as many invalids as were objects for the institution, were received and accommodated with every necessary.

The chapel was completed in 1987 and the tower, to a design by Thomas Burgh, in 1705. Warburton Whitelaw and Walsh, writing in 1818 describe the facades of the south, east and west ranges as being of brick. It is unfortunate that the brick on these facades is no longer exposed.

As has been mentioned above, there was an entrance gateway to the Royal Hospital at the south bank of the River Liffey a considerable distance to the east at the foot of Watling Street, at Barrack Bridge, now Rory O'More Bridge. The road from the gateway, as shown on the 1837 First Edition Ordnance map, was called Military Road, and ran west from the gateway across lands now part of the Guinness Brewery, onto the line of St John's Road West, before turning south as the curving section of road that leads up to the present gate of the Royal Hospital, and which is still called Military Road.

It appears from the 1837 Ordnance map that the Royal Hospital commanded lands down to the River Liffey all the way from Watling Street west as far as the Artillery Barracks at Island Bridge, now called Clancy Quay.

Kingsbridge Station

Kingsbridge Station was the Dublin terminus of the Great Southern & Western Railway, regarded as the premier railway company of Ireland. The first line built by the Great Southern & Western Railway was from Dublin to Carlow. The engineer was Sir John Macneill and the contractor was William Dargan. Both Dargan and Macneill were very experienced and had worked with the great British engineer Thomas Telford.

The line to Carlow involved 70 miles of railway, ten stations, including those at Sallins, Newbridge, Kildare, Athy and Carlow and dozens of bridges. Work began in January 1845 and the railway opened on the 4th of August 1846, just over 18 months later, an extraordinary feat. John Macneill designed the passenger sheds at Kingsbridge. A notable feature of Kingsbridge Station is that it sits on top of the confluence of the Camac River with the Liffey and that the Liffey was wider, with its southern bank further to the south, before the Camac was culverted and the station built over it. The location of the culverted river appears to be under the concourse behind the terminal building and east of the platforms.

The commission for the design of the terminal building at Kingsbridge was awarded to an English architect, Sancton Wood after a competition in 1845. Sancton Wood was the unanimous choice of the London committee of the Great Southern & Western Railway Company. The Dublin committee had favoured an entry by John Skipton Mulvany. Whereas the passenger sheds were in place by the opening of the railway in August 1846, the main terminal building was not completed for some time, and is marked on the 1847 Ordnance map as ‘Unfinished’.

Both Dargan and Macneill made fortunes through their work on the railway and through investment in railway shares. The Great Industrial Exhibition was held on Leinster Lawn in Dublin 1853. It lasted from the 12th of May to the 31st of October, Queen Victoria accompanied by the Prince Consort and the Prince of Wales, paid an official visit on the 29th of August. The Queen also visited Dargan at his home at Mount Anville. William Dargan personally paid for most of the cost of the Great Exhibition, and in thanks for his generosity the National Gallery was dedicated in his honour.

The Guinness Brewery

The Guinness Brewery was founded in 1759 at James’s Gate at the west end of the city. There were already a number of breweries and distilleries in that part of the City. Arthur Guinness, Son & Co., Ltd., published a History and Guide to St. James’s Gate Brewery in1935. That guide describes the establishment of the Guinness Brewery as follows:

> *Documents preserved in the Public Registry of Deeds, Dublin, record that in the year 1693 Alderman Sir Mark Rainsford had a brewhouse at St. James’s Gate where “ beer and fine ales” were made. In November, 1715, Rainsford*

apparently went out of business, as he then granted a lease of the premises for 99 years to Paul Espinasse. The Espinasse family carried on the brewing business for some 45 years, when for some unknown reason the lease fell out, and on the 31st December, 1759, the premises were demised by Mark Rainsford, Esq., of Portarlington (Sir Mark Rainsford's son) to Arthur Guinness, of the City of Dublin, Merchant, for 9,000 years, to be held "in as ample and beneficial a manner as the same were formerly held by Paul Espinasse or John Espinasse " at a rent of £45 per annum.

The 1935 guide goes on to describe aspects of the Brewery at that time:

The area covered by the Brewery has very naturally increased with the course of years, and the four acres which were the extent of the estate in 1760 have now, by the absorption of adjoining properties, been increased to over sixty

The number of persons employed in the Brewery, including staff, tradesmen and labour, is nearly 3,500. The tradesmen alone number about 500, as all repairs to machinery and plant are executed by the Company's engineering staff, and a large proportion of the casks in which the stout is sent into trade is manufactured in the Brewery Cooperage.

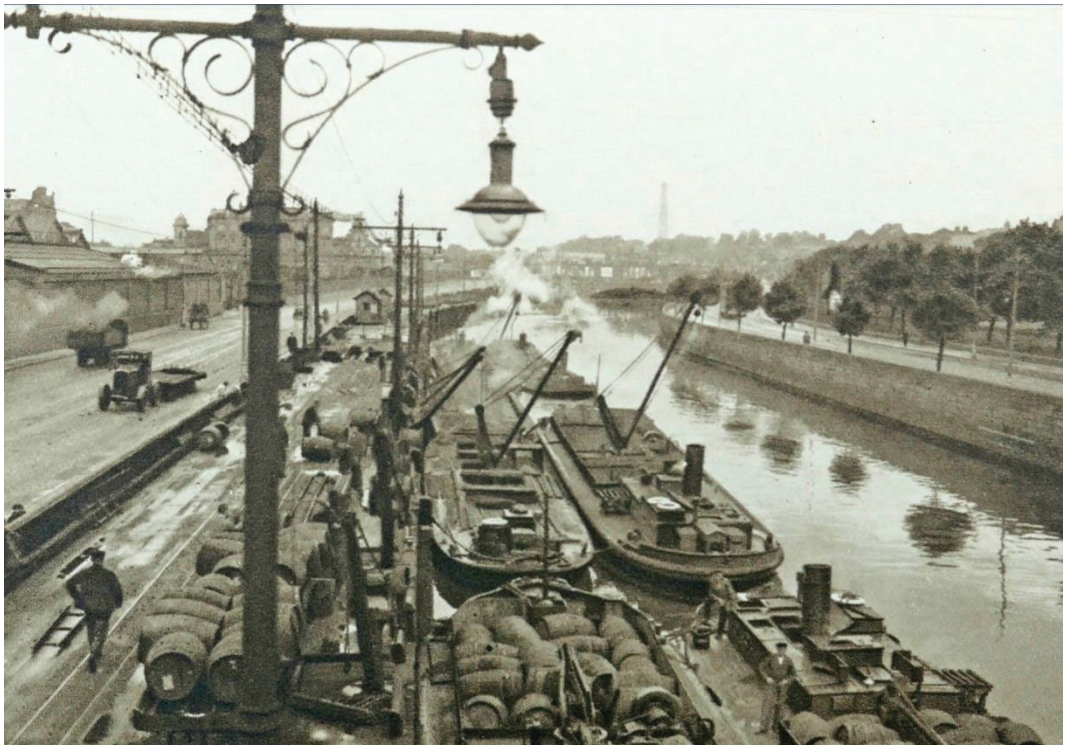

Figure 13.10: View looking west along Victoria Quay in 1935, showing Guinness barges loading barrels of Guinness to be transported down River to the area outside the Custom House for loading onto Guinness ships for transport across the Irish Sea. (*History and Guide to St. James's Gate Brewery*,1935)

Figure 13.11: View in 1935 of the Cooperage yard which was located near the River at the north west of the Guinness lands. This view looks north east towards the River across the yard and stacks of barrels. The Royal Barracks, now Collins Barracks, is seen in the distance to the right.

13.4 Likely Significant Effects

As is outlined in Section 13.3 above almost all of the lands west of what is now Rory O'More bridge as far as Chapelizod, both north and south of the River made up a vast official and military complex in which buildings and structures such as the Viceregal Lodge, the Magazine Fort, the Royal Military Infirmary (Department of Defence), the Royal Barracks (Collins), the Artillery Barracks (Clancy), the Royal Hospital Kilmanham, the Constabulary Barracks (Garda Headquarters), the Wellington Monument, and several others, were located. The setting was more rural than urban, buildings and monuments in demesne landscapes. All this changed dramatically in the 1840s with the coming of the railway, dividing the state lands, and with the new Kingsbridge Station (Heuston) becoming the focal point at the west end of the Quays. The area changed again dramatically in recent years with permission granted in 2005 on OPW lands at Military Road for a 32 storey residential tower as part of a development to be called Heuston Gate, and later with the construction of Heuston South Quarter and the Criminal Courts of Justice. The subject development at Parkgate Street will bring change, but it will be part of a process of change that is already well established.

Figure 13.12: View of the proposed 32 storey residential tower which was to form part of a development on OPW lands at St John's Road / Military Road and designed by Paul Keogh Architects for the Office of Public Works. Planning approval was granted in 2005. (image ARC Consultants)

As in Section 13.2.2 above, the *Dublin City Development Plan 2016-2022* includes a number of policies supporting strategic development in the City with a view to promoting coherent legible urban structure. Among these are policies to develop a new urban gateway character area focused on the transport node of Heuston Station, as a western counterpoint to the Docklands. Heuston is designated as one of 18 strategic development and regeneration areas (SDRAs) and an area where there is a potential for buildings over 50 metres to provide a new urban identity

The proposed development will include a cluster of substantial buildings including a landmark building of the order of 92.5 metres in height, over street level. The scale of the proposed development will be such that it is likely to be openly visible from a wide area of the surrounding City, including from some medium and long-distance vantage points.

A tall building or group of buildings on the subject site, located at the western termination of the public Liffey Quays will, inevitably, have a strong visual connection with the River Liffey and with the Liffey Quays for some distance down river. There must also be a strong visual relationship with Heuston Station, the Guinness Brewery, and, to a lesser degree with Collins Barracks. As is clearly stated in the City Development Plan 2016 -2022, the development of the Heuston area is an objective under the Vision and Core Strategy for the City as set out in Chapter 2 and is also an objective under SDRA 7, and meeting these objectives will result in new visual relationships in the Heuston area and beyond. Under the objectives of SDRA7, in addition to the subject site, there are several other sites identified for development, including Iarnród Éireann lands, OPW lands beside Dr Steeven's Hospital and the undeveloped parts of Heuston South Quarter.

Development on any of these lands will be visible along the River, both to the east and the west, and from the general surrounding area.

The visual connections implied under the objectives of SFDRA 7 offer a major potential for positive place making and increasing legibility in the City. The objectives of SFDRA 7 offer opportunities to: '*enhance the character and public realm', 'make a positive contribution to place-making', 'make a positive contribution to the urban neighbourhood', 'enhance the urban design context for public spaces',* and *'the improvement of legibility'* as is called for under the criteria set out in Section 3.2 of the *Building Height Guidelines*. As is set out in the Architect's Design Statement, which is included in the planning application documents, the design of the proposed development has been prepared specifically so as to meet such objectives.

There is less potential for visual relationships between the proposed development and other surrounding historic buildings and sites. The former Royal Military Infirmary, now the Department of Defence, is north west of the very large modern building housing the Criminal Courts of Justice, which intervenes between the Infirmary and the subject site. While it may be possible, from within the grounds of the Infirmary, to see parts of the proposed development, the main elevation of the Infirmary faces south west into the Phoenix Park, and away from the proposed development. Due to very extensive existing tree planting within the Phoenix Park, it is very unlikely that the proposed development will be visible from the Magazine Fort. As a result of the intervening development at Heuston South Quarter, it is not likely the proposed development will be visible from the Royal Hospital Kilmanham, though there is a potential for the proposal to be visible in the middle distance from parts of the grounds of the Royal Hospital, well away from the Royal Hospital buildings.

The existence of the proposed development has the potential to result in a major change of the character of Parkgate Street, as must be the case for any development on the subject site; since what is seen from Parkgate Street at the moment is a blank grey wall, a stone arched gate and the rear of a dilapidated three bay Georgian house. The existence of the proposed development will considerably change the character of Parkgate Street. It will impart a more urban, city centre, character to the immediate area, when compared to the rather empty soulless character of the present scene, imparted by the present blank grey wall. It is clear that some care has been taken in the design of the proposed development to provide a lively elevational treatment along Parkgate Street, varied in volume, form and materials, and that in particular the proposed scheme seeks to animate the street at ground level. This is consistent with the objectives of SDRA 7 and of the Building Height Guidelines.

As is discussed in Section 13.2.2 of this chapter (above), reference is made in the text of SDRA 7: Heuston and Environs, to the *'Cone of Vision'* between the Royal Hospital Kilmanham and the Phoenix Park and also to '*important visual connections to be respected include Chesterfield Avenue to Guinness Lands and from key parts of the City Quays to the Phoenix Park (Wellington Monument).'* No reference is made to other visual connections. In the text relating to SDRA 7 at Paragraph 7 it is stated that '*As a western counterpoint to the Docklands, the Heuston gateway potentially merits buildings above 50 m (16-storeys) in height in*

terms of civic hierarchy'. It is inevitable that buildings of 50 metres or more in height on any of the development sites identified under SDRA 7 will have numerous visual connections with the surroundings, both local and at some distance; and buildings of this height within SDRA 7, buildings with a substantial visual presence, will have a significant role in place making. As is stated in Section 1.2 of the Development Plan: '*Place making is particularly important in the strategic development and regeneration areas'.* The objectives of the Development Plan and of SDRA 7 call for the respecting of visual connections, but arguably not to the extent that might impede extensive new development in the Heuston area and impede successful place making within the new Heuston city quarter, 'a western counterpoint to the Docklands.'.

It is obvious that, because of the location of the subject site, that visual connections between a tall structure on the site and the River, Guinness Brewery, Heuston Station and Collins Barracks will be of greater immediacy and significance than existing visual connections between Chesterfield Avenue and the Guinness lands or between the City Quays and the Wellington monument, which are visual connections that are more distant and tentative. The visual connection between Chesterfield Avenue and the Guinness lands changes as Guinness upgrades their production process from time to time, and an present visual connection is very different than in was in the past. Christine Casey points out that the reshaping of the Phoenix Park under the guidance of Decimus Burton began in the 1830s. When Chesterfield Avenue was laid out on its present alignment as part of this reshaping of the Park, it does not appear to have been oriented towards any significant civic or cultural monument or building in the City. Chesterfield Avenue was not aligned towards the Guinness Brewery, since at that time Ordnance mapping indicates that the Guinness Brewery was confined to the south side of James's Street and could not be seen from Chesterfield Avenue.

As is clear from the early 19th century contemporary sources quoted above, the Wellington Monument was located where it now is because a military site was made available, after proposed locations in the City were rejected by residents. The current location does not appear to have been chosen because of any potential or designed distant relationship with the City Quays. If a relationship with the City Quays had been a determining factor in where the Wellington Monument was to be located, surely a visual connection with one of the City's great civic buildings would have been sought, such as with the Four Courts; and given the vast extent of military lands west of the City on both sides of the River, it would have been possible to locate the Wellington Monument so as to create such a visual connection. But there does not appear to be any evidence for the location of the Monument having been part of any intended or designed relationship with the City.The Wellington Monument is not visible from the Four Courts. It is visible from a short length of each of the two bridges either side of the Four Courts, but it is hard to believe that this is an intended visual connection.

In preparing this report, a survey was made of the visibility of the Wellington Monument from the City Quays, and it was found that its visibility is very limited.

It is visible, as a small element in the distance, from the bottom of the steps up to the front door of Dublin City Council Civic Offices, which might be regarded as an important visual connection between a civic building and the Monument, although it is unlikely that this was an intended connection. The proposal to build civic offices at Wood Quay came 150 years after the foundation stone for the Wellington Monument was laid.

13.4.1 Assessment of effects during construction

The construction of the proposed development will give rise to the usual visual impacts to be expected from a large construction project, including the normal visual impacts associated with hoarding, tower cranes, construction traffic and emerging and unfinished structure. Having regard to the general nature of the construction works as described above and as more fully described in **Chapters 3** and **4**, and having regard to statutory planning policy for the densification of the urban area, it is considered that the potential impact of the proposed development during the construction phase will be "moderate" in extent under a worst case scenario. The character of visual impacts during the construction phase is likely to be wholly negative at first, becoming neutral to positive as work proceeds and the new structure becomes apparent.

13.4.1.1 Indirect Effects

Indirect impacts are defined in the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* prepared by the Environmental Protection Agency (Draft of 2017) as follows:

> *Impacts on the environment, which are not a direct result of the project, often produced away from (the site) or as a result of a complex pathway.'*
>
> *These are sometimes referred to as 'secondary impacts'. One example of an indirect impact would be deterioration of water quality due to soil erosion following tree clearance for a leisure development on a woodland site. In this case the tree removal is a direct impact and the effects of the erosion are indirect impacts.*

This assessment has been undertaken on the basis that all reasonably foreseeable changes likely to occur as a result of the proposed development will result from the development as described in more detail in **Chapters 3** and **4**. As such, any effects over and above those described above are not envisaged.

It should be noted that visual effects of proposed development on the environment are often considered to be indirect effects (e.g. changes to the visual environment may be considered to result in indirect effects on archaeology, architectural and cultural heritage).

13.4.1.2 Cumulative

A review of the existing granted planning applications in the vicinity of the site as detailed in **Appendix 21.1**, Cumulative and Interactive Effects did not identify any developments for which permission has been granted, which, in combination with the development now proposed, would have the potential to result in material cumulative impacts on the visual environment surrounding the application site.

13.4.2 Assessment of effects during operation

The scale of the proposed development and its prominent location in the city will mean that its existence is likely to result in very substantial changes in the visual character of the immediate area surrounding the development and less substantial changes in the visual character of areas of the city even at some remove from the site of the proposed development. As has also been noted above, the word 'significance' in the context of the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* prepared by the Environmental Protection Agency, is used to refer to the extent of an effect on the receiving environment; and within *Table 3.3: Descriptions of Effects* of that document the terms 'significant' and 'very significant' are used to indicate large effects on the environment. Also in the EPA Guidelines, the term 'moderate' is used where a development is consistent with existing and emerging baseline trends.

In line with the terminology of the EPA Guidelines, this report assesses potential visual effects as 'moderate' where the development is consistent with existing and emerging trends as expressed through planning policy, even where changes resulting from the existence of the development will be large and substantive.

It will be noted that in all but two of the 19 chosen representative photomontage views, the proposed development is clearly visible. These views are representative, and are not an exhaustive list of location from which the proposed development may be visible. There will, of course, be numerous locations in Dublin, and even locations close to the proposed development, from which it will not be visible. The locations of the 19 chosen representative views are tabled and described below, together with the extent of potential visual effect as observed from each location.

The character of visual effects, positive negative or neutral, will depend on the response of the individual observer. The development is intended to have a positive role on providing legibility in the City in response to policies expressed in the *Dublin City Development Plan 2016-2022*.

Table 13.1: Table of Potential Visual Effects

View	Location	Potential Visual Effect
1	From the First Roundabout on Chesterfield Avenue	Slight to Moderate
2	From Chesterfield Avenue at the Phoenix Monument	None

View	Location	Potential Visual Effect
3	From Victoria Quay at Rory O'More Bridge	Moderate
4	From Father Matthew Bridge at Arran Quay	Moderate
5	From Wood Quay outside Dublin City Council	Slight to Moderate
6	From Benburb Street at the Aisling Hotel	Moderate
7	From Benburb Street at the junction with Parkgate Street	Moderate
8	From Parkgate Street at the junction with Infirmary Road	Moderate
9	From Conyngham Road at the entrance to Phoenix Park	Moderate
10	From St John's Road West at Heuston Station	Moderate
11	From Collins Barracks	Slight to Moderate
12	From Sarah Bridge	Slight to Moderate
13	From the Royal Hospital Kilmanham	None to Slight
14	From Con Colbert Road	Slight
15	From St John's Road West at the junction with Military Road	Moderate
16	From the south end of Steeven's Lane	Moderate
17	From the Croppies Acre	Moderate
18	From Arbour Hill north east of Collins Barracks	Slight to Moderate
19	From an internal road at Heuston Station	Moderate

A description of each location and an assessment of the potential visual effect at that location is provided below.

View 1: From the First Roundabout on Chesterfield Avenue

This view looks south east from the north west side of the first roundabout on Chesterfield Avenue. Part of the south west corner of the proposed development (Block C) and the top of the proposed residential tower (Block A) will be seen near the centre of this view in the middle distance. The proposed development is likely to form a minor element in the view. Where visible, a lower element of the development is likely to obscure a group of large metal tanks and other structures in the lands of the Guinness Brewery. The potential extent of visual effect from this location is assessed as 'slight' to 'moderate'.

View 2: From Chesterfield Avenue at the Phoenix Monument

ARC's analysis indicates that there is no potential for the proposed development to be visible in views from this location. The visual axis of all of Chesterfield Avenue north west of the first roundabout passes west of the site of the proposed development. The potential extent of visual effect from this location is assessed as none.

*View 3: From Victoria Quay at Rory O'More Bridg*e

This view looks west along the River Liffey from Victoria Quay at Rory O'More Bridge towards Frank Sherwin Bridge. Wolfe Tone Quay is seen to the right of the view lined with trees. The Croppies Acre and part of Collins Barracks can be glimpsed behind these trees. Part of the Wellington Monument can be seen emerging from the trees near the centre of the view. Part of the wall of the Hickey's site can be seen in the middle distance behind the parapets of Frank Sherwin Bridge and Sean Heuston Bridge. The lands of Guinness Brewery run along Victoria Quay on the left of the view. Heuston Station is concealed behind trees on Victoria Quay. Buildings that from part of Heuston South Quarter are seen to the left beyond the Guinness Lands

In this view as proposed, the landmark residential tower that forms part of the proposed development will be seen prominently in the centre of the view in the middle distance, marking the termination of the public quays along the River Liffey. The proposed development is likely to obscure the view of the Wellington Monument from this location, although it is noted that any substantial development on the subject site is likely to similarly obscure the Monument. It is further noted that the existing development to the west of the subject site already partly obscures the Monument. As described in Section 13.3 above, the Wellington Monument was located in the Phoenix Park in the centre of a very large military complex on a site provided by the Board of Ordinance, and any potential visual relationship with the City Quays was unlikely to have been a factor in the siting of the Monument. Any visual connection between the Monument and the Quays is not likely ever to have been a designed relationship. Having regard to existing and emerging trends for development in the areas as expressed through planning policy, the potential extent of visual effect from this location is assessed as 'moderate'.

Under the objectives of SDRA7, in addition to the subject site, which is north of the River, there are several sites to the south of the River Liffey identified for development.

These include Iarnród Éireann lands along the south side of the River, OPW lands beside Dr Steeven's Hospital and south of Heuston Station and the undeveloped parts of Heuston South Quarter. The first two are identified in SDRA7 as being suitable for buildings over 50 metres in height. Development on any of these lands will be visible from this view location, particularly development over 50 metres in height. A residential tower, more than 20 metres taller than the proposed tower on the subject site was granted planning permission around 2005 on the OPW lands. It is clear that policies and objective under SDRA7, if implemented will result in several new tall buildings seen in views looking west along the River Corridor towards Heuston.

View 4: From Father Matthew Bridge at Arran Quay

This view looks west along the River Corridor from Father Matthew Bridge. The trees at the Croppies Acre are seen in the centre of the view in the middle distance. Behind these trees, the top portion of the Wellington Monument is just visible at a further distance. In this view, the landmark residential tower that forms part of the proposed development will be seen in the middle distance at the centre of the view. The proposed landmark tower will be a relatively modest element in the view, though perhaps the focus of the view. The Wellington Monument will be seen in the far distance to the right of the landmark tower. Having regard to existing and emerging trends for development in the area as expressed through planning policy, the potential extent of visual effect from this location is assessed as 'moderate'.

View 5: From Wood Quay outside Dublin City Council

This view looks west along the River Corridor from outside the Dublin City Civic Offices towards where the River curves northward as it passes the Four Courts. The Wellington Monument is seen in the far distance in the centre of the view, framed by trees lining the River Corridor. In this view as proposed, the landmark tower that forms part of the proposed development will be seen in the distance at the centre of the view. The proposed landmark tower is likely to form a minor element in views from this location. The Wellington Monument will be seen in the far distance to the right of the landmark tower. From many other locations along the River in this area the proposed development will not be visible. The potential extent of visual effect from this specific location is assessed as 'slight to 'moderate'.

View 6: From Benburb Street at the Aisling Hotel

This view is quite close the site of the proposed development and looks west towards the site of the proposed development from outside the entrance to the Aisling Hotel. The proposed residential landmark tower will be seen as a major element in the centre of the view, the central focus of the view, with lower elements of the proposed development seen behind and curving away to the right. The existence of the proposed development will result in a dramatic change of scale on the subject site, which is now occupied by low buildings. It will also introduce large buildings on the south side of the east end of Parkgate Street, where there is now only a mute grey wall some one-and-a-half storeys in height.

Despite the extent to which the proposed development is likely to be seen in this view and to change the character of the view, having regard to existing and emerging trends for development in the area as expressed through planning policy, the potential extent of visual effect from this location is assessed as 'moderate'.

View 7: From Benburb Street at the junction with Parkgate Street

This view looks south west towards the east end of the site of the proposed development, across a complex urban junction where Parkgate Street, Benburb Street, Wolfe Tone Quay and Sean Heuston Bridge all join. Heuston Station is seen a little to the left of the centre of the view. This view is straight across the road from the proposed residential landmark tower. In views from this location, the lower floors of that tower will be seen in the centre of the view with parts of other elements of the proposed development seen curving away to the right. The existence of the proposed development will impart a more urban, city centre, character to the immediate area, when compared to the rather soulless character of the present scene. The proposed development is will fill the right hand side of the view, with Heuston Station likely to be seen in the middle distance to the left. The potential extent of visual effect from this location is assessed as 'moderate'.

View 8: From Parkgate Street at the junction with Infirmary Road

This view looks east along Parkgate Street from its junction with Infirmary Road, outside the Criminal Courts of Justice. In this view, the proposed development is seen to the right of centre, beyond the four storey commercial development of Parkgate Place. The closest parts of the proposed development are the ten storey residential elements at its western end. The upper parts of the proposed residential tower are seen above these lower residential elements. This view is quite close to the site of the proposed development and the proposed development will be seen as a major element in the centre of the view, and the focus of the view. Despite the extent to which the proposed development is likely to be seen in this view, having regard to existing and emerging trends for development in the area as expressed through planning policy, the potential extent of visual effect from this location is assessed as 'moderate'.

View 9: From Conyngham Road at the entrance to Phoenix Park

This view is a little further back from the development than View 8, above, and looks east along Conyngham Road / Parkgate Street. The proposed development will be seen as a substantial element in the centre of the view, although the largest element in the view is the Criminal Courts of Justice, seen to the left. Lower elements of the proposed development will be seen in the middle ground with upper floors of the residential tower seen behind. Despite the extent to which the proposed development is likely to be seen in this view, having regard to existing and emerging trends for development in the area as expressed through planning policy, the potential extent of visual effect from this location is assessed as 'moderate'.

View 10: From St John's Road West at Heuston Station

This view looks north across the front of the main historic station building at Heuston Station and across the concourse in front of the station, a transport interchange with a Luas Stop and bus stops as well as being the forecourt of the Station. The Riverside Stone Wall on the subject site can be seen in the centre of the view across the River. In the view as proposed, the proposed residential tower at the east end of the site becomes the focus of the view, and the focus of the perspective of the front façade of Heuston Station. The tower is the central element in the view. Parts of lower elements of the proposed development are just visible to the left. The subject site is a designated site for a tall building, and policies expressed through the Dublin City Development Plan call for development on the subject site to play an important role in place making. The counterpoint of the historic station with the modern tower, and the opening up of views from the station forecourt north across River, have the potential to create a new and very distinctive urban space. Having regard to existing and emerging trends for development in the area as expressed through planning policy, the potential extent of visual effect from this location is assessed as 'moderate'.

View 11: From Collins Barracks

This view looks west from the south side of the open square and raised promenade in front of the entrance the main central square of the Museum at Collins Barracks. In the view the blank east wall of the Aisling Hotel is seen along the promenade past part of one wing of the Museum at Collins Barracks, which is seen to the right and which is the dominant element in the view. Part of the front façade of Heuston Station is seen over to the left. In this view, the landmark residential tower that forms part of the proposed development will be seen to the left of centre with parts of the lower elements of the development seen behind. The proposed tower will be a substantial element in the view and a focus of the view. Visibility of the proposed development from the Collins Barracks complex is likely to be intermittent. For example, from a little to the right of this view location, the proposed development would no longer be visible, and from some of the main external spaces of Collins Barracks the proposed development will not be visible. The potential extent of visual effect from this location is assessed as 'slight to 'moderate'.

View 12: From Sarah Bridge

This view looks east along the River Liffey from Sarah Bridge, otherwise known as Islandbridge. In the view, modern residential developments are seen along both sides of the River. The top of the Wellington Monument is seen over to the left. In this view as proposed, landmark residential tower that forms part of the proposed development will be seen in the distance at the centre of the view, with lower elements at the foot of the tower. The proposed landmark tower will be a relatively modest element in the view, but seen along the axis of the River, will probably be the focus of the view. The potential extent of visual effect from this location is assessed as 'moderate'.

View 13: From the Royal Hospital Kilmanham

There is no potential for the proposed development to be visible from this location as it is likely to be concealed behind the intervening development at Heuston South Quarter. The proposed development may be visible from some parts of the formal garden of the Royal Hospital, but, where visible, the potential visual effect will be diminished by Heuston South Quarter in the foreground. The potential extent of visual effect from this location is assessed as ranging from none to 'slight' (where just visible).

View 14 From Con Colbert Road

This view looks east along the central reservation of Con Colbert Road towards its junction with the South Circular Road and St John's Road West. Buildings that form part of the development at Clancy Quay, are seen to the left. The top of the Wellington Monument is seen over to the far left. In this view as proposed, the landmark residential tower that forms part of the proposed development will be seen in the distance near the centre of the view, with lower elements at the foot of the tower, these lower elements in part concealed by one of the Clancy Quay buildings. The proposed landmark tower is likely to form a minor element in the view. The potential extent of visual effect from this location is assessed as 'slight'.

Under the objectives of SDRA7, in addition to the subject site, which is north of the River, there are several sites to the south of the River Liffey identified for development. These include Iarnród Éireann lands along the south side of the River, OPW lands beside Dr Steeven's Hospital and south of Heuston Station and the undeveloped parts of Heuston South Quarter. The first two are identified in SDRA7 as being suitable for buildings over 50 metres in height. Development on any of these lands will be visible from this view location, particularly development over 50 metres in height. It is likely, therefore, that the western approach to the City along Con Colbert Road will change substantially in character, becoming a new western legible western gateway to the City.

View 15: From St John's Road West at the junction with Military Road

This view looks north east across St John's Road West towards the train sheds at Heuston Station. The historic terminal building at Heuston Station is seen to the far right in the middle distance. The Criminal Courts of Justice are seen to the left. In this view, the proposed development will be seen behind the train sheds at Heuston Station, as a cluster of buildings in the middle of the view, with the residential tower seen behind lower elements of the development that step up towards the tower. The proposed development is a moderately substantial element in the view, but the Criminal Courts of Justice, over to the left are more visually prominent. Having regard to existing and emerging trends for development in the area as expressed through planning policy, the potential extent of visual effect from this location is assessed as 'moderate'.

View 16: From the south end of Steeven's Lane

This view looks north down Steeven's Lane towards Heuston. The concourse in front of Heuston Station is seen in the middle distance at the bottom of Steeven's Lane, with buildings on Parkgate Street and above at Montpelier are seen beyond. The roof of Dr Steeven's Hospital is seen to the left of centre behind trees. To the left again, the top of the criminal Courts of Justice can be seen behind a gate pier of St Patricks Hospital. In this view as proposed, the landmark tower that forms part of the proposed development will be seen in the middle distance at the centre of the view, with the upper parts of some of the lower elements seen to the left behind the roof of the former Dr Steeven's Hospital. The proposed landmark tower will be a substantial element in the view, seen as the focus of the view down Steeven's Lane and providing a visible marker the hidden location of the national transport node at Heuston Station at the western termination of the City Quays. Having regard to existing and emerging trends for development in the area as expressed through planning policy, the potential extent of visual effect from this location is assessed as 'moderate'.

View 17: From the Croppies Acre

This view looks west along the open space of the Croppies Acre. In this view as proposed, the proposed development will be seen in the centre of the view, with lower elements seen behind the landmark residential tower. The proposed development will be a substantial element in the view, and the central focus. Having regard to existing and emerging trends for development in the area as expressed through planning policy, the potential extent of visual effect from this location is assessed as 'moderate'.

View 18: From Arbour Hill north east of Collins Barracks

This view looks south west along Arbour Hill past the north side of the Museum at Collins Barracks. In this view as proposed, the upper part of landmark residential tower that forms part of the proposed development will be seen in the middle distance at the centre of the view, behind buildings in Collins Barracks The proposed landmark tower will be a relatively modest element in the view. The potential extent of visual effect from this location is assessed as 'slight' to 'moderate'.

View 19: From an internal road at Heuston Station

This view looks north east along the River Liffey from an internal road that runs along the south side of the River within the lands of Heuston Station. The main terminal building of Heuston Station is seen to the extreme right of the view. The five storey Parkgate Place apartments take up the left hand side of the view, seen across the River. In this view as proposed, the western residential block of the proposed development (Block C) is seen rising immediately behind the Parkgate Place apartments. The proposed landmark residential tower is seen above and behind Block C. The proposed development will be a major element in the view, with the residential tower being a central focus. The potential extent of visual effect from this location is assessed as 'moderate'.

The planning application includes for the possibility of placing a small group of telecommunications antennae/dish in the centre of the roof of Block B. These antennae/dish will consist of three small vertical poles grouped closely together each rising 2 metres in height above the parapet of Block B. Each pole will carry a 300-600mm diameter telecommunications dish near the top of the pole. It is unlikely that this telecommunications array will be visible in views of the proposed development. In the event that any part of the array is visible in any view, its visibility is unlikely to change the extent of likely visual effects as described and assessed in this chapter.

13.4.2.1 Indirect Effects

Indirect impacts are defined in the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* prepared by the Environmental Protection Agency (Draft of 2017) as follows:

> *Impacts on the environment, which are not a direct result of the project, often produced away from (the site) or as a result of a complex pathway.'*
>
> *These are sometimes referred to as 'secondary impacts'. One example of an indirect impact would be deterioration of water quality due to soil erosion following tree clearance for a leisure development on a woodland site. In this case the tree removal is a direct impact and the effects of the erosion are indirect impacts.*

This assessment has been undertaken on the basis that all reasonably foreseeable changes likely to occur as a result of the proposed development will result from the development as described in more detail in Chapters 3 and 4 of the EIAR. As such, any effects over and above those described above are not envisaged.

It should be noted that visual effects of proposed development on the built environment are often considered to be indirect effects (e.g. changes to the visual environment may be considered to result in indirect effects on archaeology, architectural and cultural heritage).

13.4.2.2 Cumulative

A review of the existing granted planning applications in the vicinity of the site as detailed in **Appendix 21.1**, Cumulative and Interactive Effects did not identify any developments for which permission has been granted, which, in combination with the development now proposed, would have the potential to result in material cumulative impacts on the visual environment surrounding the application site.

13.5 Do Nothing Scenario

If the proposed development does not proceed, the site of the proposed development will remain as it is and the visual effects described in this chapter will not occur.

13.6 Mitigation Measures and Monitoring

13.6.1 Mitigation

13.6.1.1 Mitigation During Construction

No mitigation measures have been proposed with respect to effects from the construction of the proposed development.

13.6.1.2 Mitigation During Operation

The subject application proposes the development of site designated as a Strategic Development and Regeneration Area under the *Dublin City Development Plan 2016-2022*, which was the subject of major re-development in order to accommodate medium and high density residential development in recent years. In these circumstances, during the construction or operational phases scope for mitigation measures, which would preserve a sustainable level of density, is limited.

13.6.2 Monitoring

No monitoring has been proposed with respect to visual effects from of the proposed development.

13.7 Residual Effects

13.7.1 Residual effects during construction

As no mitigation measures are now proposed, the residual visual effects of the proposed development on the built environment will be as described under Section 13.4 above. Cumulative effects have also been considered.

13.7.2 Residual effects during operation

As no mitigation measures are now proposed, the residual visual effects of the proposed development on the built environment will be as described under Section 13.4 above. Cumulative effects have also been considered.

13.8 References

ARC referenced the following documents above:

1) *Dublin City Development Plan 2016-2022.*

2) Department of Housing, Planning and Local Government. 2018. *Urban Development and Building Heights Guidelines for Planning Authorities*. Dublin: Government Publications Office.

3) Department of Arts, Heritage and the Gaeltacht. 2011. *Architectural Heritage Protection Guidelines for planning Authorities.* Dublin: The Stationery Office.

4) Landscape Institute, Institute of Environment Management & Assessment. 2013. *Guidelines for Landscape and Visual Impact Assessment*, Third Edition. London and New York: Routledge Taylor & Francis Group.

5) Environmental Protection Agency. 2017. *Guidelines on information to be contained in Environmental Impact Assessment Reports DRAFT*. Wexford: Environmental Protection Agency.

6) Council Directive 2011/92/EU (on the assessment of the effects of certain public and private projects on the environment) (Official Journal No. L 26, 28.1.2012),

7) Council Directive 14/52/EU (amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment) (Official Journal No. L 124/1, 25.4.2014).

8) Environmental Protection Agency. 2002. *Guidelines on the Information to be Contained in Environmental Impact Statements*. Wexford: Environmental Protection Agency.

   Environmental Protection Agency. 2003. *Advice Notes on Current Practice*. Wexford: Environmental Protection Agency.

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9) Warburton, Whitelaw & Walsh. 1818. *History of the City of Dublin*. London : Printed for T. Cadell and W. Davies.

10) Joyce, Weston St John. 1912. *The Neighbourhood of Dublin*. Dublin: W.H. Gill & Son Ltd.

11) Irish Architectural Archive. *Dictionary of Irish Architects 1720 – 1940*.

12) D'Alton, J. 1838. *The History of the County of Dublin*. Dublin: Hodges and Smith.

13) Ball, F.E. 1906. *A History of the County of Dublin*. *(Part 4)* Dublin: Alexander Thom &Co.

14) Casey, C. 2005. The Buildings of Ireland: Dublin. New Haven and London: Yale University Press.

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14 Water and Hydrology

14.1 Introduction

This chapter describes the likely significant effects of the proposed development in relation to surface water, water quality, the existing hydrological regime, wastewater, water supply and flood risk. Groundwater features of relevance and hydrogeology have been considered separately in **Chapter 16**.

Chapter 3 provides a description of the proposed development whilst **Chapter 4** describes the construction strategy.

The following aspects are particularly relevant to the water and hydrology assessment:

- Design
  - Surface water drainage network and the Sustainable (urban) Drainage Systems (SuDS) consisting of green roofs, rain gardens, filter strips, filter drains and water butts;
  - Hydrology and flood risk from the River Liffey immediately to the south of the proposed development;
  - Wastewater network to service the proposed development; and
  - Water supply network to service the proposed development.
- Construction
  - Earthworks, dewatering and stockpiling of materials during construction;
  - The contractor's wastewater and water supply facilities; and
  - Flood risk during construction of the proposed development.
- Operation
  - Performance of the surface water network and SuDS features during operation of the proposed development;
  - Performance of the wastewater network during operation of the proposed development;
  - Performance of the water supply network during operation of the proposed development; and
  - Flood risk during operation of the proposed development.

This chapter was prepared by Kevin Barry of Arup. Refer to **Appendix 1.1** for details on relevant qualifications and experience.

14.2 Assessment Methodology

14.2.1 General

Potential direct and indirect effects in relation to surface water, wastewater, potable water and flooding risk during the design, construction and operation of the proposed development have been assessed as described in **Sections 14.2.1.1-14.2.1.4**, and in accordance with the guidance and legislation outlined in **Section 14.2.2.**

This chapter has been prepared with due regards to the overarching guidance on EIA as outlined in **Section 1.9.3.**

14.2.1.1 Hydrological Regime

A computer model (Microdrainage simulation software) has been prepared for the catchment within the development area and has been used to assess the impact of the proposed surface water drainage network. The hydraulic model of the proposed drainage network (incorporating the proposed SuDS features) was run to simulate a 1 in 100-year rainfall event with a 20% allowance for climate change.

14.2.1.2 Wastewater

A hydraulic model (Microdrainage simulation software) has been prepared to assess the performance of the proposed wastewater network for the development. The wastewater network has been designed in accordance with the requirements of the *Irish Water Code of Practice for Wastewater Infrastructure*[1].

14.2.1.3 Water Supply

The water supply network has been designed in accordance with *Irish Water Code of Practice for Water Infrastructure*[2].

14.2.1.4 Flood Risk

A Flood Risk Assessment (**Appendix 14.1**) has considered the effects of flood risk on the proposed development. Flood risk from multiple sources has been considered including fluvial flooding, pluvial and tidal/coastal flooding.

14.2.2 Guidance and Legislation

This chapter has been prepared in accordance with the overarching EIA guidance identified in **Chapter 1,** Introduction and Need for the Scheme, and in accordance with the following:

[1] IW, 2017. *Code of Practice for Wastewater Infrastructure (Revision 1).*
[2] IW, 2017. *Code of Practice for Water Infrastructure (Revision 1).*

- *Council Directive 2000/60/EC*[3] establishing a framework for Community action in a field of water policy (the WFD);
- *European Union Environmental Objectives (Surface Water) (Amendment) Regulations 2015 (S.I No. 386 of 2015)*[4]; and
- *European Communities (Quality of Salmonid Waters) Regulations 1988 (S.I No. 293 of 1988)*[5].

Further descriptions of each of these is outlined in **Section 14.2.2.1, 14.2.2.2** and **14.2.2.3** respectively. The *Planning System and Flood Risk Management Guidelines for Planning Authorities*[6] have also been given due regard during the assessment (Refer to **Section 14.2.2.4** for further detail.)

14.2.2.1 Water Framework Directive

The *Water Framework Directive* (WFD)[3] aims at improving the water environment in the EU and requires all Member States to protect and improve water quality in all waters so that they achieve good ecological status by 2015 or, at the latest, by 2027.

The WFD has been transposed in Ireland by the European Communities *(Water Policy) Regulations 2003* (S.I. No. 722 of 2003)[7].The WFD applies to rivers, lakes, groundwater, and transitional coastal waters and requires that management plans are prepared on a river basin basis through the specified structured method.

The *River Basin Management Plans* (RBMPs) have been prepared to protect and improve Ireland's water environment. They are reviewed and updated every six years. The first RBMPs covered the period 2009 to 2014 and identified the waterbodies that may not meet the environmental objectives of the WFD by 2015.

[3] Directive 2000/60/EC of the European Parliament and of the Council, as amended by Decision No 2455/2001/EC of the European Parliament and of the Council, Directive 2008/32/EC of the European Parliament and of the Council, Directive 2008/105/EC of the European Parliament and of the Council, Directive 2009/31/EC of the European Parliament and of the Council and Directive 2013/39/EU of the European Parliament and of the Council.
[4] European Communities Environmental Objectives (Surface Waters) Regulations 2009 (SI No 272 of 2009) as amended by the European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2012 (SI No. 327 of 2012); and the European Communities Environmental Objectives (Surface Water) (Amendment) Regulations 2015) (SI No 386 of 2015). And defined as "European Communities Environmental Objectives (Surface Waters) Regulations 2009 – 2015"
[5] European Communities, 1988. *(Quality of Salmonid Waters) Regulations (SI No 293 of 1988).*
[6] OPW and DEHLG, 2009. *The Planning System and Flood Risk Management Guidelines for Planning Authorities.*
[7] European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003) as amended by the European Communities (Water Policy) (Amendment) Regulations, 2005 (S.I. No. 413 of 2005); the European Communities (Water Policy) (Amendment) Regulations, 2008 (S.I. No. 219 of 2008); European Communities (Water Policy) (Amendment) Regulations, 2010 (S.I. No. 93 of 2010); and the European Communities (Drinking Water) Regulations 2014 (S.I. No 350 of 2014). And defined as European Communities (Water Policy) Regulations 2003 – 2014.

The latest RBMPs[8] (for 2018 to 2021) were published in April 2018 and these set out the actions to improve water quality and achieve 'good' ecological status in water bodies (rivers, lakes, estuaries and coastal waters) by 2027.

14.2.2.2 The European Union Environmental Objectives (Surface Water) (Amendment) Regulations, 2015.

The *European Union Environmental Objectives (Surface Water) Regulations 2015*[4], as amended, provide a more complete and stringent set of surface water quality regulations which address the requirements of the WFD and *Council Directive 2006/11/EC*[9] on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community. These regulations specify the conditions and physico-chemical concentrations that should be considered in the assessment of surface water quality. These regulations also give effect to *Council Directive 2008/105/EC*[7] on environmental quality standards in the field of water policy.

14.2.2.3 European Communities (Quality of Salmonid Waters) Regulations, 1998

Legislation for salmonid waters was first established under *Council Directive 78/659/EEC*[10] on the quality of freshwaters needing protection or improvement in order to support fish life (the Freshwater Fish Directive). *The Freshwater Fish Directive*[10] was subsequently superseded by the *European Communities (Quality of Salmonid Waters) Regulations 1988*[8].

The *Freshwater Fish Directive* defines freshwaters as being waters capable of supporting Salmon (Salmo Salar), Trout (Salmo trutta), Char (Salvelinus) and whitefish (Coregonus) and are thereby designated as Salmonid waters.

14.2.2.4 The Planning System and Flood Risk Management Guidelines for Planning Authorities

In November 2009, the (then) Department of Environment, Heritage and Local Government and the Office of Public Works jointly published their guidance. The aim of the Guidelines is to ensure that flood risk is neither created nor increased by inappropriate development.

The Guidelines are issued under **Section 28** of the *Planning and Development Act 2000*[11], as amended and planning authorities and An Bord Pleanála are therefore required to implement these guidelines in carrying out their functions under the Planning Acts.

[8] DHPLG, 2018. *River Basement Management Plan for Ireland 2018-2021.*
[9] European Communities, 2006. *(Dangerous Substances Directive) Regulations (SI No 74 of 2006).*
[10] European Communities, 1978. *The Freshwater Fish Directive (78/659/EEC).*
[11] GoI, 2000. *The Planning and Development Act, 2000 (S.I. No. 30 of 2000).*

The Guidelines require the planning system to avoid development in areas at risk of flooding, unless the development can be justified on wider sustainability grounds and the risk can be reduced or managed to an acceptable level.

The Guidelines specifically require the adoption of a Sequential Approach (to Flood Risk Management) of Avoidance, Reduction, Justification and Mitigation and they require the incorporation of Flood Risk Assessment into the process of making decisions on planning applications and planning appeals. Fundamental to the Guidelines is the introduction of flood risk zoning and the classifications of different types of development having regard to their vulnerability.

The management of flood risk is therefore a key element of any development proposal in an area of potential flood risk and should therefore be addressed as early as possible in the site master planning stage.

14.2.3 Study Area

14.2.3.1 Hydrology

The study area for the hydrological assessment incorporates the planning application boundary of the proposed development and section of the River Liffey which flows immediately to the south of the proposed development.

14.2.3.2 Wastewater

The study area for the wastewater assessment incorporates the planning application boundary of the proposed development.

14.2.3.3 Water Supply

The study area for the water supply network incorporates the planning application boundary of the proposed development.

14.2.3.4 Flood Risk

The study area for the flood risk assessment incorporates the planning application boundary of the proposed development and the section of the River Liffey which flows immediately south of the proposed development.

14.2.4 Site Visits

A site visit was carried out by Kieran Dowdall and Alpha Barry from Arup on the 3rd May 2019. The topography of the site was studied, and several photographs were taken, which were subsequently used for the assessment.

14.2.5 Consultation

Various drainage design proposals for the proposed development including a document outlining the Surface Water Management Strategy prepared and submitted by Arup to Dublin City Council Drainage Division during the design development process.

A document outlining the Drainage and Water Supply Strategy for the proposed development was also submitted to An Bord Pleanála as part of the pre-planning application submission. In this document the proposed design and rationale for the stormwater drainage, wastewater infrastructure and potable water supply were outlined.

In addition, ongoing consultation is taking place with Irish Water in relation to the proposed waste water and water supply infrastructure for the development.

A number of pre-planning meetings have also been held with DCC, please refer to **Chapter 1**.

14.2.6 Categorisation of the Baseline Environment

14.2.6.1 Hydrological Regime

The drainage characteristics of the existing environment were determined through a desktop study utilising existing topographical surveys and photographs from the site visit to establish the existing drainage routes and storage areas within the study area.

A desktop study was undertaken to establish the baseline information for the study area in relation to the hydrological regime. Previous flood studies that have been reviewed which include the *National Preliminary Flood Risk Assessment (PFRA)*[12] and the current fluvial flood extent maps[13]. Furthermore, the *Strategic Flood Risk Assessment Report* produced as part of the *Dublin City Council Development Plan 2016 - 2022*[14] was reviewed with regard to the existing hydrological regime in the study area.

14.2.6.2 Wastewater

The wastewater drainage characteristics have been determined through examining existing utility records provided by Irish Water and from a survey of existing utilities in the area.

14.2.6.3 Water Supply

Existing utility records provided by Irish Water were examined in order to understand the water supply infrastructure in the area.

[12] OPW, 2012. *The National Preliminary Flood Risk Assessment (PFRA) Overview Report*.
[13] OPW, 2018. Eastern CFRAM Flood Extent Maps. Available at http://www.floodinfo.ie/map/floodmaps/. Accessed October 2018.
[14] DCC, 2016. *Strategic Flood Risk Assessment*.

14.2.6.4 Flood Risk

A desktop study was undertaken to establish the baseline information for the study area in relation to flood risk. The information with respect to flood risk considered various flood studies including the *National Preliminary Flood Risk Assessment (PFRA)*[12] and the *Eastern Catchment Flood Risk Assessment and Management Study* (Eastern CFRAM) flood maps and reports[15]. The *Strategic Flood Risk Assessment Report*[14] produced as part of the *Dublin City Council Development Plan 2016 - 2022* was also reviewed with regard to existing and predicted flooding within the study area.

14.2.7 Impact Assessment Methodology

14.2.7.1 Hydrological Regime

The assessment considers the proposed development and how relevant aspects have the potential to change the physical characteristics and thus the drainage and flood characteristics of the study area. The assessment specifically considers how any change interacts with the drainage network and how significant the change is in the context of the relevant legislation.

The baseline data (particularly the topography) has been used to establish drainage characteristics within the study area. The proposed development has been assessed to ascertain if there would be any likely significant effects on the natural drainage and the sewer network within the study area.

14.2.7.2 Wastewater

The assessment considers the proposed development and how it will have the potential to alter the wastewater network in the area. Records of the existing wastewater network in the area were obtained from Irish Water to inform the design development. A computer model of the proposed wastewater sewer network has been prepared and this will be sufficient to assess the likely significant effects of the proposed development.

14.2.7.3 Water Supply

The assessment considers the proposed development and how it will have the potential to alter water supply network in the area. Records of the existing water supply network in the area were obtained from Irish Water to inform the design development and this will be sufficient to assess the likely significant effects of the proposed development.

[15] OPW, 2018. Eastern CFRAM Reports and Maps. Available at https://www.floodinfo.ie/. Accessed October 2018.

14.2.7.4 Flood Risk

Flood risk has been assessed by determining the baseline conditions (fluvial, pluvial and tidal/coastal flood extents) and establishing the likely significant effect of the proposed development on flood risk. For the Parkgate Street site a desktop study (Site Specific Flood Risk Assessment) is sufficient to assess the likely significant effects of the proposed development on flood risk.

14.3 Baseline Conditions

14.3.1 Site Location and Setting

The site of the proposed development is located at 42A Parkgate Street, Dublin 8. The site is bordered to the north by Parkgate Street, to the south by the River Liffey, to the west by the Parkgate Business Centre and to the east by both the River Liffey and Parkgate Street.

This site lies within the area covered by the *Dublin City Council Development Plan 2016 - 2022*[16] and is zoned for mixed-use and residential development.

The site covers an area of approximately 0.82 hectares and contains a number of low rise buildings which will be demolished to make way for the proposed mixed-use development. Existing ground levels across the site vary from approximately 3.30mOD at the southwest boundary to 5.50mOD at the northeast boundary. For a detailed description of the proposed development refer to **Chapter 3.**

14.3.2 Hydrology Baseline Environment

The proposed development is located within Hydrometric Area (HA09)[17] which is the EPA Classification for the surface water catchment drained by the River Liffey and all streams entering tidal water in Dublin Bay. HA09 falls within the Eastern River Basin District Area (ERBDA)[18] and has an area of 1,616km².

14.3.3 Surface Water Bodies

The site is located in the vicinity of the River Liffey which flows immediately to the south of the proposed development.

The EPA monitoring station in the vicinity of the proposed development is station No. RS09LO12360 located at Lynch's Lane approximately 0.2km downstream of Chapelizod ridge (310423, 234138).

[16] DCC, 2016. *Dublin City Development Plan 2016-2022.*
[17] EPA, 2018. EPA River Quality Biological Data Results.
[18] ERBD, 2010. *Eastern River Basin District, River Basin Management Plan 2009-2015.*

The most recent EPA river quality survey took place in 2016 and the associated report (generated online at www.epa.ie/QValue/webusers)[17] indicated that the water quality in the area nearest the proposed scheme (RS09LO12360) was considered to be "Moderate", i.e. "Slightly Polluted". The previous four samples of survey Q (Quality) ratings are indicated in Table 14.1.

Table 14.1: River Liffey Biological Quality Ratings (EPA,2019)

Biological Quality Rating (Q Value)			
Station	Year		
	2007	2013	2010
RS09LO12360	3-4	3-4	3-4

14.3.4 Surface Water Drainage

Surface water from 94% of the existing site discharges directly from the site into the River Liffey. The remaining 6% of the existing site (localised roof areas) discharges to a combined 450mm sewer on Parkgate Street.

14.3.5 Wastewater

Drainage records provided by Irish Water indicate that there are existing 300mm and 450mm combined sewers on Parkgate Street discharging into city centre sewers and subsequently to the wastewater treatment plant in Ringsend, for appropriate treatment, prior to discharge to Dublin Bay.

The existing building in the study area is currently in operation as a warehouse and wastewater effluent discharges into the combined sewer on Parkgate Street. There are less than 10 persons working in the warehouse at any time and as such the effluent discharge volume from the subject lands is estimated to be very low.

14.3.6 Water Supply

Records provided by Irish Water indicate that the site is serviced by a connection to an existing 150mm public main on Parkgate Street. The existing building is currently in operation as a warehouse. There are less than 10 persons working in the warehouse at any time and as such the water demand from the subject lands is estimated to be less than 0.6m^3/day.

14.3.7 Flood Risk

There are two recorded flood events in the vicinity of the site which have been identified from an examination of the OPW Flood Hazard Mapping website (www.floodmaps.ie)[19]. These flood events occurred at the Ashling Hotel approximately 100m from the proposed development and at the Bridgewater Quay Apartments approximately 400m from the proposed development. Flood depths for both these events was between 0.1m and 0.5m.

[19] OPW, 2019. National Flood Hazard Maps. Available at http://www.floodmaps.ie/. Accessed March 2019.

More details on these flood events are contained within the Site-Specific Flood Risk Assessment Report in **Appendix 14.1.**

There is a risk of fluvial and tidal/coastal flooding from the River Liffey along the southern boundary of the site. This is indicated in the fluvial flood extents maps produced as part of Eastern CFRAM[15] study which show that a small portion of the site bordering the River Liffey lies within Flood Zone A.

An examination of the OPW's *National Preliminary Flood Risk Assessment (PFRA)*[12] mapping indicated that there is potential for pluvial flooding in the study area.

The site is in close proximity to the River Liffey and the site investigation conducted during August and September 2019 identified hydraulic connectivity between the groundwater levels and the tidal levels. As the existing ground levels are higher than the tidal levels the risk of groundwater flooding is considered to be low.

As per the OPW Flood Risk Management Guidelines[6] a Justification Test for the development was required and was undertaken as part of the Flood Risk Assessment.

The Plan-Making Justification Test relevant to the proposed development was completed and passed as part of the Strategic Flood Risk Assessment (SFRA) undertaken for the *Dublin City Council Development Plan 2016 - 2022*.

The Development Management Justification Test requires that two criteria must be met which are outlined in **Section 5.15** of the *Planning System and Flood Risk Management Guidelines for Planning Authorities*[6]. With regards to the first criterion, the applicable policy context is the *Dublin City Council Development Plan 2016-2022*. The development plan as adopted took full account of the OPW Guidelines and incorporated the SFRA as part of the appraisal of the plan. It can therefore be states that this criterion is passed. With regard to the second criterion, it is considered that it has also been met by virtue of the fact that:

- The proposed development will not increase the risk of flooding at adjacent sites; and
- The proposed development includes measures to minimise flood risk.

14.4 Likely Significant Effects

14.4.1 Do-Nothing Scenario

In the scenario where the proposed development does not proceed as planned, the existing hydrology in the study area will remain as currently identified in the desk study, site visits and site-specific investigations, and as described in **Section 14.3.**

14.4.2 Assessments of Effects During Construction

14.4.2.1 Water Quality

There are numerous substances used on construction sites that are potential pollutants to water bodies that could affect surface water quality. Runoff from the working areas during construction may contain increased sediment loads, suspended solids and contaminants. This is typical on construction sites and working areas of this nature.

A summary of potential pollutants of relevance to water quality is provided below:

- Potential sources of pollution from site drainage include runoff and erosion from site earthworks and stockpiles. This has the potential to pose a risk to nearby watercourses as the site will be exposed to rainfall which has the potential to produce silt laden runoff;
- Other major pollutants present include fuels and lubricants required for plant and equipment on site;
- The washing of construction vehicles and equipment also pose a pollution risk to watercourses in the area if undertaken in inappropriate locations and in the absence of effective management and mitigation; and
- Any accidental spillages of fuel and/or discharge of oil from leaks in vehicles or fuel tanks;

In the absence of mitigation, the construction activities outlined above have the potential to alter the water quality temporarily in the study area. This would be considered a short-term effect and the significance of this effect is moderate/slight.

14.4.2.2 Hydrological Regime

The construction activities associated with the enabling works are described in detail in **Chapter 4**. These works will have the effect of temporarily altering the hydrological and drainage characteristics of the site.

Construction activities such as stockpiling and excavations can block overland drainage flow paths, which can result in potential flood risk.

Construction activities that have the potential to impact the hydrological regime include:

- Temporary stockpiling of material at working areas;
- Wash water from dust suppression sprays; and
- Spillage of fuel and lubricants from maintenance of construction vehicles and mechanical equipment.

The construction activities outlined above have the potential to alter the hydrological regime temporarily in the study area. This would be considered a short-term effect and the significance of this effect is moderate/slight.

14.4.2.3 Wastewater

Effluent and sanitary waste will be generated from facilities provided for the construction staff on site. This waste will be discharged to the existing combined sewer on Parkgate Street or as otherwise agreed with Dublin City Council. This would be considered a short-term effect and the significance of this effect is imperceptible.

14.4.2.4 Water Supply

The contractor will require a water supply connection for onsite personnel during construction. This would be considered a short-term effect and the significance of this effect is imperceptible.

14.4.2.5 Flood Risk

Surface water has the potential to flood the basement excavations during the construction period. Groundwater encountered during excavations also has the potential to flood the basement during construction.

However, the proposed development will have no impact on floodplain storage and conveyance and will also not increase flood risk off site during construction. This is therefore considered a short-term effect and the significance of this effect is imperceptible.

14.4.2.6 Indirect Effects

There are no identified indirect effects at the construction stage in relation to water.

14.4.2.7 Cumulative

In preparing this chapter, consideration was given to the developments listed in **Chapter 21**, Cumulative Effects in relation to relevant cumulative and in combination effects.

Additionally, the main impacts from the proposed development arise during construction. It is unknown at this stage if the construction works associated with other developments would be occurring at the same time as the construction of the proposed development.

Notwithstanding, given the nature and scale of the developments identified, no cumulative effects in relation to water are predicted to occur if any one, or all of these developments occur concurrent to the construction of the proposed development.

There are therefore no predicted significant cumulative effects in relation to water associated with the proposed development.

14.4.3 Assessment of Effects During Operation

14.4.3.1 Hydrological Regime

The proposed development will include the construction of new roofs, terraces, pedestrian and paved areas. Surface water from these areas will be captured by a new drainage network for the site designed in accordance with the standards outlined in the *Greater Dublin Strategic Drainage Study (GDSDS)*[20], *Greater Dublin Regional Code of Practice for Drainage Works*[21], Part H of the *Building Regulations*[22] and BS EN 752 *Drain and sewer systems outside buildings*[23]. Surface water from the site will discharge directly to the River Liffey. The surface water will first pass through the SuDS features which will have the effect of both treating and temporarily storing surface water, and as such the volume of water discharging directly to the River Liffey is expected to be a reduction on the current discharge volume. An area of approximately 0.16ha of the Parkgate St. road catchment will be diverted from the existing 450mm combined sewer to a new separate drainage network on Parkgate St in order to provide capacity in the 450 mm sewer for the proposed wastewater connection. This new drainage network will connect into the existing 910mm surface water outfall pipe which discharges to the River Liffey.

Therefore, the operational phase of the proposed development is predicted to have an overall positive long-term impact on the water and hydrology within the study area.

14.4.3.2 Wastewater

The proposed development includes a new wastewater drainage network for the site designed in accordance with the *Irish Water Code of Practice for Wastewater Infrastructure* [1] and *Part H of the Building Regulations*[22].

The proposed development will result in an additional effluent volume discharging to the public sewer. The proposed development will generate a peak flow of 8.45 l/s.

The existing 450mm combined sewer on Parkgate Street has limited spare capacity during rainfall events. It is therefore proposed to provide capacity by diverting an area of approximately 0.16ha of the Parkgate St. road catchment draining to the 450mm trunk sewer equivalent to a peak discharge of 22.4l/s into a new separate surface water drainage network.

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[20] DCC, 2005. *Greater Dublin Strategic Drainage Study (GDSDS)*.
[21] DCC, 2006. *Greater Dublin Regional Code of Practice for Drainage Works*.
[22] DEHLG, 2010. *Building Regulations 2010, Technical Guidance Document, Part H, Drainage and Water Disposal*.
[23] BS EN 752:2017 *Drain and Sewer Systems Outside Buildings. Sewer System Management.*

This new surface water drainage network will discharge to the River Liffey via the existing 910mm surface water outfall pipe.

It is noted that the capacity of the Ringsend Water Treatment Plant, where effluent from the proposed development will be treated, is currently constrained. Planning permission has been granted for an upgrade of the Ringsend Wastewater Treatment Plant, including an increase in treatment capacity. This upgrade is due to commence shortly. A Pre-Connection Enquiry response from Irish Water for the proposed development has agreed to the proposed connection in principle. Further discussion on the Ringsend Wastewater Treatment Plant and the effects of the proposed development on the water quality in Dublin Bay is given in the Natura Impact Statement accompanying this planning application.

The proposed development is therefore predicted to have an overall neutral effect within the study area in relation to wastewater.

14.4.3.3 Water Supply

The proposed development includes a new water supply network for the site designed in accordance with the *Irish Water Code of Practice for Water Infrastructure*[2] and *Part B of the Building Regulations*[24]. It is proposed to connect to the existing 150mm public watermains on Parkgate Street.

The proposed development will result in an additional water demand on the existing public water mains supply. The average expected water demand will be 2.43l/s. A connection agreement has been made with Irish Water.

The development is however predicted to have an overall neutral effect within the study area in relation to water supply.

14.4.3.4 Flood Risk

The proposed development will have no impact on floodplain storage and conveyance. The proposed development includes the provision of SuDS features in the drainage design and will not increase flood risk off site during operation. As such the proposed development is predicted to have an overall neutral effect within the study area in relation to flood risk.

14.4.3.5 Indirect Effects

There are no identified indirect effects at the operational stage in relation to Water.

[24] DEHLG, 2006. Technical Guidance Document B - Fire Safety.

14.4.3.6 Cumulative Effects

In preparing this chapter, consideration was given to the developments listed in **Chapter 21**, Cumulative Effects in relation to relevant cumulative and in combination effects. No significant cumulative effects in relation to water have been identified for the proposed development in the operational phase.

14.5 Mitigation Measures and Monitoring

14.5.1 Mitigation During Construction

The employment of good construction management practices will minimise the risk of pollution of soil, surface water and groundwater. The following site-specific measures will be implemented for the proposed development which will include:

- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding;
- Run-off will be controlled to minimise the water effects in outfall areas;
- All concrete mixing and batching activities will be located in areas away from watercourses and drains; and
- Good housekeeping (site clean-ups, use of disposal bins, etc.) will be implemented on the site.

In order to prevent the accidental release of hazardous materials (fuels, cleaning agents, etc.) during construction site activity, all hazardous materials will be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks will be used on the site during the construction phase of the project. Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the proposed development. The contractor's sanitary facilities will discharge into the existing combined sewer on Parkgate Street or as otherwise agreed with Dublin City Council.

These mitigation measures will be in accordance with:

- *ICE (2015) Earthworks, A Guide (2nd Edition)*[25]*; and*
- *TII (2013) Specification for Road Works Series 600 - Earthworks.*[26]

In addition to the above, construction phase mitigation measures for the proposed development are described in a detailed Construction Environmental Management Plan (CEMP) which is contained in **Appendix 4.1**. The CEMP will be implemented by the Contractor for the duration of the construction phase. The CEMP will cover all potentially polluting activities and include an emergency

[25] Institute of Civil Engineers ICE, 2015. Earthworks, A Guide (2nd Edition) https://www.icevirtuallibrary.com/isbn/9780727741851 [Accessed October 2018]
[26] Transport Infrastructure Ireland, 2013. Specification for Road Works Series 600 – Earthworks (including Erratum No. 1, dated June 2013) http://www.tiipublications.ie/library/CC-SPW-00600-03.pdf [Accessed October 2018]

response procedure. All personnel working on the site will be trained in the implementation of the procedures.

The CEMP for the proposed development will be formulated in consideration of standard best practice and will align with the guidance set out in the following documents:

- CIRIA – Guideline Document C532 Control of Water Pollution from Construction Sites (CIRIA, 2001)[27]; and
- CIRIA – Guideline Document C624 Development and Flood Risk - guidance for the construction industry (CIRIA, 2004)[28]; and
- CIRIA (2015) Environmental Good Practice on Site C692 (4th Edition) (C762)[29].

The CEMP will comprise all of the construction mitigation measures, which are set out in this EIAR, and any additional measures which are required by the conditions attached to the An Bord Pleanála decision.

14.5.2 Mitigation During Operation

The proposed development will incorporate SuDS features in order to improve water quality and reduce the quantity of surface water discharging into the receiving system. The water supply network will include low flow devices with the aim of minimising water usage.

14.5.3 Monitoring During Construction

Hydrology, Water Quality and Drainage

Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development to ensure existing surface water runoff is draining from the site and is not exposed to any contaminants.

Wastewater

The contractor will be required to ensure that the sanitary facilities for the site personnel are maintained and effluent storage is regularly emptied and disposed of.

Water Supply

The contractor will be required to ensure that the water supply to the site is maintained and free of contaminants.

[27] CIRIA, 2001. Guidance Document C532 Control of Water Pollution from Construction Site: https://www.ciria.org [Accessed October 2018]
[28] CIRIA, 2004. Guidance Document C624 Development and Floor Risk – guidance for the construction industry: https://www.ciria.org [Accessed October 2018
[29] CIRIA, 2015. Environmental Good Practice on Site C692 (4th Edition): https://www.ciria.org [Accessed October 2018]

Flood Risk

The contractor is required to monitor the weather forecasts to inform the programming of earthworks and stockpiling of materials.

14.5.4 Monitoring During Operation

There are no monitoring activities required during the operation phase of the proposed development.

14.6 Residual Effects

Cumulative effects have also been considered, during construction and operation.

14.6.1 Residual Effects During Construction

14.6.1.1 Hydrology, Drainage and Water Quality

With the implementation of mitigation measures described in **Section 14.5.1**, there will be no significant residual effect on hydrology, drainage characteristics of the site or water quality during construction.

14.6.1.2 Waste Water

There are no significant residual effects expected in relation to waste water arising from the construction phase of the proposed development.

14.6.1.3 Water Supply

There are no significant residual effects expected in relation to water supply arising from the construction phase of the proposed development.

14.6.1.4 Flood Risk

There will be no significant residual effect on flood risk caused by the construction of the proposed development.

14.6.2 Residual Effects During Operation

14.6.2.1 Hydrology, Drainage and Water Quality

As the proposed development is predicted to have an overall neutral long-term impact on water and hydrology within the study area there no mitigation measures required and as such there will be no significant residual effect on hydrology, drainage characteristics of the site or water quality during operation.

14.6.2.2 Waste Water

There is no significant impact expected to the public sewer as a result of the proposed development. Any increase in discharge will be compensated by a reduction in the expected surface water runoff into the combined sewers from the proposed development.

14.6.2.3 Water Supply

The development will result in additional demands on the public water network however the instillation of low flow devices will minimise the impact of the proposed development on the existing water supply network.

14.6.2.4 Flood Risk

There will be no significant residual effect on flood risk caused by the operation of the proposed development.

14.7 References

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15 Land and Soils

15.1 Introduction

This section describes the likely significant effects of the proposed development on land and soils. An assessment is made of the likely effects associated with the construction and operation of the proposed development on these resources. Measures are presented to mitigate or eliminate the effects of the proposed development on the soils, subsoils, bedrock and geological resources.

Chapter 3 provides a full description of the proposed development and **Chapter 4** describes the construction strategy.

This chapter has been prepared by Eoin Wyse of Arup. Refer to **Appendix 1.1** for details on relevant qualifications and experience

15.2 Assessment Methodology

15.2.1 General

The following section outlines the legislation and guidelines considered, and the adopted methodology for preparing this chapter and undertaking the land and soils assessment.

The potential effects of the proposed development on the land and soil has been assessed by classifying the importance of the relevant attributes and quantifying the likely magnitude of any impact on these attributes.

15.2.2 Guidance and Legislation

This assessment has been undertaken with due regard to the overarching EIA guidance[1,2,3,4] (see **Section 1.9.3** of **Chapter 1**) and Institute of Geologists Ireland (IGI) guidance[5].

The following guidance documents are particularly relevant to the management of impacts to land and soil:

[1] DHPLG, 2018. *Circular PL 05/2018* -Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private projects on the environment (the EIA Directive).
[2] DHPCLG, 2017. *Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems.*
[3]DHPCLG, 2017. *Circular PL 1/2017* - Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on the Administrative Provisions in Advance of Transposition.
[4] GoI, 2018. *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*.
[5] IGI, 2013. *Guidelines for the Preparation of Soil, Geology and Hydrogeology Chapters of Environmental Impact Statements*.

- Environmental Protection Agency (2017) Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft August 2017)[6]; and
- European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report[7].

This chapter has been prepared using the following guidelines:

- Institute of Geologists of Ireland (IGI, 2013). Guidelines for the Preparation of Soil, Geology and Hydrogeology Chapters of Environmental Impact Statements5;
- National Roads Authority (NRA, 2008). Environmental Impact Assessment of National Road Schemes – A Practical Guide[8];
- National Roads Authority (NRA, 2008). Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes[9];
- Environmental risks have been assessed by comparing testing against Generic Assessment Criteria (Arup GACs) based on Contaminated Land Exposure Assessment (CLEA) v1.07 software to determine the appropriate assessment of risks to human health from contaminated land. Using the input parameters including soil organic matter content and health criteria values, soil guideline values are produced for different land uses.

15.2.3 Study Area

The proposed development and study area for the land and soils assessment are shown on Figure 15.1 in **Appendix 15.1**. These lands include the site of the development and also the location of upgrade works to services required on Parkgate Street.

In accordance with IGI's Guidelines for the preparation of soils, geology and hydrogeology chapters of environmental impact statements, 2013, baseline information within a distance of 2km from the proposed development has been reviewed. This 2km buffer area is also shown on Figure 15.1 in **Appendix 15.1**.

[6] EPA, 2017. *Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports.*
[7] European Commission, 2017. *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report. Directive 2011/92/EU as amended by 2014/52/EU.*
[8] NRA, 2008. *Environmental Impact Assessment of National Road Schemes - A Practical Guide.*
[9] NRA, 2008. *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.*

15.2.4 Site Visits

Numerous site visits and site walkovers have been conducted by Arup geotechnical and other Arup personnel in late 2018 and early 2019 as part of the desk study phase, ground investigation scoping and pre-mobilisation meetings.

15.2.5 Consultation

Discussions have been held with the Waste Enforcement division of Dublin City Council (DCC) (on 10/10/2019) in relation to the retention of materials on site where appropriate and also the potential for reuse of suitable materials on site.

15.2.6 Categorisation of the Baseline Environment

As part of the desk study that was undertaken to establish the baseline conditions (i.e. soils, and geological environment), the following sources of information were reviewed:

Desk Study Information

- Bing Maps (2018). Aerial photography[10];
- Department of Communications, Energy and Natural Resources (2011). State Mining and Prospecting Facilities[11];
- Environment Protection Agency (EPA) (2018). EPA Maps, Corine Land Cover 2012[12];
- EPA (2018). Office of Licencing and Permitting[13].
- Google Maps (2018). Aerial photography[14];
- Geological Survey of Ireland (GSI) (2018). Geological maps of the site area produced by the Geological Survey of Ireland[15] including;
    - Quaternary Maps (GSI);
    - Bedrock Mapping;
    - National Landslide Database (GSI);
    - Karst Database (GSI);
    - Historic Mine Sites - Inventory and Risk Classification;
- GSI (2014). Directory of Active Quarries, Pits and Mines in Ireland. 4th Ed;

[10]Bing Maps, 2019. Aerial photography. Available at: https://www.bing.com/maps, Accessed July 2019.
[11] DCENR, 2011. *State Mining and Prospecting Facilities, Prospecting Licence Competition and Industry News*.
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[15] GeoHive, 2018. GeoHive Map Viewer. Available at http://map.geohive.ie/mapviewer.html. Accessed July 2018.

- National Parks and Wildlife Service (2018). Proposed / Designated NHA, SPA, SAC Sites[16];
- Ordnance Survey of Ireland (OSI) (2017). Current and historical Ordnance Survey (OS) maps (1837-1842 and 1888-1913) available for the study area at 1:2,500 and 1: 10,560 scales[17];
- OSI (2017). Aerial photography (1995, 2000, 2005)[17];
- Teagasc and the Environmental Protection Agency (EPA) (2017). Irish Soil Information System[18];
- Dublin City Development Plan 2016-2022 (2016) Dublin City Council[19].

Historic Ground Investigations

The following historic reports have been used to inform this report:

- Arup Consulting Engineers (2003) Site Investigation Report, Parkgate Street Development for Hickeys Fabrics & Co. Ltd., refer to **Appendix 15.2**.
- Arup Consulting Engineers (2006) Geotechnical and Environmental Assessment Report for Hickeys Fabrics & Co. Ltd., refer to **Appendix 15.3**.

The original 2003 report is attached as an appendix (**Appendix 15.1)** to this report. Reference will be made to the relevant sections of the 2003 report. The 2006 report was prepared as part of a planning report submitted for Hickey's of Parkgate Street Planning Application (Planning Ref. 3613-06) and included the ground investigation results from the 2003 report.

Project Specific Ground Investigations

A detailed geotechnical and geo-environmental site investigation was carried out and completed in early May 2019, see **Appendix 15.4**.

15.2.7 Impact Assessment

The likely significant effects have been assessed by classifying the importance of the relevant attributes and quantifying the magnitude of any likely significant effects on these attributes. This has been undertaken in accordance with the *EC Commission Guidance on the preparation of an EIAR*[1,2,3,4,7] and the *draft EPA guidelines on the preparation of an EIAR*[6], along with the IGI guidance[5] which outlines a 13-step methodology that is divided across four distinct elements:

- Initial Assessment;
- Direct and Indirect Site Investigation;

[16] NPWS, 2019. NPWS MapViewer. Available at http://webgis.npws.ie/npwsviewer/. Accessed October 2019.
[17] Geohive, 2019. GeoHive MapViewer. Available at http://map.geohive.ie/mapviewer.html. Accessed October 2019.
[18] Teagasc, 2019, Irish Soil Information System. Available at http://gis.teagasc.ie/soils/index.php. Accessed October 2019.
[19] DCC, 2016. *Dublin City Development Plan 2016-2022.*

- Final Impact Assessment, Mitigation Measures, Residual Effects and;
- Completion of the Soils and Geological Sections of the EIAR.

Initial Assessment

The 'Initial Assessment' presents a description of the past and present uses of the land across the study area which may have a bearing on the proposed development. This includes a detailed description of the nature of the ground conditions within the planning boundary based on existing literature as well as site specific and neighbouring site investigation data.

Direct and Indirect Site Investigation

Section 15.3.3 provides discussion on the data available from the site-specific ground investigation (GI) carried out in relation to the proposed development. This, along with **Section 15.3.5** look at the regional setting. The information gathered on the baseline environment during ground investigations corresponds to the second element of the methodology, 'Direct and Indirect Site Investigation and Studies'.

Mitigation Measures, Residual Impacts and Final Impact Assessment

The outcome from examining this available data is a Conceptual Site Model (CSM). The CSM is a summary of geological conditions beneath the proposed development that considers the likely significant effects of the proposed development.

A 'Feature Importance ranking' is then assigned to each feature likely to be affected by the proposed development based on guidance from the IGI Guidance document which in turn references the National Roads Authority (NRA) guidance10. This facilitates the assessment of likely significant effects which has been undertaken in accordance with the guidance outlined in **Section 15.2.2**.

Section 15.5 outlines the "Mitigation Measures and Monitoring" associated with the works in accordance with the above methodology.

Completion of the Land and Soils Sections of the EIAR

This section has been prepared iteratively whilst undertaking the first three elements. Upon finalisation of the preceding steps, this information has been documented accordingly (i.e. as part of this chapter) which corresponds to the final element of the methodology 'Completion of the Soils and Geological Sections of the EIAR'.

In parallel with the EIAR process, the site has been assessed following the Environmental Protection Agency's Guidance on the Management of Contaminated Land and Groundwater at EPA licenced Sites[20]. While this document outlines the approach, which should be adopted in order to assess contamination present on a licenced site, it is widely accepted as best practice for the assessment of contaminated sites in advance of redevelopment.

[20] EPA, 2013. *Guidance on the Management of Contaminated Land and Groundwater at EPA licensed Sites*.

The Preliminary Site Assessment (PSA) and Detailed Site Assessment (DSA) required under this methodology are all included in **Appendix 15.5** and **15.6**.

15.3 Baseline Conditions

15.3.1 Introduction

As noted in **Section 15.2.6**, the existing soils and geology in the study area have been interpreted from both desk study information and from project-specific site investigations.

15.3.2 Non-Intrusive Investigations

Geophysical surveys were carried out to examine the nature of the foundations beneath the site. The results of these surveys are included in **Appendix 15.4**.

15.3.3 Intrusive Investigations

15.3.3.1 IGSL 2002 Ground Investigation

A site investigation (SI), consisting of 8 No. shell and auger boreholes (Nos. 1 to 7 and 8B) and 16 No. window samples (Nos. 1 to 8, 9B and 10 to 16), was undertaken by Irish Geotechnical Services Limited (IGSL) in December 2002, under the direction of representatives from Arup Consulting Engineers, Dublin.

During the SI works (presented in the 2003 Arup Consulting Engineers Report), environmental soil testing was carried out. It should be noted that the analyses were carried out was for the purposes soil disposal and before the finalising of the Landfill Directive[21] and therefore do not follow the outlined methodology from that document. However, the results may still be used to indicate chemicals of concern on the site.

The following organic contaminants present in the soils:

- Mineral Oil – Associated with diesel, turpentine, and fuel oil; and
- PAH's (Polynuclear Aromatic Hydrocarbons) – Formed through the incomplete combustion of fossil fuels, typically found in ash and clinker, also, a component of petrol.

The following metals were noted to be present in the made ground:

- Lead;
- Copper;
- Arsenic;
- Mercury; and

[21] OJEC, 2002. Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.

- Chromium.

Concentrations of these metals were elevated when screened against the Dutch Intervention values[22]. These values were used in Holland as Generic Assessment Criteria for sites and represent concentrations above which there would be an unacceptable risk to human health and the environment, assuming a final use of residential and including for potential plant uptake. Arsenic, chromium and mercury were isolated to one sample. Copper was noted in 3 no. samples while lead was noted in 6 no. samples. These exceedances were located within the top 2-3m.

Ground gas was detected during the ground investigation in 2002 at concentrations of 2.3% (CO2) and 3.9% (Methane). The historic reports (**Appendix 15.2** and **15.3**) assessed the concentrations against CIRIA 149[23], however this methodology is now obsolete.

15.3.3.2 Ground Investigations Ireland Ground Investigation 2019

Ground Investigations Ireland Ltd. (GII), under the instruction of Arup, carried out the GI between March and May 2019. The GII Ground Investigation Report (2019) is presented in **Appendix 15.4**.

The following intrusive works were carried out:

- 18 No. window sample boreholes to recover soil samples;
- 4 No. cable percussion boreholes to a maximum depth of 7.6mBGL;
- 4 No. rotary core follow-on boreholes to a maximum of 15.60mBGL;
- 4 No. rotary core follow-on boreholes to a maximum depth of 17.0mBGL;
- Installation of 10 No. groundwater monitoring wells;
- Installation of 3 no. gas monitoring caps;
- Geophysical survey; and
- Geotechnical and environmental laboratory testing.

To give a robust understanding of the nature of contamination within the made ground and natural soils in vertical and lateral extent, environmental samples were taken from both boreholes and window samples. At boreholes, bulk distributed samples were taken from made ground and granular soil at 1m intervals to 8mBGL. In window samples, a small distributed sample was taken from the made ground and natural material at 1m intervals commencing at 0.5mBGL to a 4mBGL or until practical refusal.

Samples were collected in dedicated soil pots and jars as specified and supplied by the analytical laboratory.

[22] Dutch Ministry of Housing, Spatial Planning and Environment, 2000. Dutch Standards, Circular on *Target Values and Intervention Values for Remediation*.
[23] CIRIA, 1995. CIRIA Report 149 - Protecting Development from Methane.

Samples were taken in accordance with methods specified and referenced in the Investigation of potentially contaminated sites - Code of practice (BS 10175:2011+A2:2017[24]).

Representative geotechnical samples of the soils were also collected in dedicated sample pots and bulk bags.

The site geology consists generally of made ground overlying a layer of clay with occasional shell fragments, which overlies sand and gravel. Limestone bedrock is present underneath the natural soils. A summary of the strata proven at the site is summarised in Table 15.1.

This information is compiled from the borehole and window sample logs from the site investigation as presented in **Appendices 15.2** and the site investigation report produced by Ground Investigations Ireland (**Appendix 15.4**). The strata proven is consistent with the regional geology and generally consistent with findings from previous site investigations for the site.

Table 15.1: Site geology

Lithology	Description	Depth (mBGL)	Thickness (m)
Made ground	Hardcore Concrete and Tarmacadam Clay/Gravel Brown to dark brown slightly sandy clay and gravel with cobbles and anthropogenic materials (including, but not limited to slag, redbrick, mortar, charcoal). Gravel is angular to subrounded, fine to coarse.	0 – 1.3 0 – 5.0	0.04 – 1.3 1.4 – 5.0
Clay	Soft, light brown to brown, slightly sandy silty clay with occasional shell fragments	1.9 – 6.20	0.3 – 1.40
Sand and gravel	Loose to very dense grey to brown slightly clayey gravelly fine to coarse sand and gravel with occasional cobbles. Gravel is subangular to subrounded.	2.6 – 8.50	1.2 - 3.8
Weathered Bedrock	Angular cobbles of weak, thinly laminated dark grey to black Mudstone and Limestone	6.4 – 8.6	0.2 - 1.5
Limestone Bedrock	Weak to very strong dark grey fine grained limestone with bands of mudstone (?) and calcite veining	6.7 – 17.0 (proven)	8.7 (proven

[24] BS 10175:2011+A2:2017. *Investigation of potentially contaminated sites. Code of practice.*

15.3.4 Technical Limitations

The baseline data described and considered in this assessment includes existing data from earlier investigations within the study area and surrounds as well as dedicated field surveys commissioned specifically for the proposed development. The data collected provides a comprehensive dataset in relation to the soils, and geology within the study area.

The baseline data provides valuable information on the existing soils, geology and hydrogeological environment at point locations within the study area. Between each point the baseline data has been assessed by conservative interpretation. While soils and geology can vary, the exploratory locations have been selected following the completion of the comprehensive baseline data collection. This review was completed by studying local geological maps, aerial photography, historic ground investigation and completing site walkovers to provide an understanding of the study area. The location and the spacing of the exploratory locations used as part of the intrusive investigation was chosen in order to gain an understanding of the soils and geology beneath the site. The findings from the investigations for the majority of cases compared favourably with the desk study of existing information on the baseline conditions.

15.3.5 Regional Overview

The site is located on the original floodplain of the River Liffey. The site is approximately 7km east of the River Liffey discharge point to the Irish Sea.

15.3.5.1 Regional Geomorphology and Topography

The site is located within the original flood plain of the River Liffey.

With reference to the GSI online mapping, the subsoils comprise primarily of made ground, with alluvium shown to the west of the site. This has been interpreted as a potential glacial meltwater channel which potentially extends beneath the site.

The topography of the site falls to the south towards the River Liffey. Levels on Parkgate Street to the north of the site vary from 5.3 to 5.5mOD, falling to approximately 3.4mOD at the southernmost point of the site adjacent to the River Liffey.

15.3.5.2 Regional Soils and Subsoils

The soils within the study area are described in the Teagasc Subsoils Map. The general soil map of Ireland published by Teagasc shows the study area to be underlain by urban soils or made ground.

River alluvium deposited from historic flooding events is mapped by the GSI along the banks of the River Liffey and along the River Liffey paleochannel. Another paleochannel is visible approaching the site from the northwest, passing beneath the Criminal Courts of Justice. It is unknown where this paleochannel terminates. This is shown in Figure 15.2.

The till within the study area principally reflects the depositional process of the last glaciation. Typically, during the ice advance, boulder clays were deposited subglacially as lodgement till over the eroded bedrock surface, whilst moraine granular deposits were laid down at the glacier margins. Subsequently, with the progressive retreat of the ice sheet from the region, granular fluvio-glacial deposits were laid down in places by melt waters discharging from the front of the glacier.

The Teagasc Subsoils map of the study area is shown in Figure 15.3.

15.3.5.3 Regional Bedrock Geology

The 1:100,000 GSI bedrock geology map indicates that the site is underlain by the Lucan Formation consisting of dark limestones and interbedded shales known colloquially as Calp Limestone.

No bedrock structures were noted on the 1:100,000 GSI bedrock geology map (Figure 15.4).

The GSI depth to bedrock map is included as Figure 15.5.

15.3.6 Site Specific Environmental Setting

15.3.6.1 Introduction

This section outlines the site-specific information available for the proposed development. This section describes the findings of the site-specific surveys commissioned for the proposed development.

15.3.6.2 Site Description

There is one main access point to the site on Parkgate Street. The public do not have access to the site.

The River Liffey forms the southern boundary of the site and Parkgate Street runs parallel to the northern site boundary. Sean Heuston Bridge (Luas crossing and pedestrian only) is located to the east of the site (refer to Figure 15.1).

The site is located in a built up urban environment. West of the site is an apartment complex, Parkgate Complex, and commercial office buildings at Parkgate Place, presently occupied by Transport Infrastructure Ireland (TII). Parkgate street is lined with two and three storey buildings used for retail and potentially some residential apartments over the ground floor retail units.

15.3.6.3 Topography

The topography of the site falls to the south towards the River Liffey. Levels on Parkgate Street to the north of the site vary from 5.3 to 5.5mOD, falling to approximately 3.4mOD at the southernmost point of the site adjacent to the River Liffey.

15.3.6.4 Site History/Man Made Features

The previous site operations have been established based on publicly available information.

A history of the site was prepared and is summarised in Table 15.2 below.

Table 15.2: Summary of Site History at 42A Parkgate Street.

Date	Site History
Early 1800s	2-5m of fill was used to raise the levels across the site above the River Liffey floodplains.
1800s – 1890 (approximate)	Phoenix and Royal Iron Works As shown on Figure 2, the Historic Map 6 Inch Colour (1837-1842)
c.1820	Construction of the Phoenix Iron Works manager's house located the in the north-west of the site. Listed under the National Inventory of Architectural Heritage (NIAH), Reg. No. 500060347.
c. 1895	Construction of the electricity sub-station east of the site. Listed under the National Inventory of Architectural Heritage (NIAH), Reg. No. 500060350
1900 - 1910	Woollen worsted manufacturing by The Knightsbridge Mills
1910 - 1920	Site left vacant under the ownership of Phoenix and Royal Iron Works
1920-1930	Government Stores
1930 -1970s	Printing works As shown in OSi Cassini 6 inch (1830s – 1930s)
Mid 1970s - Present	Hickey's Fabrics warehouse.

Directly to the west of the site currently lie No.'s 41 and 42 Parkgate. Historic maps show that this site was also part of the Phoenix Iron Works and later the Lucan Dairy Depot.

Further west of the site along Conyngham Road, was the location of a chemical works around the early 1800s; no further information was found. A chemical factory was also noted on the northern side of Parkgate Street, the use of which was recorded as chemical manufacturing and chemical importing at various times.

The iron works were in operation from approximately the 1880s to 1890. Following the iron works the site was used as a mill under Knightsbridge Mills from approximately 1900-1910. The site was then left vacant until the 1920s when it was used as a government store until the 1930s when the printing works began.

Hickey's Fabrics took ownership of the site in the 1970s and it has since been used as a warehouse.

Several other garages and depots (bus and electric railway) were recorded, both on Conyngham Road and on the northern side of Parkgate street. A petrol spill is known to have occurred at the Maxol Garage in the mid-1990s located to the west of the site.

15.3.6.5 Potential Effects due to Site History

Based on a review of the historic site investigation data, the following parameters were noted as potential contaminants of concern:

- Hydrocarbons (Diesel Range Organics (DRO) from 99 – 7090mg/kg);
- Heavy Metal Concentrations (Arsenic, Copper, Chromium, Lead);
- Poly-Aromatic Hydrocarbons (PAHs) from 0.13mg/kg to 18.9mg/kg (Sum of 17 PAHs); and
- Asbestos Containing Materials (ACM) in soils and in the building fabric.

15.3.6.6 Soils

The made ground is present in all boreholes and window samples on the site. A generally thin layer of concrete or tarmacadam overlies the clay and gravel made ground layers.

The thickness of the made ground varies between 1.4m in WS113 to 5.0m in BH104 and typically contains slag, red brick fragments, mortar and charcoal.

A clay layer with occasional shell fragments is present across the site and is likely to be alluvium deposits from the River Liffey floodplain before the site was reclaimed in the early 1800's.

Layers of sand and gravel underlying the clay layer were also present throughout the site and are likely to be river or estuarine deposits in the area of the River Liffey channel.

A layer of angular cobbles of limestone were then encountered, described by the drillers as weathered bedrock followed by weak to very strong dark grey fine-grained limestone with bands of mudstone and calcite veining, proven to 17.0mBGL.

15.3.6.7 Bedrock Geology

Bedrock described as Weak to very strong dark grey fine-grained limestone with bands of possible mudstone and calcite veining. Bedrock was encountered approximately 6.7 to 17m Below Ground Level.

15.3.6.8 Karst Features

The karst database available on the GSI Groundwater Data Viewer – Karst Features layer was consulted. No recorded karst features were identified within 1km of the study area. As such, this assessment does not consider this feature any further.

15.3.6.9 Soft and/or Unstable Ground

Soft deposits consist of peat, alluvium or very soft cohesive material. Construction on these soils may undergo settlement or other undesirable ground movements. Where identified, special measures may be required such as excavation and replacement or other ground improvement measures. Various sources of information were consulted in establishing these areas within the study area and include:

- Teagasc subsoil map, produced by Teagasc, EPA and GSI;
- GSI database of historical landslides;
- EPA subsoil mapping;
- GI data; and
- Site Walkover.

The Teagasc subsoil map outlined no locations of soft soil within the study area, and the GSI database shows no recorded landslide events within the study area. As such, this assessment does not consider this feature any further.

15.3.6.10 Mineral/Aggregate Resources

Various datasets were consulted in establishing the economic geology of the study area including:

- GSI: Aggregate Potential Mapping;
- GSI: mineral localities; and
- EPA: active mine sites.

A detailed description of how the Aggregate Potential Mapping was developed is available on the GSI Website[25].

The site was noted to have a low to moderate aggregate potential, however given the current location and planning context of the site, it is unlikely to ever be utilised.

No active metallic mines exist today in the study area. There is no record of underground mining in the area. Therefore, there would be a low risk of underground structure collapse due to underground excavations.

As such, this assessment does not consider these features any further.

15.3.6.11 Geological Heritage Areas

The Irish Geological Heritage Programme is a partnership between the GSI and the National Parks and Wildlife Services (NPWS).

[25] DCENR, 2019. Map Viewer. Available at https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=ee8c4c285a49413aa6f1344416dc9956. Accessed October 2019.

The programme was developed to identify and document the geological heritage and protect and conserve it. Consultation was conducted with the GSI in order to identify all geological heritage sites within the study area through checking of the GSI GHA/County Geological Sites (CGS) webviewer [26].

No Geological Heritage Areas' were noted.

Two County Geological Sites were identified. One consists of two boreholes located in the Diageo Brewery at St James Gate and the other was identified as the Phoenix Park. Both sites are suitably remote and they will not be affected by the proposed development.

As such, this assessment does not consider these features any further.

15.3.6.12 Chemical Test Results

The site investigations that have been undertaken (Refer to **Appendix 15.4**) are described in detail in the Detailed Site Assessment that has been produced by Arup (Refer to **Appendix 15.6**).

The soil samples recovered during the Ground Investigation were tested against a suite of parameters which included the contaminants highlighted as potential contaminants of concern.

These results were screened with a view to assessing the possibility of retaining these materials on site and reusing them as fill materials.

In terms of assessing the level of contamination within the soils, the soil results were screened against Generic Assessment Criteria (GACs). The GACs are values which have been calculated for typical soils in certain proposed end uses to determine the concentration above which there would be an unacceptable risk to human health or the environment.

The samples recovered during the ground investigation were screened against the GACs for a residential end use without plant uptake.

In addition, the samples were screened for the presence of asbestos fibres.

Based on the screening carried out on the soils, a number of locations were identified where the soils contained parameters which exceeded the GACs for Residential Land Use (without Plant Uptake). These were as presented In Table 15.3 below.

Table 15.3: Exceedances of GAC Threshold for Residential Land Use

Contaminant	GAC Threshold	No. Exceedances	Sample ID and Depth (mBGL)	Sample Result
Arsenic	2mg/kg	1	BH01 at 1.0mBGL	43.1mg/kg
Lead	310mg/kg	8	WS106 at 0.5mBGL	366mg/kg

[26] DCENR, 2019. Map Viewer. Available at https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=b245c2bd11a64162a1632ad6bccf8e34&scale=0. Accessed October 2019.

Contaminant	GAC Threshold	No. Exceedances	Sample ID and Depth (mBGL)	Sample Result
			WS106 at 1.0mBGL	414mg/kg
			WS114 at 1.5mBGL	385mg/kg
			WS103 at 2.6mBGL	521mg/kg
			WS101 at 1.0mBGL	312mg/kg
			WS105A at 0.5mBGL	4755mg/kg
			TP102 at 1.0mBGL	692mg/kg
			WS110 at 0.9mBGL	2229mg/kg
Benzo[a] anthracene	14mg/kg	1	WS106 at 0.5mBGL	19.01mg/kg
Benzo[a] pyrene	3mg/kg	2	WS106 at 0. 5mBGL	17.27mg/kg
			WS105A at 1.3 mBGL	8.97mg/kg
Dibenzo[ah] anthracene	0.32mg/kg	3	WS106 at 0.5mBGL	4.81mg/kg
			WS106 at 1.0mBGL	0.64mg/kg
			WS105A at 1.3mBGL	1.46mg/kg
Total No. of Exceedances		15		

Based on this table, the majority of the exceedances (13 of 15) occur between 3.5mOD and 2.5mOD.

8 no. soil samples were noted to contain low levels of asbestos (<0.1%). Four of the asbestos detects all occurred in close proximity, at TP102, BH101, WS101 and WS103, all between 3.5-2.5mOD.

3 no. asbestos detects occurred just between ground level and 3.5mOD with the remaining asbestos detect occurring between 2.5-1.5mOD.

15.3.7 Conceptual Site Model

15.3.7.1 Introduction

A CSM was developed based on the data obtained during the intrusive investigations i.e. borehole and trial pit logs, geophysical surveys and groundwater monitoring data. The CSM (as presented in Figure 15.6) summarises the important geological and hydrogeological features in the study area.

15.3.7.2 Importance of Features

A summary of the geological and hydrogeological features of relevance within the study area is presented in Table 15.4. In addition, the importance ranking of the highlighted feature is established based on the IGI guidance.

Table 15.4: Summary of the geological features of importance

ID	Feature	Description/ Location	Feature Importance Ranking	Criteria
Overburden soils	Made ground, estuarine deposits, glacial tills	Widespread	Low	Volume of soil has a low significance on a local scale
Contaminated Land	Made ground	Historical site for heavy industry	High	Contaminated Soil on site with previous heavy industrial usage.
Soft ground	Estuarine deposits	Widespread	Low	Volume of soil has a low significance on a local scale
Bedrock/Aggregate Resources	Crushed rock aggregate potential	Excavation of material	Low	Uneconomically extractable resource

15.3.7.3 Environment Type

The geological environment at and in the vicinity of the study area can be described as a historically stable geological environment and underlain by a poor aquifer. Consequently, the geological environment is considered to be Passive (type A) as per the IGI guidelines.

15.3.7.4 Activities/Environment Matrix

Table 15.5 outlines the required activities that would be undertaken during construction and operation, and the investigations, assessments and surveys that have been carried out to consider those activities.

Table 15.5: Details of proposed works as per the IGI Guidelines and how they were undertaken to support this EIAR

Work Required under Activity and Type Class (based on IGI Guidelines)	Details of works completed to date
Earthworks	
Invasive site works to characterise nature, thickness, and stratification of soils and subsoils	Site specific site investigation carried out across the study area.
Storage/transmission of leachable and/or hazardous materials	
Establish nature and quantity of leachable materials.	Collection of soil samples. Analysis for quality, including WAC and waste classification screening.
Site works to characterise nature, thickness, permeability and stratification of soils, subsoils, bedrock geology.	Site specific site investigation carried out across the study area.

Work Required under Activity and Type Class (based on IGI Guidelines)	Details of works completed to date
Excavation of materials above the water table	
Site works to characterise nature, thickness, permeability and stratification of soils, subsoils, bedrock geology.	Site specific site investigation carried out across the study area.
Excavation of materials below the water table	
Site works to characterise nature, thickness, permeability and stratification of soils, subsoils, bedrock geology.	Site specific site investigation carried out across the study area.

15.4 Likely Significant Effects

15.4.1 Introduction

The activities on site during the construction phase will involve the demolition of some of the existing structures and the excavation of parts of the site to facilitate the construction of the undercroft/basement, with a finished slab level of approximately 2.0mOD. Local excavation may be carried out to deeper depths.

In addition, upgrade works are required for infrastructure located beneath Parkgate Street. These works were considered when preparing the effects listed below.

15.4.2 Assessment of effects during the "Do Nothing" Situation

In accordance with EC Guidance notes and after reviewing the baseline data, this section considers the effects of the 'do nothing' scenario. If nothing is done, there is no effect on the land and soils and the site condition remains as outlined in the baseline.

This situation is not likely to change over time and the impact on the land and soils can be considered negligible.

15.4.3 Assessment of Effects during Construction

The likely potential effects of the construction of the proposed development on land and soils are listed below and described in the following sections:

- Pollution from construction activities;
- Compression of substrata;
- Loss of Overburden
- Earthworks haulage;
- Excavation of Soft Soils; and
- Ground Movements.

Pollution from Construction Activities

The construction of the proposed development will require the use of fuels and materials which will have the potential to pollute the site, and adjacent, environment. The potential effect of pollution from construction activities is considered to be a small adverse effect and the significance of this effect is moderate/slight.

Compression of Substrata

During earthworks heavily loaded HGVs would travel through the site potentially generating ground vibration, unwanted compaction and disturbance of natural ground on unfinished surfaces. Construction traffic may therefore result in increased loading on underlying soils which may affect the current characteristics of the ground by compressing substrata.

Given the nature of the soils and the site history of industrial use, the effect is deemed to be imperceptible and thus not significant during construction.

Loss of Overburden

Some of the overburden material may be suitable for re-use as an engineered fill for use within the development subject to appropriate approvals/notifications. Materials which are not suitable for reuse, through their properties or the absence of opportunity for reuse, will need to be removed off-site to a suitable disposal facility.

Given the nature of the soils and the site history of industrial use, the effect is deemed to be imperceptible and thus not significant during construction.

Earthworks Haulage

The excavation of soils to facilitate construction of the basement/undercroft will result in increased traffic on the roads to and from the proposed site, as discussed in **Chapter 6,** Traffic and Transportation. Increased noise, dust and vibration will also be generated, as discussed in **Chapter 9**, Noise and Vibration and **Chapter 7,** Air Quality.

Details in relation to the management of these soils is discussed in **Chapter 17,** Resource and Waste Management of this EIAR.

Excavation of Soft Soils

Limited soft soils may require excavation and replacement when encountered at the base of excavations for the proposed development. These are expected to be localised and minor in extent.

Given the relatively small quantity of soils which will be removed, it is considered to be a small adverse impact that does not have any regional significance. The significance of the potential impact is Imperceptible.

Removal of Contaminated Soils

The excavation on the site and removal of soils unsuitable for reuse or retention on site would be of low importance given the volume of the material that would be removed is low on a local scale. Further, where possible, suitable material would be retained within the proposed development.

The removal of soils unsuitable for reuse or retention on site would be a small adverse effect, therefore this effect is deemed to be imperceptible during construction. However, the removal of these soils off-site would also result in a beneficial small positive effect on site. Details in relation to the management of these soils is discussed in **Chapter 17,** Resource and Waste Management of this EIAR.

Ground Movements

The excavation activities generate the potential to induce ground movements and potentially settlement adjacent to excavations and dewatering operations across the study area. However, this would be typical of a development of this scale and would be considered as standard for these types of works.

The potential to induce movement and settlement would be of low importance given the limited area to be excavated and the provision of appropriate temporary support measures, including but not limited to trench boxes and/or sheet piling. The potential to induce movement and settlement would be small adverse and this effect is deemed to be Slight.

Summary of Construction Effects

Table 15.6 summarises the predicted impacts during the Construction Phase.

Table 15.6: Summary of Effects due to construction

Feature	Importance		Magnitude of Effects		Significance of Effects
	Ranking	Justification	Ranking	Justification	
Contaminated Land	High	Historic site for heavy industry	Small adverse	Limited construction traffic and construction activities	Moderate/ Slight
Overburden Soils	Low	Subsoils are likely to be removed. Increased loading on underlying deposits	Small adverse	Removal of soils and replacement with structure will not impact on the characteristics of the soils and rock.	Imperceptible
Loss of Overburden	Low	Made Ground/ estuarine deposits/ Glacial Till	Small adverse	Loss of a small proportion of soils	Imperceptible
Earthworks Haulage	Low	Volume of material for removal is low on a local scale	Small adverse	Limited excavation and disposal	Imperceptible

Feature	Importance		Magnitude of Effects		Significance of Effects
	Ranking	Justification	Ranking	Justification	
Excavation of soft soils	Low	Volume of soft alluvial soil is small	Small adverse	Only a small proportion/if any of soft soils beneath the foundations will require excavation	Imperceptible
Effect on the surrounding ground	Low	Minor on a local scale	Small Adverse	Results in minor impact on the integrity of the attribute	Imperceptible

15.4.3.1 Indirect Effects

The main identified indirect effects relate to removal and disposal of contaminated soils off site, contaminated soils entering groundwater or surface waters, and damage to nearby sites and infrastructure due to ground movements during excavation.

Both of these are directly addressed in **Sections 15.5.1.** Mitigation and Monitoring measures from **Section 15.5.2** are provided to minimise the residual indirect risk.

15.4.3.2 Cumulative Effects

In preparing this chapter, consideration was given to the developments listed in **Chapter 21**, Cumulative Effects in relation to relevant cumulative and in combination effects.

The main effects from the proposed development arise during construction with negligible effects with respect to land and soils occurring during operation. It is unknown at this stage if the construction works associated with other developments would be occurring at the same time as the construction of the proposed development.

Notwithstanding, given the nature and scale of the developments identified, no cumulative effects on land and soils are predicted to occur if any one, or all of these developments occur concurrent to the construction of the proposed development.

There are no significant cumulative effects on Land and Soils associated with the proposed development.

15.4.4 Assessment of Effects During Operation

The operational phase of the proposed development will have an overall neutral long-term impact on land and soils.

The potential effects on land and soils during the operational phase will be limited to accidental spillage of potentially polluting substances including fuel, oils, paints and wastes.

All potential impacts on land and soils from the operational phase of the proposed development will be of imperceptible significance.

15.4.4.1 Indirect Effects

There are no identified indirect impacts at the operational stage relation to Soils and Geology.

15.4.4.2 Cumulative Effects

In preparing this chapter, consideration was given to the developments listed in **Chapter 21**, Cumulative Effects in relation to relevant cumulative and in combination effects. There are no significant cumulative effects on Land and Soils associated with the proposed development in the operational phase.

15.5 Mitigation Measures and Monitoring

15.5.1 Mitigation

15.5.1.1 Mitigation During Construction

General

A Construction Environmental Management Plan (CEMP) is contained in **Appendix 4.1.**

Precautionary measures will be taken to contain any areas within the planning boundary at risk of contaminated run-off.

- Potential pollutants shall be adequately secured against vandalism and will be provided with proper containment according to the relevant codes of practice. Any spillages will be immediately contained, and contaminated soil shall be removed from the proposed development and properly disposed of in an appropriately licenced facility;
- Dust generation shall be kept to a minimum through the wetting down of haul roads as required and other dust suppression measures;
- Any stockpiles of earthworks and site clearance material shall be stored on impermeable surfaces and covered with appropriate materials;
- Silt traps shall be placed in gullies to capture any excess silt in the run-off from working areas;
- Soil and water pollution will be minimised by the implementation of good housekeeping (daily site clean-ups, use of disposal bins, etc.) and the proper use, storage and disposal of these substances and their containers as well as good construction practices; and

A CEMP has been prepared for the proposed development and is included in **Appendix 4.1**.

This CEMP includes good housekeeping and emergency response measures to be implemented during the construction phase of the project, including actions for dealing with any potential pollution incidents, in accordance with CIRIA Guidance 37. This CIRIA guidance requires the following to be addressed:

- Containment measures;
- Emergency discharge routes;
- List of appropriate equipment and clean-up materials;
- Maintenance schedule for equipment;
- Details of trained staff, location and provision for 24-hour cover;
- Details of staff responsibilities;
- Notification procedures to inform the EPA or Environmental Department of the Dublin City Council;
- Audit and review schedule;
- Telephone numbers of statutory water consultees; and
- List of specialist pollution clean-up companies and their telephone numbers.

Compression of Substrata

- Excavations shall be kept to a minimum, using shoring or trench boxes where appropriate. For more extensive excavations, a temporary works designer shall be appointed to design excavation support measures in accordance with all relevant guidelines and standards.

Loss of Overburden

- All excavated material will, where possible, be reused as construction fill. The appointed contractor will ensure acceptability of the material for reuse for the proposed development with appropriate handling, processing and segregation of the material. This material would have to be shown to be suitable for such use and subject to appropriate control and testing according to the Earthworks Specification(s);
- These excavated soil materials will be stockpiled using an appropriate method to minimise the impacts of weathering. Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff; and
- Any surplus suitable material excavated that is not required elsewhere for the proposed development, shall be used for other projects where possible, subject to appropriate approvals/notifications.

Earthworks Haulage

- Earthworks haulage will be along agreed predetermined routes along existing national, regional and local routes.

Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to an acceptable condition. Where practicable, compaction of any soil or subsoil which is to remain in situ will be avoided; and

- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe runoff and prevent ponding and flooding. Runoff will be controlled through erosion and sediment control structures appropriate to minimise the possible impacts.

Impact on surrounding ground:

- Ground settlement, horizontal movement and vibration monitoring will be implemented during construction activities to ensure that the construction does not exceed the design limitations; and
- Ground settlements will be controlled through the selection of a foundation type and construction methods which are suitable for the particular ground conditions.

15.5.1.2 Mitigation During Operation

No mitigation has been proposed with respect to effects from operation of the proposed development in relation to soils and geology.

There are no residual issues relating to soils and geology. No specific operational phase mitigation measures relating to soils and geology are required.

15.5.2 Monitoring

15.5.2.1 Monitoring During Construction

Excavations in made ground will be monitored by an appropriately qualified person to ensure that any contaminated material is identified, segregated and disposed of appropriately. Any identified hotspots shall be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the hotspot does not cross-contaminate clean soils elsewhere.

Any excavation shall be monitored during earthworks to ensure the stability of side slopes and to ensure that the soils excavated for disposal are consistent with the descriptions and classifications according to the waste acceptance criteria testing carried out as part of the site investigations.

Ground settlement, horizontal movement and vibration monitoring will be implemented during construction activities to ensure that the construction does not exceed the design limitations. Monitoring will be more rigorous in the proximity of any protected structures. This will include more frequent monitoring and additional monitoring points. Monitoring points will be located on the face of the structures and centred every 1m. Horizontal, vertical and rotational displacement in all directions will be monitored.

Movement monitoring shall be carried out during any activities which may result in ground movements or movements of any nearby structures.

15.5.2.2 Monitoring During Operation

No monitoring is specified as no impacts were identified for the operational phase of the works.

15.6 Residual Effects

Before the implementation of any mitigation measures, all but one effect was noted to have an imperceptible effect. The only feature which was identified to have a moderate to slight effect related to the excavation and management of contaminated soils on the site.

With the implementation of the proposed mitigation measures outlined in **Section 15.5.1** and monitoring during construction, the effect of the proposed development on land and soils is considered to be of negligible magnitude and imperceptible significance during construction and operation. No residual effects of significance on land and soils have been identified. Table 15.7 summarises the residual effects.

Cumulative effects have also been considered.

Table 15.7: Residual Effects

Feature	Importance		Magnitude of Effects		Significance of Effects	Mitigation Measures	Residual effect	Residual Significance of Effect
	Ranking	Justification	Ranking	Justification				
Contaminated Land	High	Historic site for heavy industry	Small adverse	Limited construction traffic and construction activities	Moderate/ Slight	Implementation of CEMP, Good management of site and excavated soils.	Negligible	Imperceptible
Overburden Soils	Low	Subsoils are likely to be removed. Increased loading on underlying deposits	Small adverse	Removal of soils and replacement with structure will not impact on the characteristics of the soils and rock.	Imperceptible	N/A	Negligible	Imperceptible
Loss of Overburden	Low	Made Ground/ estuarine deposits/ Glacial Till	Small adverse	Loss of a small proportion of soils	Imperceptible	N/A	Negligible	Imperceptible
Earthworks Haulage	Low	Volume of material for removal is low on a local scale	Small adverse	Limited excavation and disposal	Imperceptible	N/A	Negligible	Imperceptible
Excavation of soft soils	Low	Volume of soft alluvial soil is small	Small adverse	Only a small proportion/if any of soft soils beneath the foundations will require excavation	Imperceptible	N/A	Negligible	Imperceptible
Effect on the surrounding ground	Low	Minor on a local scale	Small Adverse	Results in minor impact on the integrity of the attribute	Imperceptible	N/A	Negligible	Imperceptible

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Map Viewers

Bing Maps

Google Maps

EPA Maps

GeoHive Map Viewer

NPWS Map Viewer

Aggregate Potential Mapping

16 Hydrogeology

16.1 Introduction

This section describes the likely significant effects of the proposed development on hydrogeology. An assessment is made of the likely effects associated with the construction and operation of the proposed development on these resources. Measures are presented to mitigate or eliminate the effects of the proposed development on the groundwater beneath the site.

Chapter 3 provides a full description of the proposed development and **Chapter 4** describes the construction strategy.

This chapter has been prepared by Eoin Wyse of Arup. Refer to **Appendix 1.1** for details on relevant qualifications and experience.

16.2 Assessment Methodology

16.2.1 General

The following section outlines the legislation and guidelines considered, and the adopted methodology for preparing this chapter and undertaking the hydrogeology assessment.

This assessment has been undertaken with due regard to the overarching EIA guidance[1,2,3,4] (described in **Section 1.9.3** of **Chapter 1**) and Institute of Geologists Ireland (IGI) guidance[5].

16.2.2 Guidance and Legislation

The following legislation and guidance is particularly relevant to the management of groundwater:

[1] DHPLG, 2018. *Circular PL 05/2018* -Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private projects on the environment (the EIA Directive).
[2] DHPCLG, 2017. *Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems.*
[3] DHPCLG, 2017. *Circular PL 1/2017* - Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on the Administrative Provisions in Advance of Transposition.
[4] GoI, 2018. *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*.
[5] IGI, 2013. *Guidelines for the Preparation of Soil, Geology and Hydrogeology Chapters of Environmental Impact Statements*.

- *Environmental Protection Agency (EPA) (2017) Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft August 2017)[6]; and*
- *European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report[7];*
- *The EU Water Framework Directive (WFD), 2000/60/EC[8];*
- *The Groundwater Directive, 2006/118/EC[9];*
- *European Communities (Water Policy) Regulations 2014 (S.I. No. 350 of 2014)[10];*
- *European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010), as amended;*
- *European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009) as amended;*
- *European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (SI No. 386 of 2015)[11];*
- *European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003) as amended;*
- *European Communities (Water Policy) (Amendment) Regulations, 2008 (S.I. No. 219 of 2008)[12];*
- *European Communities (Water Policy) (Amendment) Regulations, 2010 (S.I. No. 93 of 2010)[13];*
- *European Communities (Drinking Water) Regulations 2014 (S.I. No 122 of 2014), as amended;*
- *European Communities (Quality of Salmonid Waters) Regulations 1988 (SI no. 293 of 1988)[14]; and*
- *Water Services Acts (2007 – 2017)[15].*

[6] EPA, 2017. *Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports*.
[7] European Commission, 2017. *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report. Directive 2011/92/EU as amended by 2014/52/EU*.
[8] The EU Water Framework Directive (WFD), 2000/60/EC.
[9] The Groundwater Directive, 2006/118/EC.
[10] European Union (Water Policy) Regulations, 2014. S.I. No. 350 of 2014.
[11] European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (S.I. No. 386 of 2015).
[12] European Communities (Water Policy) (Amendment) Regulations, 2008 (S.I. No. 219 of 2008).
[13] European Communities (Water Policy) (Amendment) Regulations, 2010 (S.I. No. 93 of 2010).
[14] European Communities (Quality of Salmonid Waters) Regulations 1988 (SI no. 293 of 1988).
[15] *Water Services Acts, 2007 – 2017.*

16.2.3 Study Area

The study area for the hydrogeology assessment extends to areas within 2km of the proposed development outline as defined by the red line boundary illustrated in Figure 15.1 in **Appendix 15.1**. This also includes the upgrade works required to the services lying in Parkgate Street.

16.2.4 Site Visits

Numerous site visits and site walkovers have been conducted by Arup geotechnical and other Arup personnel in late 2018 and early 2019 as part of the desk study phase, ground investigation scoping and pre-mobilisation meetings.

16.2.5 Consultation

Discussions have been held with the Waste Enforcement division of DCC (on 10/10/2019) in relation to the retention of materials on site where appropriate and also the potential for reuse of suitable materials on site.

In the course of discussions, it was noted that any proposed discharges from the site as part of the dewatering activities would have to occur under licence from DCC.

16.2.6 Categorisation of the Baseline Environment

Baseline conditions of the hydrogeological environment within 2km of the red line site boundary were determined by reviewing publicly available information from the following sources:

- Bing Maps (2018). Aerial photography[16];
- Google Maps (2018). Aerial photography[17];
- Geological Survey of Ireland (GSI) (2018). Geological maps of the site area produced by the Geological Survey of Ireland[18] including;
    - Karst Database;
    - Bedrock Aquifer and Gravel Aquifer Maps;
    - Groundwater Recharge Maps;
    - Groundwater Vulnerability Maps;
    - Groundwater Wells and Springs Database;
    - Drinking Water Protection Areas Database; and
    - National Federation Group Water Schemes Database.
- Environmental Protection Agency (2018). Environmental maps of the site area produced by the EPA[19] including:
    - Water Framework Directive;

[16] Bing Maps, 2019. *Aerial photography*.
[17] Google Maps, 2019. *Aerial photography*.
[18] GSI, 2019. *Public Data Viewer Series*.
[19] EPA, 2019. *EPA Maps*.

- Clean Water and Health;

- GSI (2003). Dublin GWB: Summary of Initial Characterisation. Groundwater Bodies[20];
- National Parks and Wildlife Service (2018). Proposed / Designated NHA, SPA, SAC Sites[21];
- Ordnance Survey of Ireland (OSI) (2017). Current Ordnance Survey (OS) maps available for the study area:

Ground Investigations

The following historic reports have been used to inform this report:

- Arup Consulting Engineers (2003) Site Investigation Report, Parkgate Street Development for Hickeys Fabrics & Co. Ltd., refer to **Appendix 15.2**.
- Arup Consulting Engineers (2006) Geotechnical and Environmental Assessment Report for Hickeys Fabrics & Co. Ltd., refer to **Appendix 15.3**.

Reference will be made to the relevant sections of the 2003 report (**Appendix 15.2**). The 2006 report was prepared as part of a planning report submitted for Hickey's of Parkgate Street Planning Application (Planning Ref. 3613-06) and included the ground investigation results from the 2003 report.

In addition, Ground Investigations Ireland Ltd. (GII), under the instruction of Arup, carried out a project specific GI between March and May 2019. The GII Ground Investigation Report (2019), see **Appendix 15.3**.

16.2.7 Impact Assessment

The likely significant effects have been assessed by classifying the importance of the relevant attributes and quantifying the magnitude of any likely significant effect on these attributes. This has been undertaken in accordance with the *EC Commission Guidance on the preparation of an EIAR*[7] and the *draft EPA guidelines on the preparation of an EIAR*[6], along with the IGI guidance[5] which outlines a 13 step methodology that is divided across four distinct elements:

- Initial Assessment;
- Direct and Indirect Site Investigation;
- Final Impact Assessment, Mitigation Measures and Residual Effects
- Completion of the Hydrogeological Sections of the EIAR.

Initial Assessment

The 'Initial Assessment' presents a description of the past and present uses of the land across the study area which may have a bearing on the proposed development.

[20] GSI, 2003. *Dublin GWB: Summary of Initial Characterisation. Groundwater Bodies*.
[21] NPWS, 2018. *Proposed / Designated NHA, SPA, SAC Sites*.

This includes a detailed description of the nature of the ground conditions within the planning boundary based on existing literature as well as site specific and neighbouring site investigation data.

Direct and Indirect Site Investigation

Section 16.3.3 provides discussion on the data available from the site-specific ground investigations (GI) carried out in relation to the proposed development. This, along with other sections from within **Sections 16.3.1 and 16.3.2** look at the regional setting. The information gathered on the baseline environment during ground investigations corresponds to the second element of the methodology, 'Direct and Indirect Site Investigation and Studies'.

Final Impact Assessment, Mitigation Measures and Residual Effects

The outcome from examining this available data is a Conceptual Site Model (CSM). The CSM is a summary of geological conditions beneath the proposed development that considers the likely significant effects of the proposed development.

A 'Feature Importance ranking' is then assigned to each feature (likely to be affected by the proposed development based on guidance from the National Roads Authority (NRA)[22] and IGI[5]. The IGI guidance draws upon the existing guidance at the time of publication from the NRA and applies it to Soils Geology and Hydrogeology. This facilitates the assessment of likely significant effects which has been undertaken in accordance with the guidance outlined in **Section 16.2.2. Section 16.5** outlines the "Mitigation Measures and Monitoring" associated with the works in accordance with the above methodology.

Completion of the Hydrogeology Sections of the EIAR

This section has been prepared iteratively whilst undertaking the first three elements. Upon finalisation of the preceding steps, this information has been documented accordingly (i.e. as part of this chapter) which corresponds to the final element of the methodology 'Completion of the Soils, Geological and Hydrogeological Sections of the EIAR'.

16.3 Baseline Conditions

As noted in **Section 16.2.7**, the existing hydrogeology in the study area has been interpreted from both desk study information and from project-specific site investigations. The current baseline would represent the "Do Nothing Scenario" as required under the European Commission Guidance.

[22] Note that the NRA merged with the Railway Procurement Agency (RPA) to become Transport Infrastructure Ireland (TII) in 2015. The NRA tables presented in Tables C2 to C6 of the IGI (2013) document can be found in Box 4.1, Box 4.3, Box 5.1, Box 5.3 and Box 5.4 of the NRA (2008) document available on the TII website.
NRA, 2008. Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.

16.3.1 Regional Geomorphology and Topography

The proposed development is located on the northern side of the River Liffey which flows from the west to the east along the southern boundary of the site. The River Liffey is tidal in the vicinity of the site and discharges to the Irish Sea approximately 7km east of the site (Refer to Figure 15.1 **in Appendix 15.1**).

16.3.2 Regional Hydrogeology

16.3.2.1 Aquifer Type

The Geological Survey of Ireland (GSI) has devised a system for classifying both bedrock and gravel aquifers in Ireland based on the hydrogeological characteristics, size and productivity of the groundwater resource[23]. The three main classifications are Regionally Important Aquifers, Locally Important Aquifers and Poor Aquifers. These are then further subdivided by their general characteristics.

The proposed development is underlain by limestone bedrock (referred to as the Lucan formation) which is classified by the GSI as a Locally Important Aquifer (Ll) bedrock which is moderately productive in local zones. The GSI has not designated any gravel aquifers beneath or in the vicinity of the proposed development. The aquifer classification map is presented on Figure 16.1 in **Appendix 16.1**.

This bedrock aquifer is part of the Dublin Urban groundwater body. The GSI note that the aquifer does not contain significant primary porosity with the majority of flow and storage occurring in fractures[24]. It is reported by the GSI that based on packer tests the permeability was seen to reduce by an order of magnitude with every 5 m increase in depth[29]. The GSI report that the majority of flow is in the upper weathered bedrock and is also common within fractures and fissures at depth of up to 50mbgl[29]. Conduits are also recorded at depth between 30mbgl to 50mbgl[29].

Regional groundwater flow in the aquifer is towards Dublin Bay and the Irish Sea in the east[29]. It is also reported by the GSI that flow is also seen towards the River Liffey[29] which suggested that that there is a degree of continuity between the groundwater in the Lucan Formation and the River Liffey.

16.3.2.2 Groundwater Vulnerability

Groundwater vulnerability is a relative measure of the ease with which groundwater may be contaminated by human activity. It is based on the aquifer's intrinsic geological and hydrogeological characteristics. The vulnerability is determined by the thickness and permeability of overlying deposits and the depth to groundwater.

[23] GSI, 2018. Aquifer classification.
[24] GSI, 2015. Dublin GWB: Summary of initial characteristics.

For example, bedrock with a thick, low permeability, clay-rich overburden is less vulnerable than bedrock with a thin, high permeability, gravelly overburden.

The groundwater vulnerability rating is relevant to groundwater in the bedrock aquifer rather than the subsoil (drift). Where the cover over the glacial sand and gravel is thin the groundwater will be more vulnerable.

Groundwater vulnerability in this area of the city, north of the River Liffey is generally Low and increases to Moderate along the River Liffey corridor (See Figure 16.2 in **Appendix 16**.1).

16.3.2.3 Recharge

Recharge is the amount of effective rainfall that replenishes the aquifer. It is a function of the effective rainfall (i.e. rainfall minus evaporation and run off), transpiration (uptake by plants) and the aquifer characteristics.

According to the GSI groundwater recharge database, the recharge to the area is 68mm/yr which accounts for approximately 20% (19.94%) of the effective annual rainfall (341mm/yr) over the area. The recharge in the area of the proposed development is shown on Figure 16.3 **in Appendix 16.1.**

This is a low rate of recharge which reflects both the relatively low effective rainfall value and the low permeability of the subsoil above the limestone aquifer. This highlights that there is only a limited capacity for rainwater to infiltrate into the limestone aquifer.

16.3.2.4 Groundwater Receptors – Groundwater Abstractions

Based on the GSI database there are no Source Protection Zones or National Federation of Group Water Scheme Zones of Contribution within 2km of the proposed development site boundary. There are two groundwater wells on the GSI database within 2km of the site.

The groundwater abstractions within the area of the proposed development are shown on Figure 16.4.

16.3.2.5 Groundwater Receptors – Groundwater Dependent Ecosystems

Under to the *EU Habitats Directive (92/43/EEC)*[25] and the *EU Birds Directive (2009/147/EC)*[26], Member States are required to establish a Natura 2000 network of sites of highest biodiversity importance for rare and threatened habitats and species across the EU. In Ireland, the Natura 2000 network of European sites includes Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

[25] OJEC, 1992. Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna.
[26] OJEC, 2009. Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.

In Ireland, areas which have a nationally important habitat(s) or which have a habitat(s) that needs protection, are granted protection under the *Wildlife (Amendment Act) 2000*[27]. Such areas may be designated Natural Heritage Areas (NHAs) or proposed NHAs (pNHAs). Under the *Wildlife Amendment Act (2000)*[31], NHAs are legally protected from damage from the date they are formally proposed for designation. There are no NHAs or pNHAs within 2km of the site. Thus, no groundwater dependant ecosystems of conservation significance are identified within the study area. Refer to **Chapter 10,** Biodiversity for further information, as well as the Report for the Purposes of Appropriate Assessment Screening and Natura Impact Statement, which are submitted alongside this planning application.

The sensitive features within the area of the proposed development are shown on Figure 16.5.

16.3.3 Site Specific Environmental Setting

16.3.3.1 Introduction

This section outlines the site-specific information available for the proposed development.

16.3.3.2 Site Overview

The River Liffey forms the southern boundary of the site and Parkgate Street runs parallel to the northern site boundary.

The site is located in a built up urban environment.

Significant landmarks in proximity to the site include the Criminal Courts and Phoenix Park, located approximately 200m north-east of the north-western tip of the site. East of the site is Collins Barracks. Heuston Station is south of the site on the southern side of the River Liffey.

16.3.3.3 Site Topography

The topography of the site falls to the south towards the River Liffey. Levels on Parkgate Street to the north of the site vary from 5.3 to 5.5mOD, falling to approximately 3.4mOD at the southernmost point of the site adjacent to the River Liffey

16.3.3.4 Site Specific Ground Investigation

Ground Investigations Ireland Ltd. (GII), under the instruction of Arup, carried out the GI between March and May 2019. The GII Ground Investigation Report (2019) is presented in **Appendix 15.4**.

The following intrusive works were carried out:

[27] *Wildlife (Amendment Act) 2000.*

- 18 No. window sample boreholes to recover soil samples;
- 4 No. cable percussion boreholes to a maximum depth of 7.6mbgl;
- 4 No. rotary core follow-on boreholes to a maximum of 15.60mbl;
- 4 No. rotary core follow-on boreholes to a maximum depth of 17.0mbgl;
- Installation of 10 No. groundwater monitoring wells;
- Installation of 3 no. gas monitoring caps;
- Geophysical survey; and
- Geotechnical and environmental laboratory testing.

To give a robust understanding of the nature of any potential contamination within the made ground and natural soils in vertical and lateral extent, environmental samples were taken from both boreholes and window samples. At boreholes, bulk distributed samples were taken from made ground and granular soil at 1m intervals to 8mbgl. In window samples, a small distributed sample was taken from the made ground and natural material at 1m intervals commencing at 0.5mbgl to a 4mbgl or until practical refusal.

Samples were collected in dedicated soil pots and jars as specified and supplied by the analytical laboratory. Samples were taken in accordance with methods specified and referenced in the Investigation of potentially contaminated sites - Code of practice (BS 10175:2011+A2:2017)[28].

Representative geotechnical samples of the soils were also collected in dedicated sample pots and bulk bags.

The site geology consists generally of made ground overlying a layer of clay with occasional shell fragments, which overlies sand and gravel. Limestone bedrock is present underneath the natural soils. A summary of the strata proven at the site is summarised in Table 16.1. This information is compiled from the borehole and window sample logs from the site investigation as presented in **Appendix 15.3** containing the site investigation report produced by Ground Investigations Ireland. The strata proven is consistent with the regional geology and generally consistent with findings from previous site investigations.

Table 16.1: Ground Conditions

Lithology	Description	Depth (mbgl)	Thickness (m)
Made ground	Hardcore Concrete and Tarmacadam	0 – 1.3	0.04 – 1.3
	Clay/Gravel Brown to dark brown slightly sandy clay and gravel with cobbles and anthropogenic materials (including, but not limited to slag, redbrick, mortar, charcoal). Gravel is angular to subrounded, fine to coarse.	0 – 5.0	1.4 – 5.0

[28] BS10175:2011+A2:2017. Investigation of potentially contaminated sites. Code of practice.

Lithology	Description	Depth (mbgl)	Thickness (m)
Clay	Soft, light brown to brown, slightly sandy silty clay with occasional shell fragments	1.9 – 6.20	0.3 – 1.40
Sand and gravel	Loose to very dense grey to brown slightly clayey gravelly fine to coarse sand and gravel with occasional cobbles. Gravel is subangular to subrounded.	2.6 – 8.50	1.2 - 3.8
Weathered Bedrock	Angular cobbles of weak, thinly laminated dark grey to black Mudstone and Limestone	6.4 – 8.6	0.2 - 1.5
Limestone Bedrock	Weak to very strong dark grey fine grained limestone with bands of mudstone (?) and calcite veining	6.7 – 17.0 (proven)	8.7 (proven

16.3.3.5 Groundwater Levels and Flow

The only water bearing overburden strata intercepted by the boreholes during the site investigation was the natural sand and gravel. No groundwater was encountered in the made ground. Groundwater monitoring installations were installed in all boreholes, with response zones in the following locations:

- BH101, BH103, BH106 in the natural clay and/or gravel;
- BH102, BH104, BH105 in the limestone bedrock;
- BH107 in the natural gravel and the limestone bedrock.

Water levels in the new boreholes and historic boreholes (BH101, BH103, BH104, BH105, BH106, BH107, BH01, BH02, BH05, BH06, WS06, WS12 and WS13) were manually recorded on four occasions in May and June 2019 while the site investigation works were ongoing. Water levels were not recorded in BH102 as it was not completed or was not accessible during this time.

Water levels in the boreholes were electronically recorded over a four-week period between 14th August and 12th September 2019 using transducers in BH101, BH102, BH103 and BH106. A summary of this data is presented in Table 16.2 below.

The groundwater level in both the natural sand and gravel aquifer and in the limestone bedrock aquifer varied with the tide during the monitoring period.

BH106 in the south-centre of the site had the maximum variation in groundwater level as it was closest to the River Liffey and so was impacted by the tidal variation most. Groundwater levels in BH103, located in the north-centre of the site and furthest away from the river, varied the least but was still influenced slightly by tidal variation.

Based on this data, groundwater flow across the site is in a north-west to south-east direction toward the river during low tide and in a south-east to north-west direction at high tide.

Table 16.2: Summary of monitored groundwater levels

Location ID	Aquifer Type	Groundwater Level Maximum (mOD)	Groundwater Level Minimum (mOD)
BH101	Sand and gravel	1.18	0.18
BH102	Limestone bedrock	0.91	0.12
BH103	Sand and gravel	1.08	0.82
BH106	Sand and gravel	1.45	-0.38

The data from the transducers and manual readings are presented in **Appendix 15.4.**

16.3.3.6 Groundwater Abstractions

Based on the GSI database there is one well listed within 1km of the centre of the site. The exact location is unclear as the well location in the GSI database is only accurate to 500m however North Brunswick Street is recorded as the address, which is approximately 750m north east from the site boundary. This well is reported as having a 'good' yield of 393m3/day and understood to be drilled for industrial use. The source of water is from bedrock which is reported to be 2.5mbgl.

16.3.3.7 Groundwater Receptors – Groundwater Dependent Ecosystems

According to the National Parks and Wildlife Service (NPWS) database, there are no European sites, within 2km of the site.

The nearest European sites are those associated with Dublin Bay including the South Dublin Bay and River Tolka Estuary SPA (Site code 004024) which is located approximately 4.37km to the east, the South Dublin Bay SAC (Site code 000210) which is located approximately 5.41km to the east, the North Bull Island SPA (Site code 004006) which is located approximately 7.46km to the east, and the North Dublin Bay SAC (Site code 000206) which is located approximately 7.47km to the east.

16.3.4 Conceptual Site Model

16.3.4.1 Introduction

The Conceptual Site Model (CSM) (as presented in Figure 15.6 in **Appendix 15.1**) summarises the important geological and hydrogeological features in the study area. The CSM was developed based on the data obtained during the intrusive investigations i.e. borehole and trial pit logs, geophysical surveys and groundwater monitoring data.

16.3.4.2 Environment Type

The geological environment at and in the vicinity of the study area can be described as a historically stable geological environment and underlain by a poor aquifer. Consequently, the geological environment is considered to be Passive (type A) as per the IGI guidelines.

16.3.4.3 Importance of Features

The bedrock beneath the proposed development is classified as a Locally Important Aquifer (Ll) which is moderately productive in local zones and the feature is classified as Medium in accordance with the IGI/NRA guidelines.

There are no NHAs or pNHAs within 2km of the site.

Table 16.3: Hydrogeology Feature Importance

Feature		Importance ranking	Justification
Aquifer	Locally important bedrock aquifer	Medium	This is a medium quality attribute and is important on a local scale.
Aquifer	Sand and gravel deposits,	Low	While not classified by GSI as an aquifer their importance is based on their connection between the bedrock aquifer and river
River	River Liffey	Medium	Groundwater baseflow to the river and the site is located directly adjacent the river.

16.3.5 Activities/Environment Matrix

Table 16.4 outlines the required activities as set out in the IGI guidance that should be undertaken during construction and operation, and the investigations, assessments and surveys that have been carried out to consider those activities.

Table 16.4: Activities and Environment Matrix

Work Required under Activity and Type Class (based on IGI Guidelines)	Details of works completed to date
Earthworks	
Invasive site works to characterise nature, thickness, and stratification of soils and subsoils	Site specific site investigation carried out across the study area.
Works to determine groundwater level, flow direction and gradient.	Manual and electronic groundwater monitoring.
Works to determine groundwater-surface water interaction.	Collection of groundwater and surface water samples for water quality analysis
Excavation of materials above the water table	
Site works to characterise nature, thickness, permeability and stratification of soils, subsoils, bedrock geology.	Site specific site investigation carried out across the study area.

Work Required under Activity and Type Class (based on IGI Guidelines)	Details of works completed to date
Works to determine groundwater level, flow direction and gradient.	Manual and electronic groundwater monitoring
Excavation of materials below the water table	
Site works to characterise nature, thickness, permeability and stratification of soils, subsoils, bedrock geology.	Site specific site investigation carried out across the study area.

16.4 Likely Significant Effects

16.4.1 Do-Nothing Scenario

The current baseline as described in **Sections 16.3.1** to **16.3.5** represents the "Do Nothing Scenario" as required under the EC Guidance. A conservative approach is to assume that the hydrological environment of the site will remain as described in the baseline sections of this chapter.

16.4.2 Assessment of Effects During Construction

The proposed development includes upgrade works to the mains sewer on Parkgate Street and also the excavation and construction of an undercroft/basement with a finished slab level of 2.0mOD.

Based on this level, groundwater ingress is not anticipated in the main dig, however local deepenings for the excavation of services and lift pits may require local dewatering.

The proposed construction methodologies for the development are outlined in **Chapter 4**, Construction Strategy.

The potential construction effects on the hydrogeological features identified are listed below:

- Removal of Made ground;
- Effect on groundwater quality;
- Effect on groundwater flow and recharge;
- Effect on bedrock aquifer;
- Effect on water level in the River Liffey; and
- Pollution from construction activities.

Removal of Made Ground

As part of the works, some of the made ground from across the site will be removed resulting in a minor positive effect on the groundwater quality beneath the site. This is due to the reduced leachate generated from percolation of surface water through the made ground on site.

Effect on groundwater quality

Construction activities which have the potential to affect the groundwater quality beneath the proposed scheme during the construction phase include:

- Accidental spillages of polluting materials onsite;
- Release of fines into the groundwater and surface water; and
- The potential for contaminated runoff to enter the groundwater and surface water.

If any of these occur, they may potentially contaminate the groundwater beneath the proposed development. These are potential short-term effects. The magnitude and significance of these potential effects on the receptors are summarised below:

- The magnitude of this potential effect on the sand and gravel deposits could potentially be small adverse leading to a significance rating of slight;
- The magnitude of this potential effect on the River Liffey could potentially be small adverse leading to a significance rating of slight.
- The magnitude of this potential effect on the Locally Important aquifer could potentially be small adverse leading to a significance rating of slight.

Effects on Groundwater Flow and Recharge

Localised groundwater dewatering using a series of sumps and submersible pumps is proposed during the construction of the development.

Any local dewatering is to be discharged to the River Liffey, subject to any necessary agreements or consents, and will include necessary treatment as required, such as silt traps and settlement tanks. Alternatively, dewatering may be reinjected to the subsurface through a number of wells or injection points across the site. Similar treatment measures will be adopted prior to reinjection.

The construction of these works will have a negligible effect on the groundwater levels and flows in the sand and gravels which have a low importance. This is due to the proposed basement slab level of 2.0mOD. Highest groundwater recorded was 1.45mOD. Hence, the magnitude of the impact of this activity would be negligible and the overall significance rating of the effect on groundwater levels and flow is imperceptible.

Effects on Bedrock Aquifer

Localised groundwater dewatering using a series of sumps and submersible pumps is proposed during the construction of the development.

The construction of these works will have a negligible effect on the groundwater levels and flows in the bedrock which have a low importance. This is due to the proposed basement slab level of 2.0mOD. Highest groundwater recorded was 1.45mOD. Hence, the magnitude of the impact of this activity would be negligible and the overall significance rating of the effect on groundwater levels and flow within the bedrock are imperceptible.

Water Level in the River Liffey

The River Liffey is in continuity with the groundwater in the sand and gravels throughout the study area. As limited dewatering is proposed as part of the construction of the proposed development as outlined above, the effect on groundwater levels in the sand and gravel deposits and river water levels in the Liffey during construction is negligible. The magnitude of the impact of this activity would be negligible and the overall significance rating of the impact on river water levels and flow is imperceptible.

Pollution from Construction Activities

The construction of the proposed development will require the use of fuels and materials which will have the potential to pollute the site, and adjacent, environment. Pollution from construction activities is considered to be a small adverse impact and the significance of this impact is slight.

16.4.2.1 Indirect Effects during Construction

There were no indirect effects identified due to groundwater associated with the construction phase.

16.4.2.2 Cumulative Effects During Construction

In preparing this chapter, consideration was given to the developments listed in **Chapter 21**, Cumulative Effects in relation to relevant cumulative and in combination effects.

Additionally, the main impacts from the proposed development arise during construction. It is unknown at this stage if the construction works associated with other developments would be occurring at the same time as the construction of the proposed development.

Notwithstanding, given the nature and scale of the developments identified, no cumulative effects on hydrogeology are predicted to occur if any one, or all of these developments occur concurrent to the construction of the proposed development.

There are therefore no predicted significant cumulative effects on hydrogeology associated with the proposed development.

16.4.3 Assessment of effects during Operation

The potential effect on hydrogeology during the operational phase will be limited to accidental spillage of potentially polluting substances such as fuels. The likelihood of this occurring is negligible.

The removal of some of the made ground from the site and the construction of sealed SUDs drainage results in reduced infiltration and therefore reduced leaching from any made ground left in situ. This could then be considered a small positive effect during the operational phase.

16.4.3.1 Indirect Effects during Operation

There were no indirect effects identified due to groundwater associated with the operational phase.

16.4.3.2 Cumulative effects during Operation

There are no significant cumulative effects on hydrogeology associated with the proposed development in the operational phase.

16.5 Mitigation Measures and Monitoring

16.5.1 Mitigation

16.5.1.1 Mitigation During Construction

A CEMP is contained in **Appendix 4.1.**

Pollution from Construction Activities

The construction management of the site will implement the recommendations of the CIRIA guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams et al., 2001) to minimise as far as possible the risk of soil, groundwater and surface water contamination.

Measures that will be implemented to minimise the risk of spills and contamination of soils and waters include:

- Excavated spoil will be treated to remove excess fluid prior to stockpiling and transportation;
- Transfer of excess soil materials from stockpile areas off-site will be preferentially undertaken during dry periods;
- Stockpile and transfer of excess soil material will be restricted to specified and impermeable areas that are isolated from the surrounding environment;
- Wheel washes will be provided at site entrances to clean vehicles prior to exiting the work site;
- All staff will be trained and follow vehicle cleaning procedures. Details of these procedures will be posted in all work sites for easy reference;
- The implementation of the above measures will ensure that the risk of pollution of groundwater and nearby water bodies resulting from the construction activities will be minimised;
- Training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures;
- Careful consideration will be given to the location of any fuel storage facilities. These will be designed in accordance with guidelines produced by CIRIA (as described in Section 2.2.1.9), and will be fully bunded;

- All vehicles and plant will be regularly inspected for fuel, oil and hydraulic fluid leaks. Suitable equipment to deal with spills will be maintained on site;
- Ensure that all areas where liquids are stored, or cleaning is carried out are in designated impermeable areas that are isolated from the surrounding area e.g. by a roll-over bund, raised kerb, ramps or stepped access;
- Minimise the use of cleaning chemicals; and
- Use trigger-operated spray guns, with automatic water-supply cut-off.

16.5.1.2 Mitigation During Operation

No mitigation measures are considered necessary for the operational phase of the proposed development as no significant effects are predicted.

16.5.2 Monitoring

16.5.2.1 Monitoring During Construction

In relation to soils contamination a suitably experienced environmental consultant will be required to oversee the excavation works for the proposed development so that potential contamination can be segregated, classified and suitably disposed.

The works will be monitored by a Resident Engineer.

Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development to ensure the groundwater resource is not impacted by the proposed development.

16.5.2.2 Monitoring During Operation

No monitoring is proposed during operation of the proposed development.

16.6 Residual Effects

16.6.1 Residual effects during construction

No residual effects during construction are expected. Cumulative effects have also been considered. See Table 16.5 below.

Table 16.5: Residual Effects

Feature		Importance		Magnitude of Effect		Significance of Effect	Mitigation Measures	Residual Effect	Significance of Residual Effect
		Ranking	Justification	Ranking	Justification				
Aquifer	Locally important bedrock aquifer	Medium	This is a medium quality attribute and is important on a local scale.	Minor beneficial	Removal of made ground and decrease in infiltration from surface	Imperceptible	N/A	N/A	Imperceptible
				Moderate adverse	Accidental releases from site, increased fines into groundwater and surface water, contaminated runoff from site	Moderate	Implementation of CEMP, Good management of sites, management of runoff	Negligible	Imperceptible
				Negligible	Maximum recorded groundwater levels were at 1.45mOD. Basement slab level is at 2.0mOD. Only localised dewatering anticipated.	Imperceptible	N/A	Negligible	Imperceptible
Aquifer	Sand and gravel deposits,	Low	While not classified by GSI as an aquifer their importance is based on their connection between the bedrock aquifer and river	Minor beneficial	Removal of made ground and decrease in infiltration from surface	Imperceptible	N/A	N/A	Imperceptible
				Moderate adverse	Accidental releases from site, increased fines into groundwater and surface water, contaminated runoff from site	Slight	Implementation of CEMP, Good management of sites, management of runoff	Negligible	Imperceptible

Feature		Importance		Magnitude of Effect		Significance of Effect	Mitigation Measures	Residual Effect	Significance of Residual Effect
		Ranking	Justification	Ranking	Justification				
				Negligible	Maximum recorded groundwater levels were at 1.45mOD. Basement slab level is at 2.0mOD. Only localised dewatering anticipated.	Imperceptible	N/A	Negligible	Imperceptible
SAC's/SPA's	Dublin Bay	Low	Downstream from site	Negligible	SAC's / SPA's remote from site	Imperceptible	N/A	N/A	Imperceptible
River	River Liffey	Medium	Groundwater baseflow to the river and the site is located directly adjacent the river.	Negligible	Maximum recorded groundwater levels were at 1.45mOD. Basement slab level is at 2.0mOD. Only localised dewatering anticipated.	Imperceptible	N/A	N/A	Imperceptible

16.6.2 Residual effects during operation

No residual effects during operations are expected. Cumulative effects have also been considered.

16.7 Difficulties Encountered

No difficulties were encountered during the preparation of this EIAR chapter that limited the extent of the investigation or impacted significantly on the results of the assessment.

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17 Resource and Waste Management

17.1 Introduction

This chapter describes the likely significant effects of the proposed development in relation to resource and waste management. **Chapter 3** provides a description of the proposed development whilst **Chapter 4** describes the construction strategy. Please refer to **Chapter 4** for quantities of raw materials.

The following aspects are particularly relevant to the resource and waste assessment:

Design:

- Throughout the design development for the proposed development, consideration has been given to the minimisation of waste through retention of material on site and material reuse.

Construction:

- During the construction of the proposed development, waste will be generated from site clearance and excavation. General construction waste is also likely to be generated throughout the construction of the proposed development.

Operation:

- During operation, waste is likely to be generated from residents, tenants and maintenance works associated with the proposed development.

This chapter was prepared by Chonaill Bradley and Elaine Neary of AWN Consulting. Refer to **Appendix 1.1** for details on relevant qualifications and experience.

A site-specific Construction and Demolition Waste Management Plan (C&D WMP) has been prepared to deal with waste generation during the construction and demolition phases of the project and is included as **Appendix 17.1**. The C&D WMP was prepared in accordance with the '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Project'*[1] document produced by the National Construction and Demolition Waste Council (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government in July 2006.

A separate Operational Waste Management Plan (OWMP) has also been prepared for the operational phase of the development and is included as **Appendix 17.2**.

[1] DEHLG, 2006. Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects.

These documents will ensure the sustainable management of wastes arising at the development in accordance with legislative requirements and best practice standards.

17.2 Assessment Methodology

The assessment of the impacts of the proposed development arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports. A summary of the documents reviewed, and the relevant legislation is provided in **Appendices 17.1 & 17.2** as part of the C&D WMP and OWMP.

This chapter is based on the proposed development, as described in **Chapter 3,** the construction strategy described in **Chapter 4** and considers the following aspects:

- Legislative context;
- Demolition phase;
- Construction phase (including site preparation, excavation and levelling); and
- Operational phase.

A desk study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the demolition, construction and operational phases; and
- Identification of mitigation and monitoring measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy

17.2.1 General

Estimates of waste generation during the demolition, construction and operational phases of the proposed development have been calculated. The waste types and estimated quantities are based on published data by the EPA in the *National Waste Reports* and *National Waste Statistics*[2], data recorded from similar previous developments, Irish and US EPA waste generation research and other available research sources.

[2] EPA, 2012. National Waste Database Reports.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in **Section 17.6.1**.

A review of the existing ground conditions is presented in **Chapter 15,** Land and Soils.

17.2.2 Guidance and Legislation

Waste management in Ireland is subject to EU, national and regional waste legislation which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the *Waste Framework Directive (2008/98/EC)*[3] which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the *Waste Management Act 1996 (as amended)*[4].

In addition, the Irish government issues policy documents which outline measures aimed to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document *A Resource Opportunity – Waste Management Policy in Ireland* [5] was published in 2012 and stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention.

The strategy for the management of waste from the construction phase is in line with the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* published in 2006. The guidance document *Construction and Demolition Waste Management: A handbook for Contractors and Site Managers* [6] was also consulted in the preparation of this assessment.

There are currently no Irish guidelines on the assessment of operational waste generation and guidance is taken from industry guidelines, plans and reports including the *Eastern Midlands Region Waste Management Plan 2015 – 2021* [7], *BS 5906:2005 Waste Management in Buildings – Code of Practice* [8], DCC Dublin City Council *(Storage, Presentation and Segregation of Household and Commercial Waste)* 2018 [9], the *EPA National Waste Database Reports 1998 – 2012* and the *EPA National Waste Statistics Web Resource* [10].

Please refer to **Appendix 17.1** & **17.2** which include the C&D WMP and OWMP for further details.

[3] EC, 2008. Waste Framework Directive 2008/98/EC
[4] Waste Management Act 1996 (No. 10 of 1996)
[5] DECLG, 2012. A Resource Opportunity - Waste Management Policy in Ireland.
[6] FÁS and the. Construction Industry Federation, 2012. Construction and Demolition Waste Management – a handbook for Contractors and Site Managers.
[7] DCC, 2015. Eastern-Midlands Region Waste Management Plan 2015 – 2021.
[8] BS 5906:2005 Waste Management in Buildings – Code of Practice
[9] DCC, 2018. Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste)
[10] EPA, 2019. Available at http://www.epa.ie/nationalwastestatistics/constructiondemolition/.

17.2.3 Study Area

Chapter 3 provides a description of the proposed development while **Chapter 4** describes the Construction Strategy.

Waste Management Planning in Ireland takes a place on a regional and local basis and the proposed development is located in the Eastern-Midlands Region and Dublin City Council for the purpose of waste planning. Waste statistics are also published in Ireland on a national basis. Subject to available data the study area in relation to the baseline waste generation and treatment and effects is local, regional and national.

17.2.4 Site Visits

This assessment is a desk-based assessment and no site visit was required to be undertaken.

17.2.5 Consultation

A number of pre-planning meetings have been held with Dublin City Council. Please refer to **Chapter 1**, Introduction and Need for the Scheme.

17.2.6 Categorisation of the Baseline Environment

The methodology for obtaining and evaluating baseline information was desk-based research.

17.2.7 Impact Assessment Methodology

The methodology followed in carrying out this resource and waste impact assessment aligns with the overarching EIAR guidance as outlined in **Section 1.9.3** of **Chapter 1**, Introduction and Need for the Scheme.

17.3 Baseline Conditions

The subject site located at 42A Parkgate Street, Dublin 8.

In terms of waste management, Dublin City Council (DCC) is the local authority responsible for setting and administering waste management activities in the area. Waste Management in the DCC area is governed by the requirements set out in the *Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021.*

The EMR Waste Management Plan sets the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and

- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The EMR Waste Management Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of *"70% preparing for reuse, recycling and other recovery of construction and demolition waste"* (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The National Waste Statistics update published by the EPA in October 2019 identifies that Ireland's current progress against this C&D waste target is at 68% and our progress against '*Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)*' is at 45%. Both of these targets are required to be met by 12 December 2020 in accordance with the requirements of the Waste Framework Directive.

The *Dublin City Development Plan 2016 – 2022* [11] also sets policies and objectives for the DCC area which reflect those set out in the regional waste management plan, refer to **Appendix 17.2** for further details.

In terms of physical waste infrastructure, DCC no longer operates any municipal waste landfill in the area. There are a number of permitted and licensed waste facilities located in the Eastern-Midlands Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and two waste-to-energy facilities.

The three waste planning regions in Ireland (Eastern Midlands Region, Connaught, Ulster Region and Southern Region) published a report on national soil waste treatment capacity in 2016 [12]. The report analysed the national market capacity for soil and stone wastes. It concluded that the capacity available to recover soil and stone wastes is an issue in each waste planning region. It noted that a lack of licensed capacity exists nationally and in particular the Greater Dublin Area to meet current and forecasted growth in soil and stones waste. One of the recommendations of the report was that the application of Article 27 By-Product Notifications for the reuse of low volume clean soil materials from construction activity at a local level is explored further.

17.3.1 Demolition Phase

There will be waste materials generated from the demolition of some of the existing buildings and hardstanding areas on site, as well as from the excavation of the basement, building foundations and drainage and the minor works on Parkgate Street.

[11] DCC, 2015. Dublin City Council Development Plan 2016-2022
[12] DCC, on behalf of the regional waste management offices, 2016. Construction and Demolition Waste. Soil and Stone Recovery/ Disposal Capacity. Dublin, Ireland.

Further detail on the waste materials likely to be generated during the demolition works are presented in the project-specific C&D WMP in **Appendix 17.1**. The C&D WMP provides an estimate of the main waste types likely to be generated during the C&D phase of the proposed development. The reuse, recycling/recovery and disposal rates have been estimated using the EPA National Waste Reports and these are summarised in Table 17.1.

Table 17.1: Estimated off-site reuse, recycle and disposal rates for demolition waste

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	25.4	0	0.0	85	21.6	15	3.8
Concrete, Bricks, Tiles, Ceramics	1449.5	30	434.9	65	942.2	5	72.5
Plasterboard	101.7	0	0.0	80	81.4	20	20.3
Asphalts	228.8	0	0.0	25	57.2	75	171.6
Metal	381.3	5	19.1	80	305.1	15	57.2
Slate	203.4	0	0.0	85	172.9	15	30.5
Timber	305.1	10	30.5	60	183.0	30	91.5
Total	2695.2		484.4		1763.3		447.5

A site-specific C&D WMP has been prepared by AWN Consulting for the proposed development, see **Appendix 17.1**. The plan will be further developed and submitted to DCC prior to commencement of the demolition phase.

17.3.2 Construction Phase

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The construction contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

In addition, soil, stones, gravel and clay will require excavation to facilitate basement completion and construction of foundations, and the installation of underground services within the development site and on Parkgate Street. The volume of material to be excavated has been estimated by the project engineers to be c.14,620m^3. The importation of c. 6,100m^3 of fill materials will be required for ground preparation works, including build up to landscape and paving. It is anticipated, where appropriate, that the majority of this fill requirement will be obtained from the quantum of excavated materials outlined above. The remaining balance of excavated materials, which is either unsuitable for use as fill, or not required for use as fill, will be exported off site.

If the material that requires removal from site is deemed to be a waste, removal and reuse/recycling/recovery/disposal of the material will be carried out in accordance with the *Waste Management Act 1996 (as amended*), the *Waste Management (Collection Permit) Regulations 2007 (as amended)*[13] and the *Waste Management (Facility Permit & Registration) Regulations 2007 (as amended)*[14]. The volume of waste requiring recovery/disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as a by-product under Article 27 classification *(European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011)*[15].

In order to establish the appropriate reuse, recovery and/or disposal route for the soils and stones to be removed off-site, it will first need to be classified prior to removal. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous*. Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste including potential pollutant concentrations and leachability. It is anticipated that the surplus material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in Ireland or, in the unlikely event of hazardous material being encountered, be transported for treatment/recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction workers e.g. organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided onsite during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific C&D WMP, see **Appendix 17.1**. The C&D WMP provides an estimate of the main waste types likely to be generated during the C&D phase of the proposed development and these are summarised in Table 17.2.

[13] Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended
[14] Waste Management (Facility Permit and Registration) Regulations 2007 (S.I No. 821 of 2007) as amended.
[15] European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended.

Table 17.2: Estimated off-site reuse, recycle and disposal rates for construction waste

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	851.2	10	85.1	80	681.0	10	85.1
Timber	722.3	40	288.9	55	397.2	5	36.1
Plasterboard	258.0	30	77.4	60	154.8	10	25.8
Metals	206.4	5	10.3	90	185.7	5	10.3
Concrete	154.8	30	46.4	65	100.6	5	7.7
Other	386.9	20	77.4	60	232.2	20	77.4
Total	2579.5		585.5		1751.5		242.5

17.3.3 Operational Phase

As noted in **Section 17.1**, an OWMP has been prepared for the development, see **Appendix 17.2**. The OWMP provides a strategy for segregation (at source), storage and collection of all wastes generated by the proposed development during the operational phase including dry mixed recyclables, organic waste and mixed non-recyclable waste as well as providing a strategy for management of waste glass, batteries, WEEE, printer/toner cartridges, chemicals, textiles, waste cooking oil and furniture.

The total estimated waste generation for the development for the main waste types based on the AWN Waste Generation Model (WGM) is presented in Tables 17.3 and 17.4 below and is based on the uses and areas (i.e. 481 residential units (66 no. studio units, 298 no 1-bed units, and 117 no. 2 -bed units), as well as c. 3,698 sqm commercial office space, c.214 sqm retail and c. 444 sqm café/ restaurant space).

Table 17.3: Estimated off-site reuse, recycle and disposal rates for construction waste

Waste type	Waste Volume (m3/week)			
	Residential Block A	Residential Block B	Residential Block C1	Residential Block C2
Organic Waste	2.03	1.80	0.78	0.51
DMR	13.87	13.20	5.68	3.76
Glass	0.39	0.35	0.15	0.10
MNR	9.23	7.32	3.15	2.08
Total	25.53	22.67	9.76	6.46

Table 17.4: Estimated waste generation for the proposed development for the main waste type

Waste type	Waste Volume (m3/week)			
	Residential Block C3	Office Unit	Retail Unit	Café/Restaurant Unit
Organic Waste	1.13	0.41	0.07	0.44
Confidential Paper	-	3.65	-	-
DMR	7.51	8.93	1.42	1.04
Glass	0.22	0.07	0.02	0.02
MNR	4.34	3.88	0.59	1.16
Total	13.20	16.95	2.12	2.66

The residents and tenants will be required to provide and maintain appropriate waste receptacles within their units to facilitate segregation at source of these waste types. The location of the bins within the units will be at the discretion of the residents. As required, the residents and tenants will need to bring these segregated wastes from their units to their allocated Waste Storage Areas (WSAs). All WSAs can be viewed on the plans submitted with the planning application.

The bottle bank located adjacent to the Dublin bicycle stand on the eastern side of the development will be relocated to a new position, which will be agreed with DCC at a later date.

The OWMP seeks to ensure the development contributes to the targets outlined in the *EMR Waste Management Plan 2015 – 2021* and the *DCC Waste Bye-laws*.

17.4 Likely Significant Effects

This section details the potential waste effects associated with the proposed development.

17.4.1 Do-Nothing Scenario

If the proposed development was not to go ahead there would be no demolition, excavation or construction or operational waste generated at this site. This would result in a neutral effect on the environment.

17.4.2 Assessment of effects during construction

The proposed development will generate a range of non-hazardous and hazardous waste materials during demolition, excavation and construction as detailed above. General housekeeping and packaging will also generate waste materials as well as typical municipal wastes generated by construction employees including food waste.

There is a quantity of soil, stone, gravel and clay which will need to be excavated to facilitate the proposed development.

It is anticipated that most of the excavated material will need to be removed offsite, however it is envisaged that a small volume of excavated material will be reused onsite. Correct classification and segregation of the excavated material will be required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. This is discussed in more detail in **Chapter 15,** Land and Soils.

Waste materials will be required to be temporarily stored on site pending collection by a waste contractor. Dedicated areas for waste skips and bins will be identified across the site. These areas will need to be easily accessible to waste collection vehicles.

Any ACMs and suspected ACMs identified by the Asbestos survey will be required to be removed by a suitably trained and competent person prior to commencement of demolition works. ACMs will only be removed from site by a suitably permitted waste haulier and will be brought to a suitably licenced facility.

Wastes arising will need to be taken to suitably registered/permitted/licensed waste facilities for processing and segregation, reuse, recycling, recovery, and/or disposal as appropriate. There are numerous licensed waste facilities in the Eastern Midlands region which can accept hazardous and non-hazardous waste materials and acceptance of waste from the proposed development would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. Where possible, waste will be segregated into reusable, recyclable and recoverable materials. The majority of demolition and construction materials are either recyclable or recoverable.

Recovery and recycling of C&D waste has a positive impact on sustainable resource consumption, for example where waste timber is mulched into a landscaping product or waste asphalt is recycled for use in new pavements. The use of recycled materials, where suitable, reduces the consumption of natural resources.

The potential effect of demolition & construction waste generated from the proposed development is considered to be short-term, not significant and neutral.

17.4.2.1 Indirect Effects

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the proposed development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

17.4.2.2 Cumulative Effects

Multiple permissions remain in place for both residential and commercial developments within the immediate vicinity, as outlined in **Chapter 21.** In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the construction phase. Due to the high number of waste contractors in the Dublin region there would be sufficient contractors available to handle waste generated from a large number of these sites simultaneously, if required. Similar waste materials would be generated by all the developments.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative effects associated with waste generation and waste management. As such the effect will be a **long-term, imperceptible** and **neutral.**

17.4.3 Assessment of effects during operation

If improper, or a lack of, waste management, was to occur during the operational phase of the development this would cause a diversion from the priorities of the waste hierarchy. This would lead to small volumes of waste being sent unnecessarily to landfill.

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Waste estimations for the operational phase of this development are provided in Tables 17.3 & 17.4. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. At present, there is sufficient capacity for the acceptance of the likely operational waste arisings at facilities in the region. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which are typically exported for conversion in recycled products (e.g. paper mills and glass recycling). At present, there is sufficient capacity for the acceptance of the likely operational waste arisings at facilities in Europe.

Waste contractors will be required to service the development on a regular basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

The potential impact of operational waste generation from the development is considered to be long-term, not significant and negative.

17.4.3.1 Indirect Effects

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas.

17.4.3.2 Cumulative Effects

There are similar existing residential and commercial developments close by, along with the neighbouring residential sites and these developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such the effect will be a **long-term, imperceptible** and **neutral**.

17.5 Mitigation Measures and Monitoring

17.5.1 Mitigation

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

17.5.1.1 Mitigation During Construction

As previously stated, a project specific C&D WMP has been prepared in line with the requirements of the guidance document issued by the DoEHLG and is included as **Appendix 17.1**. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the proposed development. Prior to commencement, the contractor(s) will be required to refine/update the C&D WMP or submit an addendum to the C&D WMP to DCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to 'design out waste';
- On-site segregation of waste materials will be carried out where practical to increase opportunities for off-site reuse, recycling and recovery – the following waste types, at a minimum, will be segregated:
  - Concrete rubble (including ceramics, tiles and bricks);
  - Plasterboard;
  - Metals;
  - Glass; and
  - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials will be re-used on-site, where possible;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with *Article 27 of the EC (Waste Directive) Regulations (2011)* [16]. EPA approval will be obtained prior to moving material as a by-product.

These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996, as amended*, associated Regulations, the *Litter Pollution Act 1997* [17] and the *EMR Waste Management Plan (2015-2021).* It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

[16] EC (2011) Article 27 of the EC (Waste Directive) Regulations
[17] Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended

17.5.1.2 Mitigation During Operation

As previously stated, a project specific OWMP has been prepared and is included as **Appendix 17.2**. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the *EMR Waste Management Plan 2015 – 2021* and abiding by the *DCC waste bye-laws*.

In addition, the following mitigation measures will be implemented:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
  - Organic waste;
  - Dry Mixed Recyclables;
  - Mixed Non-Recyclable Waste;
  - Glass;
  - Waste electrical and electronic equipment (WEEE);
  - Batteries (non-hazardous and hazardous);
  - Cooking oil;
  - Light bulbs;
  - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.);
  - Furniture (and from time to time other bulky waste); and
  - Abandoned bicycles.
- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available and
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

17.5.2 Monitoring

17.5.2.1 Monitoring During Construction

The management of waste during the construction phase will be monitored by the site manager to ensure compliance with relevant local authority requirements and effective implementation of the C&D WMP including maintenance of waste documentation.

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. The C&D WMP specifies the need for a waste manager to appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and the identification of trends. The data will be maintained to advise on future projects.

17.5.2.2 Monitoring During Operation

The management of waste during the operational phase will be monitored by the site manager to ensure effective implementation of the OWMP by the building management company and the nominated waste contractor(s).

Waste generation volumes will be monitored against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the Waste Storage Areas (WSAs) where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contactor costs.

17.6 Residual Effects

The implementation of the mitigation and monitoring measures outlined in **Section 17.5** will ensure that the high rate of reuse, recovery and recycling is achieved at the development during the demolition, excavation and construction phases as well as during the operational phase. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved. Cumulative effects have also been considered.

17.6.1 Residual effects during construction

A carefully planned approach to waste management as set out in **Section 17.5.1.1** and adherence to the C&D WMP during the construction and demolition phase will ensure that the effect on the environment will be **short-term**, **imperceptible** and **neutral**.

17.6.2 Residual effects during operation

During the operational phase, a structured approach to waste management as set out in **Section 17.5.1.2** will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will be **long-term, imperceptible** and **neutral**.

17.7 Difficulties Encountered

There were no difficulties encountered during the production of this chapter of the EIAR.

17.8 References

British Standards (BS) 5906:2005 Waste Management in Buildings – Code of Practice.

Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.

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European Communities, 2011. Article 27 of the EC (Waste Directive) Regulations.

European Communities, 2008. Waste Framework Directive 2008/98/EC.

FÁS and the Construction Industry Federation (CIF), 2002. Construction and Demolition Waste Management – a handbook for Contractors and Site Managers.

Forum for the Construction Industry – Recycling of Construction and Demolition Waste.

Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended

Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended

Protection of the Environment Act 2003, (No. 27 of 2003) as amended.

Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate and associated legislation include: European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended.

- Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended.
- Waste Management (Facility Permit and Registration) Regulations 2007 (S.I No. 821 of 2007) as amended.
- Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended.
- European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended.
- Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended.
- Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
- European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
- European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended.
- Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended.
- European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 191 of 2015)
- Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended.
- Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended.
- The European Communities (Transfrontier Shipment of Hazardous Waste) Regulations 1988 (S.I. No. 248 of 1988)
- European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011)
- European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended

18 Population and Human Health

18.1 Introduction

This chapter describes the likely significant effects of the proposed development on population and human health.

The purpose of this assessment is to identify and assess the potential health and wellbeing effects of the proposed development on the surrounding population and local community during construction and operation, along with the likely economic significant effects at local and regional level. This assessment also considers the provision of commercial and residential opportunities and the creation of a new community centre in the study area.

Population and Human Health is a broad ranging topic and addresses the existence, activities and wellbeing of people as groups or 'populations'.

Potential population and human health effects relating to the proposed development arise from traffic and transportation, air quality and climate, noise and vibration, townscape and visual, material assets and the risk of major accidents and/or disasters. These aspects are dealt with in the specific chapters in this EIAR dedicated to those topics. This chapter refers to the findings of those assessments included elsewhere in this EIAR for which human health effects might occur. **Chapter 3** provides a description of the proposed development whilst **Chapter 4** describes the construction strategy.

The following aspects are particularly relevant to the population and human health assessment:

- Design:
  - Aspects including the prime city centre location of the proposed development, and maximised design facilitating the incorporation of a range of uses which will provide residential and commercial opportunities.
- Construction:
  - Upgrades to existing services and infrastructure and associated human health benefits;
  - Provision of temporary employment for construction workers;
  - Potential for significant effects on human health, including effects of emissions such as noise and dust from plant and equipment; and
  - Potential for significant effects on population and human health associated with disturbance and annoyance, including construction traffic and how that may interact with human health.
- Operation:
  - Provision of much needed housing opportunities, and the enhancement of the local community;

- Provision of permanent employment and commercial opportunities; and
- Creation of new open space and amenity areas

This assessment was undertaken by Ailsa Doyle and Clodagh O'Donovan of Arup. Refer to **Appendix 1.1** for details on relevant qualifications and experience.

18.2 Assessment Methodology

18.2.1 General

Aspects examined in this chapter primarily relate to effects from the proposed development on the local population, including the provision of commercial and residential opportunities, the creation of a new community centre, and likely effects on local community health. These two themes are discussed separately in this chapter.

18.2.2 Guidance and Legislation

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

- Department of Housing, Planning and Local Government (2018) *Guidelines for Planning Authorities and an Bord Pleanála on carrying out Environmental Impact Assessment*, (August 2018)[1];
- EPA (2017) *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, draft August 2017)[2];
- EPA (2015) *Revised Guidelines on the Information to be Contained in Environmental Impact Statements* (Environmental Protection Agency, draft September 2015)[3];
- EPA (2015) *Advice Notes for Preparing Environmental Impact Statements (Draft September 2015)*[4];
- EPA (2003) *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*[5];
- US EPA (2016) *Health Impact Assessment Resource and Tool Compilation*[6];

[1] Department of Housing, Planning and Local Government (2018) *Guidelines for Planning Authorities and An Bord Pleanala on carrying out Environmental Impact Assessment.* Stationary Office, Dublin.
[2] EPA (2017) *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.* Dublin, Ireland.
[3] EPA (2015) *Revised Guidelines on the Information to be Contained in Environmental Impact Statements*. Dublin, Ireland.
[4] EPA (2015) *Advice Notes for Preparing Environmental Impact Statements*. Dublin, Ireland.
[5] EPA (2003) *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*. Dublin, Ireland.
[6] US EPA (2016) *Health Impact Assessment Resource and Tool Compilation.* Cincinnati, USA

- European Commission Guidance (2003) *Implementation of Directive 2001/42 on the assessment of the effects of certain plans and programmes on the environment*[7];
- European Commission (2017) *Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report*[8];
- Fáilte Ireland (2011) *Guidelines for treatment of tourism in an Environmental Impact Statement*[9];
- IEMA (2017) *Health in Environmental Impact Assessment - A Primer for a Proportionate Approach*[10];
- IPI (2009) *Health Impact Assessment (Institute of Public Health Ireland* 2009)[11];
- World Health Organisation (WHO) (2018) *Environmental Noise Guidelines for the European Region 2018*[12];
- WHO (2009) *Night time Noise Guidelines for Europe*[13];
- WHO (2005) *WHO Air Quality Guidelines for particulate matter, ozone, nitrogen dioxide and sulphur dioxide*[14];
- WHO (1999) *Guidelines for Community Noise*[15]; and
- WHO (2014) *Regional Office for Europe. Health in impact assessments: opportunities not to be missed.*[16]

18.2.3 Study Area

The principal study area has been determined as the proposed development site (i.e. all areas within the planning boundary for the proposed development). However, for the purposes of this assessment, the wider study area of the proposed development is examined in the context of the baseline environment, and with regard to the potential for significant effects on population and human health. The study area of the proposed development for the purposes of this assessment is therefore considered to be the 'Phoenix Park' CSO Electoral Division (ED).

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[7] European Commission Guidance (2003) *Implementation of Directive 2001/42 on the assessment of the effects of certain plans and programmes on the environment.* Brussels, Belgium.
[8] European Commission (2017) *Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report.* Brussels, Belgium.
[9] Fáilte Ireland (2011) *Guidelines for treatment of tourism in an Environmental Impact Statement* Dublin, Ireland.
[10] Cave,B. Fothergill,J., Pyper, R. Gibson, G. and Saunders, P. (2017) Health in Environmental Impact Assessment: A Primer for a Proportionate Approach. Ben Cave Associates Ltd, IEMA and the Faculty of Public Health. Lincoln, England.
[11] IPI (2009) *Health Impact Assessment (Institute of Public Health Ireland* 2009). Dublin, Ireland.
[12] World Health Organisation (WHO) (2018) *Environmental Noise Guidelines for the European Region 201.* Copenhagen, Denmark.
[13] WHO (2009) *Night time Noise Guidelines for Europe.* Copenhagen, Denmark.
[14] WHO (2005) *WHO Air Quality Guidelines for particulate matter, ozone, nitrogen dioxide and sulphur dioxid*e. Copenhagen, Denmark.
[15] WHO (1999) *Guidelines for Community Noise* Copenhagen, Denmark.
[16] WHO (2014) *Regional Office for Europe. Health in impact assessments: opportunities not to be missed.* Copenhagen, Denmark.

Electoral Divisions (EDs) are the smallest legally defined administrative areas in the State for which Small Area Population Statistics (SAPS) are published from the Census.

In order to contextualise the baseline environment of the study area, the Dublin city administrative area is also examined.

The proposed development is located within the 'Phoenix Park' ED, as illustrated in red in Figure 18.1. The Dublin City administrative area is illustrated in white in Figure 18.1.

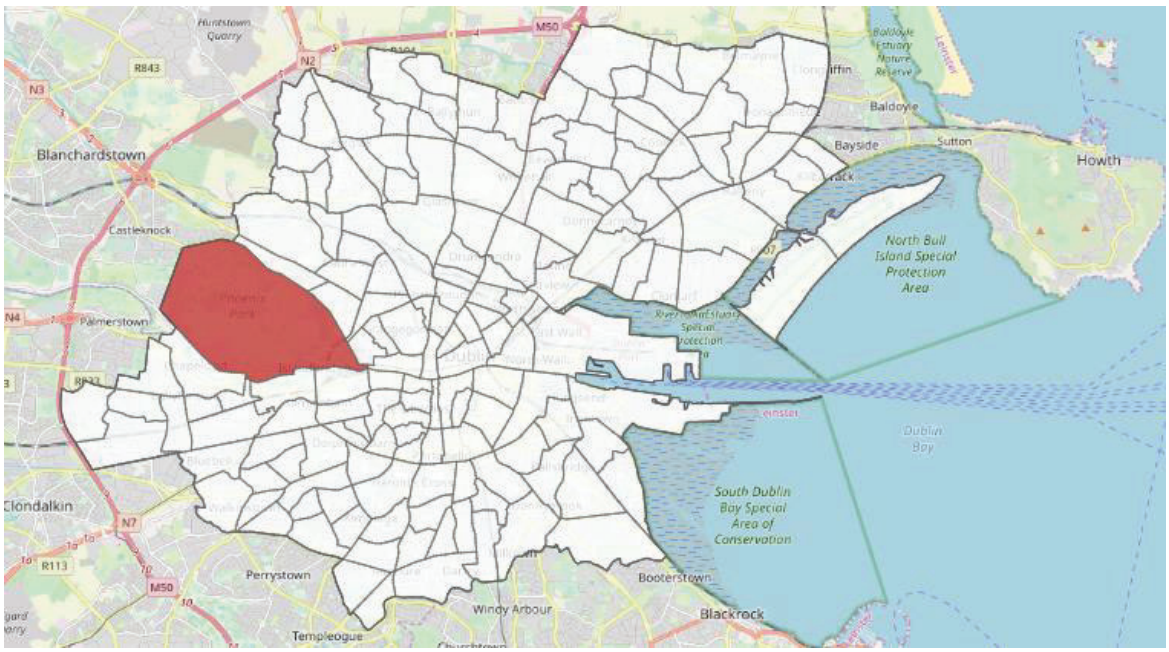

Figure 18.1: Phoenix Park Electoral Division (proposed development site indicated as black dot)

18.2.4 Site Visits

A site visit was undertaken on 27th February 2019 as part of this assessment.

18.2.5 Consultation

Chapter 1, Introduction details the various consultations which were carried out as part of the proposed development. No consultation specific to this assessment was undertaken.

18.2.6 Categorisation of the Baseline Environment

An assessment of population and human health requires an understanding of the baseline environment and local community and is acquired through background research, site visits, and discussions with local people and community representatives where necessary. Specifically, data has been collected by means of:

- Primary data sources (e.g. demographic data from Census 2016 and preceding Census data produced by the Central Statistics Office [CSO]);
- Design drawings of the proposed development;
- Street maps of the study area obtained in April 2019;
- Other relevant environmental baseline data gathered and considered as part of this EIAR, especially traffic and air quality, noise, landscape and visual assessments, as well as the findings of the Social and Community Infrastructure Audit, Childcare Needs Assessment, and the Daylight, Sunlight and Wind Analysis for the proposed development;
- A review of relevant planning documentation including the *Dublin City Development Plan 2016 - 2022*[17] and *Dublin City Local Economic and Community Plan 2016 - 2021*[18];
- Observation of local settlement, travel patterns and amenity activity along with identification of community facilities; and
- Available community health profiles including the Health Profile completed by the HSE for the area (Health Profile 2015, Dublin City[19]).

18.2.7 Impact Assessment Methodology

The requirement to carry out an assessment of potential effects on population and human health is set out in the new *EIA Directive (2014/52/EU)*[20]. The recitals to the 1985 and 2011 Directives refer to 'Human Health' and include 'Human Beings' as the corresponding environmental factor. The 2014 Directive changes the title of this factor to 'Population and Human Health'.

European Commission guidance relating to the implementation of the 2014 Directive, in reference to *"human health"* states *"Human health is a very broad factor that would be highly project dependent. The notion of human health should be considered in the context of other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study*[21]*."*

[17] Dublin City Council (2016) Dublin City Development Plan 2016-2022. Dublin, Ireland.
[18] Dublin City Council (2016) Dublin Local Economic and Community Plan 2016-2021. Dublin, Ireland.
[19] HSE (2015) *Health Profile 2015 Dublin City*. Dublin, Ireland
[20] European Commission (2014) *Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance*. Brussels, Belgium
[21] *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report*, European Commission, 2017 http://ec.europa.eu/environment/eia/eia-support.htm

According to the Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017)[2] *"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*."

Section 3.3.6 of the Draft Guidelines also note that:

"The legislation does not generally require assessment of land-use planning, demographic issues or detailed socio-economic analysis. Coverage of these can be provided in a separate Planning Application Report to accompany an application for planning permission"

Potential effects of the proposed development on population and human health arise 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. These aspects are dealt with in the specific chapters in this EIAR dedicated to those topics, and this chapter refers to the findings of those assessments included elsewhere in this EIAR for which human health effects might occur.

The initial assessment as outlined in **Section 18.3** examines the existing population statistics and the status of human health in the proposed study area.

The likely significant effects are subsequently outlined in **Section 18.4**.

It should be noted that human health aspects are primarily considered through an assessment of the environmental pathways by which health may be affected (i.e. the determinants of health) such as air, noise, water or soil. The assessment on human health therefore draws on the findings of other sections of the EIAR as necessary to ensure that the likely significant effects that have the potential for significant effects on human health are considered herein.

Impact assessment criteria are based on those outlined in the EPA guidelines[2], as reproduced in Table 1.1 of **Chapter 1**, Introduction and Need for the Scheme.

Following the assessment of effects, specific mitigation and monitoring measures have been developed to avoid, reduce and, if possible, remedy any negative effects on population and human health. These are described in **Section 18.5**.

Residual effects are described in **Section 18.6**.

18.3 Baseline Environment

18.3.1 Overview

This section provides an overview of the existing population and health status of the study area. As described in **Section 18.2.3**, the representative study area of the population and human health assessment is the Phoenix Park ED, and the Dublin City administrative area.

The description of the baseline environment of those factors under which human health effects might occur has been addressed elsewhere in this EIAR, under the environmental factors of traffic and transportation, air quality and climate, noise and vibration, townscape and visual and material assets. It should be noted that the extent of the study area may differ in the various baseline assessments and may not be directly applicable or comparable.

18.3.2 Population

The 2016 Census results indicate that the total population of the Phoenix Park ED was 1,534 in 2016. This represents a 1% decrease in population from 2011 figures, and a -3% decrease in population from 2006 figures. Figure 18.2 illustrates population trends in the Phoenix Park ED.

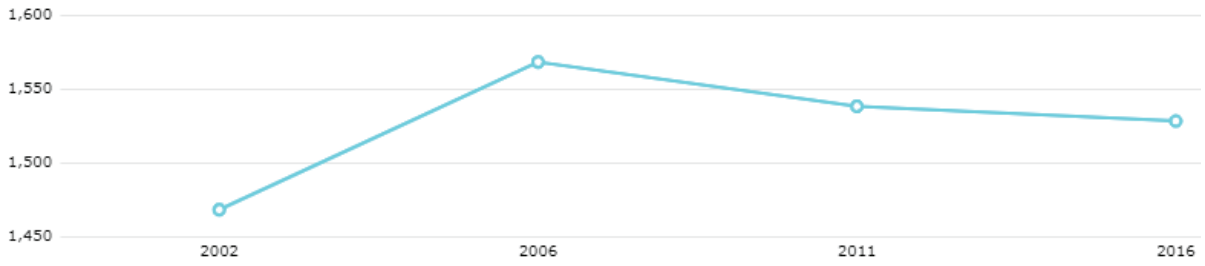

Figure 18.2: Population trends in Phoenix Park ED, 2002-2016 (Source: CS0, 2016)

The population trends relative to the study area suggest an area that is in decline, and are not representative of the wider Dublin City administrative area. In 2016, the population of the Dublin City administrative area was recorded as being 553,165. This represents a population increase of 4.6% in the last inter-censal period from 2011 to 2016. Figure 18.3 illustrates population increase in Dublin City.

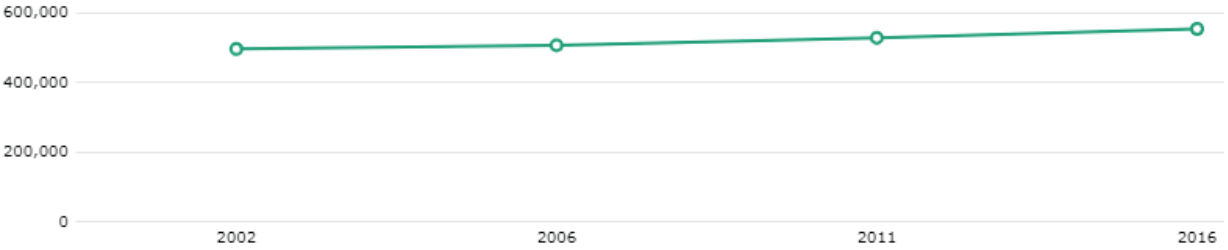

Figure 18.3: Population trends in Dublin City, 2002-2016 (Source CSO, 2016)

In 2016, approximately 50% of the population of the Phoenix Park ED, were young adults (20 - 39 years old), at 806 individuals. This is higher than the comparative figure for Dublin City, where 213,801 individuals or 39% of the population were recorded as being between the ages of 20 - 39.

Dependency ratios are used to give a useful indication of the age structure of a population with young (0 - 14 years) and old (60+ years) shown as a percentage of the population of working age (15 - 64 years). In the Phoenix Park ED, the total dependency ratio was 28% in 2016.

This is lower than the total dependency ratio of 39% in Dublin City. This can be attributed to the high level of young adults living in the study area.

Figure 18.4 illustrates the age distribution of the Phoenix Park A ED, and Figure 18.5 illustrates the age distribution of Dublin city.

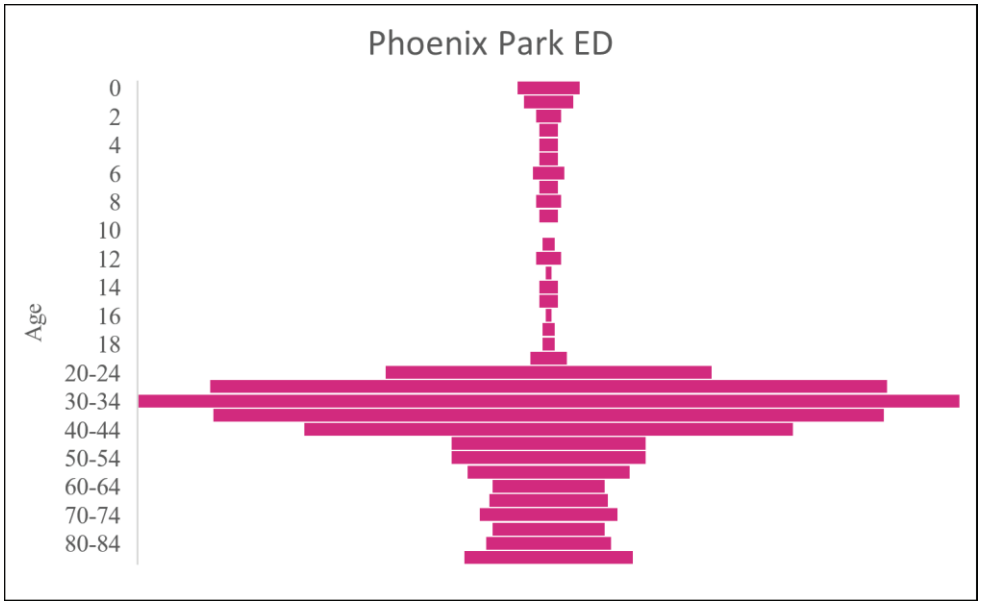

Figure 18.4: Age distribution in Phoenix Park A (Source: CSO, 2016)

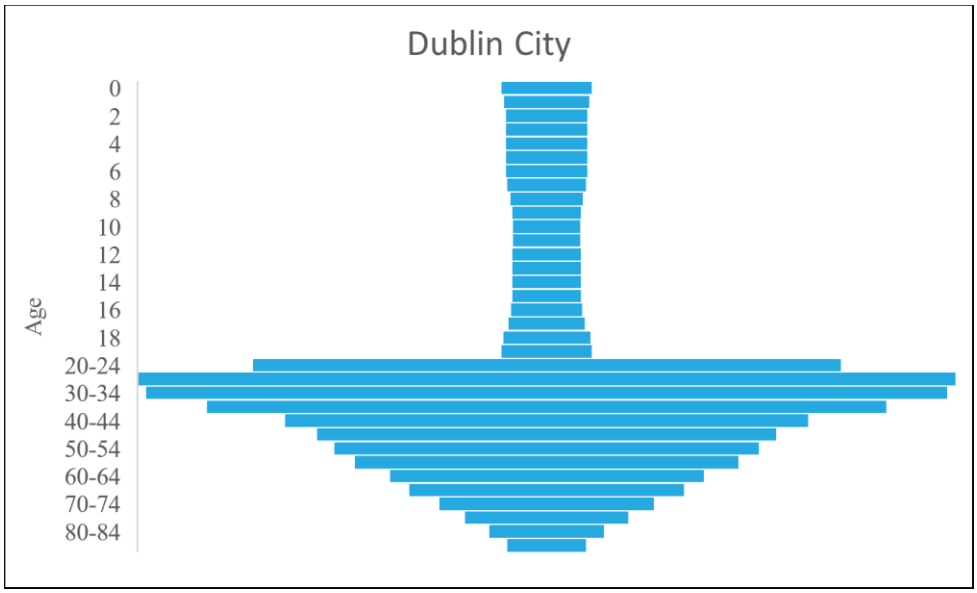

Figure 18.5: Age distribution in Dublin city (Source: CSO, 2016)

According to the 2016 census, some 45% of the population of the Phoenix Park ED were noted as living as a family, in 2016. This is lower than the Dublin city comparison of 60% in 2016.

Stephen Little Associates (SLA) carried out a 'childcare needs assessment' in respect of the proposed development (Refer to **Appendix 18.1**).

In order to determine if a childcare facility is required at the proposed development site, it was considered appropriate to review existing childcare facilities in the vicinity of the proposed development site and underlying demographic trends.

According to the findings of the childcare needs assessment, it is estimated that there are:

- c.63 no. existing childcare facilities (containing in excess of 74 no. existing childcare spaces) within c. 0.5km - 1.5km of the proposed development site, under extant planning permissions; *and*
- an additional 80 no. childcare spaces permitted within c. 1.5km of the subject site, under extant planning permissions, and a further 100 no. spaces currently under consideration by the planning authority.

Refer to Figure 18.6 for the childcare facilities located in proximity to the proposed development.

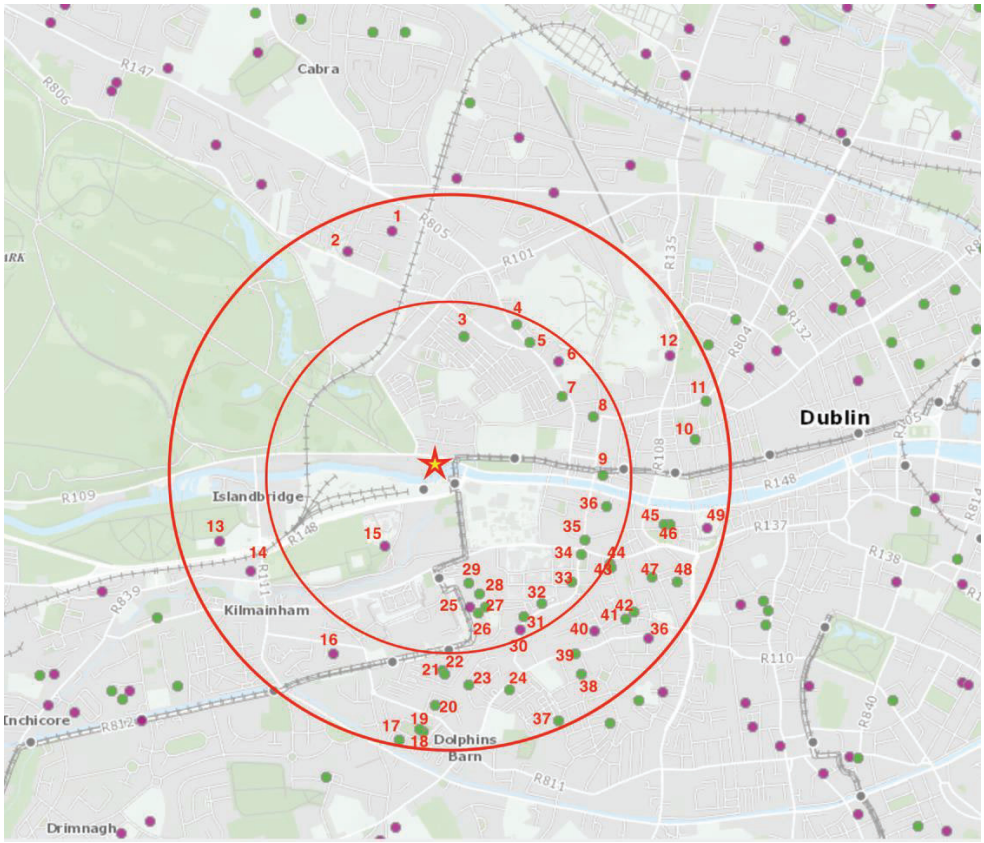

Figure 18.6: Extract from Pobal Maps which identifies TUSLA registered childcare facilities. The subject site is identified (star) with an indicative 1.5km radius show in red (Overlay by SLA).

It is the opinion of SLA that a further childcare facility to accommodate the proposed residential development at the application site is not required. There is sufficient capacity in the existing registered and permitted childcare facilities in the identified catchment to absorb this demand.

A schools assessment was also carried out by SLA, to determine if the proposed development will be adequately served by primary and post-primary schools facilities.

According to the assessment, four primary and two post-primary schools are located within 1km of the proposed development and there are 40 no. primary schools and 13 no. post-primary schools in the surrounding Dublin 8 and Dublin 7 area. Refer to Figure 18.7 for the primary and post primary schools in the vicinity of the proposed development.

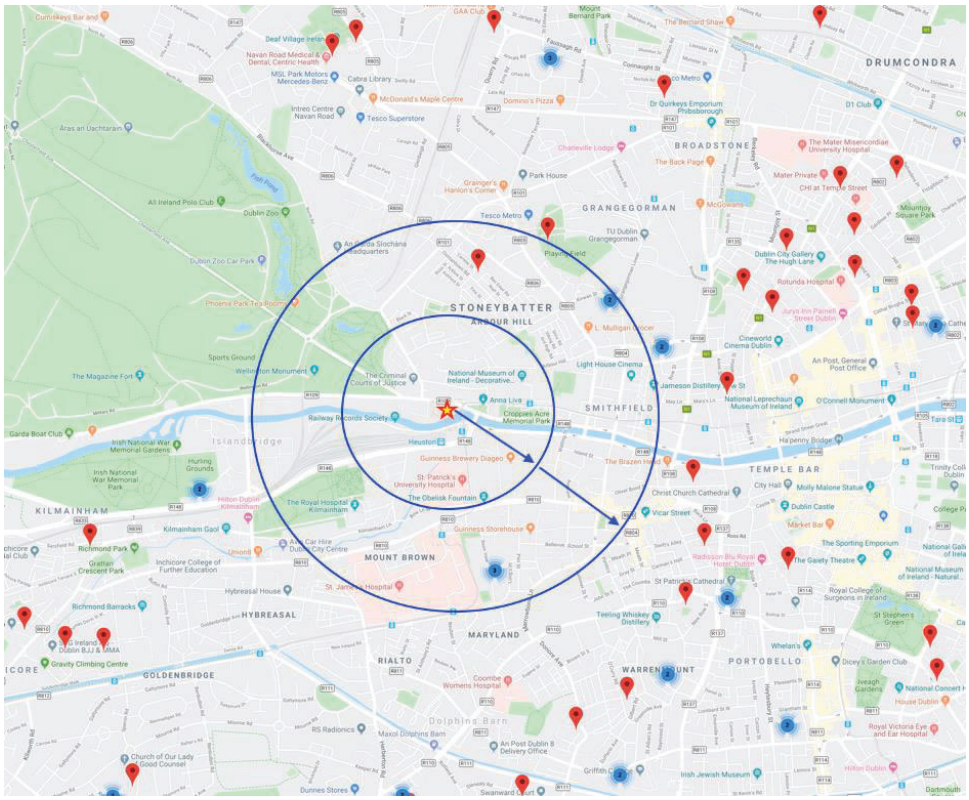

Figure 18.7: Primary and post-primary schools in the vicinity of the proposed development

The unemployment rate recorded in the Phoenix Park ED was 6.5% in 2016, and 6.1% in Dublin City, in the final quarter of 2017. These are both considerably lower than the peak unemployment rate in 2011, which was 13.7%.

The study area of the proposed development is notably more diverse than other parts of the city, with some 29% of the usually resident population of the Phoenix Park ED being recorded as being of Non-Irish nationality in 2016, compared to 17% in Dublin City as a whole.

According to the 2016 Census, the primary form of accommodation within Phoenix Park ED is flats/apartments, whereas the primary form of accommodation throughout Dublin city as a whole, is houses/bungalows, as illustrated in Figure 18.7 and 18.8.

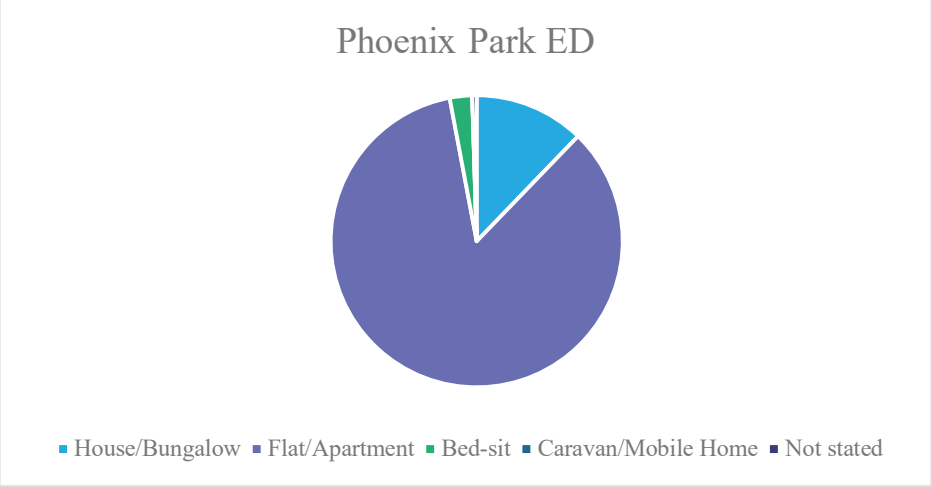

Figure 18.8: Accommodation types in Phoenix Park ED

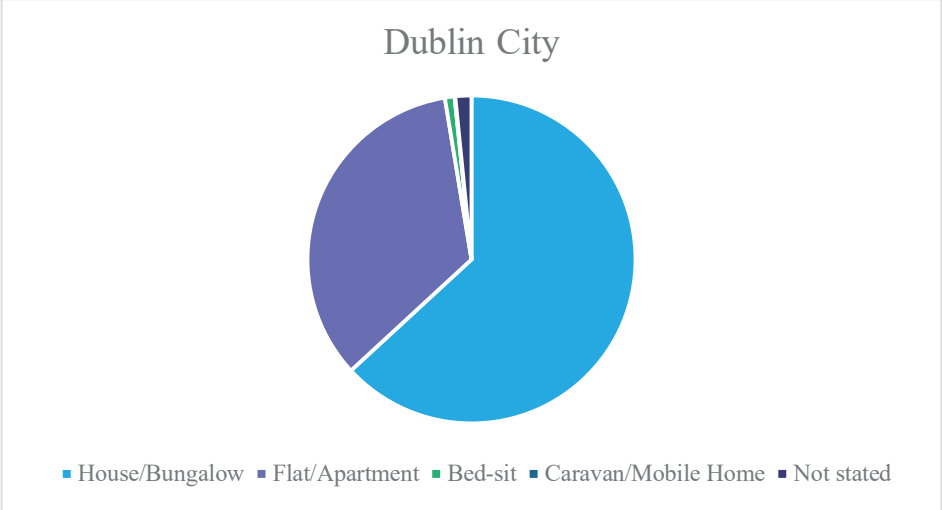

Figure 18.9: Accommodation types in Dublin city

Only 18% of households in the Phoenix Park ED were recorded as being 'owner occupied' in 2016. This is significantly lower than the number of owner occupied households in Dublin city in 2016; which was recorded as being 51%.

In summary, the study area of the proposed development is primarily made up of young adults, occupying rented apartments. The study area has a high non-Irish population, and a small dependant population. The area is also in population decline.

18.3.3 Human Health

The 2016 Census recorded the self-perceived health of the city. In 2016, 79% of the population of the Phoenix Park ED classified themselves as being of 'good' or 'very good' health. This is marginally lower than the Dublin city comparison of 83%.

Further, some 3% of the population of the Phoenix Park ED identified themselves as being of 'bad' or 'very bad' health. This is marginally higher than the Dublin city comparison of 2%.

Table 18.1 provides information on the health status of Dublin (note this includes Dublin City and County)

Table 18.1: Health Status of Dublin (City and County) (Source: HSE, Health Profile 2015 Dublin City)

Indicator	Persons[22]
Persons with blindness or a serious vision impairment	7,560
Persons with deafness or a serious hearing impairment	12,480
Persons with a condition that limits basic physical activities	32,681
Persons with an intellectual disability	6,307
Persons with a difficulty in learning, remembering or concentrating	16,993
Persons with psychological or emotional condition	13,941
Persons with other disability including chronic illness	37,676
Persons with a difficulty in dressing/bathing/getting around the home	15,166
Persons with a difficulty in working or attending school/college	23,312
Persons with a difficulty in going outside home alone	21,423
Persons with a difficulty in participating in other activities	25,922
Deaths from cancer - all ages	11,468

According to the 2016 Census results, some 382 people in the Phoenix Park ED classified themselves as having a disability, accounting for some 25% of the population. This is significantly greater than the Dublin city comparison of 15%.

In addition, 3% of the population of the Phoenix Park ED classified themselves as 'carers' in 2016. This is marginally lower than the Dublin city comparison of 4%. A total of 20,808 carers were providing an average of 36.5 hours of unpaid help per week in Dublin City in 2016, with women providing 64 per cent of the total number of unpaid hours per week.

Figure 18.9 shows the geographical spread of people with a disability in Dublin city, with high rates identified in the Phoenix Park ED. In 2016, the unemployment rate amongst persons with a disability was 26.3% in Dublin city. In 2016, the Health Research Board (HRB) reported that there were 1,397 individuals registered in the Community Healthcare Organisation CHO Area 9 Dublin North City and County area, registered on the National Physical and Sensory Disability Database (NPSDD) in December 2016, with a physical or sensory disability. CHO Area 9 includes the Dublin North, Dublin North Central and Dublin North West areas[23].

[22] Dublin City and Dublin County, Census 2011
[23] Tusla Child and Family Agency (2018), *Dublin City North CYPSC Health and Wellbeing Action Plan.* Dublin, Ireland.

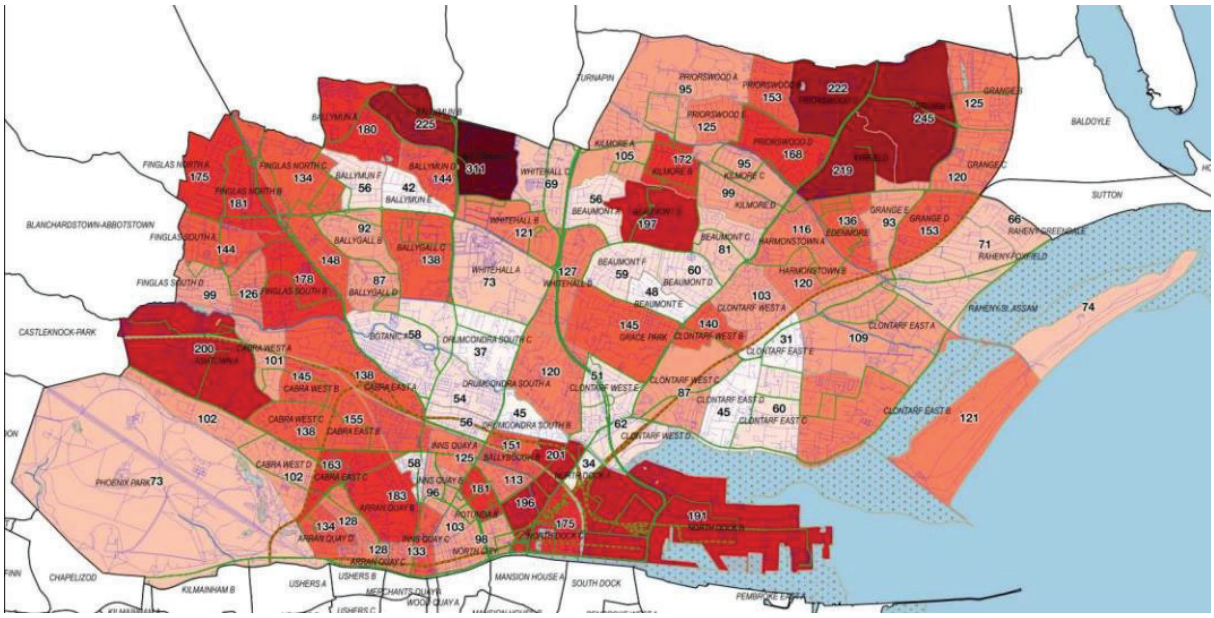

Figure 18.10: People with a Disability in Dublin City North (Source: CSO, Census 2016)

According to the 2016 Census, the average age of first time mothers in Dublin City was 31.2 years. This is above the State average of 30.9 years and is slightly lower than the Dublin regional average of 31.3 years. Based on the population of females aged 10 to 17, the rate of births to mothers aged 10 to 17 in Dublin City was 6.8 per 10,000. Relative to other areas this was the third highest rate in the State.

According to the 2016 Census, an infant death is defined as the death of an infant aged less than one year. The infant mortality rate is calculated as the number of infant deaths per 1,000 births. In 2016, 27 infant deaths occurred in Dublin City, this represents an infant mortality rate of 3.7 per 1,000 births. This rate was higher than the State average of 3.3 and equal to the Dublin regional average of 3.7.

The greatest health risk from radiation in Ireland is caused by radon. It accounts for more than half of the total radiation dose received by the Irish population. As a known carcinogen, in the same category as tobacco smoke and asbestos it is a cause of lung cancer. Approximately 300 cases of lung cancer in Ireland every year can be linked to radon. These lung cancer cases are principally associated with exposure to radon in the home, but exposure in the workplace is also a contributor. In the workplace, the employer must protect the health of workers from this identifiable risk.

Certain areas of the country are more likely to have a high number of homes with excessive levels of radon and these areas are known as High Radon Areas. According to the EPA, some 3.8% of the homes within the 10km grid square of the proposed development site are estimated to be above the Reference Level for Radon and thus it is classified as a High Radon Area.

The availability of public amenities plays an important role in the health and well-being of any city community.

The recreational open spaces available to the population of Dublin city are comprised of approximately: 120 large open spaces, 260 playing fields, 120 playgrounds, 88 public parks (including open spaces and gardens), 4 beaches, 2 nature reserves, 1 main river and its associated boat clubs and walks and 2 canals. According to the Community and Social Infrastructure Audit (Refer to **Appendix 18.2**), there are four sports and recreational facilities within 500km of the proposed development: The Phoenix Park, Anytime Fitness Kilmainham, Avona Boxing Club and The Croppies Acre Park.

A number of social and community services are also located within 1000m of the proposed development site: St. Catherine's Community Centre, Aughrim Street Sports Hall, St. James's Parochial Hall, Blackhall Street St. Pauls Community Hall, Stoneybatter Community Training Centre, Aughrim Street Scout Group.

Art and culture amenities located within 500m of the proposed development sire include: The National Museum of Ireland, Pearse Lyons Distillery and Guinness Open Gate Brewery.

The site is well served by local amenities and easily within walking distance of most of the key amenities of the city centre. Directly adjacent to the subject site are local neighbourhood facilities such as Londis, a Post Office and numerous café/restaurant units including The Natural Bakery, FX Buckley, The Sandwich Market. Heuston South Quarter and Thomas Street are located within 1 km of the subject site, which contains a wide array of amenities such as banks, post office, local offices, restaurants, public houses, community and cultural facilities.

Phoenix Park is located to the north west of the subject site which provides a significant amount of open space including facilitates such as playing pitches, polo and cricket grounds and a children's playground. The subject site is in close proximity to a number of other open spaces including The Croppies Acre (within 300m), Irish Museum of Modern Art Gardens, Irish War Memorial Gardens and Grangegorman Playing Fields.

The baseline environment of other indicators of public health, such as air quality and water supply, are included in the relevant chapters in this EIAR.

18.4 Likely Significant Effects

18.4.1 Do-Nothing Scenario

In the event that the proposed development does not proceed, no new residential, commercial or amenity opportunities would be provided in the area. Thus, the population dynamics, economy and urban realm of the study area would remain as it is currently, as described in **Section 18.3.2**.

18.4.2 Construction Phase

18.4.2.1 Population

Potential effects on the population during construction relate to issues such as employment generation and community disturbance.

The construction phase of the proposed development will provide for the temporary employment of c. 600 - 700 no. construction workers. The multiplier effect arising from these additional construction jobs will also lead to an increase in employment in local businesses providing services to construction workers. The construction phase of the proposed development will therefore have a likely significant positive short-term effect on employment, and subsequently on the population.

The construction phase of the proposed development may result in some temporary community disturbance in terms of site hoarding/fencing, additional signage, reduced local access (pathways etc.), increased number of people accessing local services etc. Any disturbance is predicted to be commensurate with the normal disturbance associated with the construction industry where a site is efficiently and properly managed having regard to neighbouring activities. The level of construction generated traffic is not expected to be significant. Proposed access routes will keep trucks to an established HGV route, minimising their impact on residential areas. The potential disturbance is likely to result in a slight negative temporary effect on the population.

18.4.2.2 Human Health

Potential effects on human health arising during the construction phase of the proposed development relate generally to quality of life including; air quality, climate, noise, water and hydrology, resource and waste management, potential disruption of services and the risk of major accidents/disasters. While the assessment of effects relating to each of these environmental factors are dealt with separately elsewhere in this EIAR (Refer to **Chapters 6 - 20**), this section provides a summary as to how these effects have the potential to give rise to human health effects.

Poor air quality has the potential to affect human health by increasing the risk of asthma and other respiratory diseases. As outlined in **Chapter 7**, Air Quality, the construction phase of the proposed development has the potential to give rise to ‘significant soiling’ with regards dust emissions. This will occur during activities such as: building demolition, excavation works, piling etc. It is also possible that Asbestos Containing Materials (ACMs) will be released to atmosphere during construction activities. Traffic generation during construction will not be significant, and no subsequent likely effects on air quality are predicted. There is therefore potential for air quality effects during construction to affect human health.

Climate change affects social and environmental determinants of health – clean air, safe drinking water, sufficient food and secure shelter.

A climate impact assessment was carried out in order to determine the likely significant effects of greenhouse gas emissions predicted due to the construction phase of the proposed development. The greenhouse gas emissions predicted during the construction phase of the proposed development effect are not considered significant. No direct or indirect effects with regards sunlight, daylight or wind are predicted during the construction phase of the proposed development. There is therefore no potential for significant climate related human health effects during the construction phase of the proposed development.

According to the 2015 European Commission report '*Noise Impacts on Health'*[24]*,* the most common effects of excessive noise on people include annoyance, sleep disruption, heart and circulation problems, quality of life, cognitive process disruption and hearing problems. As outlined in **Chapter 9**, Noise and Vibration, the assessment has determined that, during the construction phase, there is the potential for some short-term significant noise effects when works are undertaken within close proximity to the receptor locations. There is therefore potential for noise generated during construction to affect human health.

Contaminated water can result in the spreading of infectious diseases such as gastrointestinal illnesses, respiratory diseases and eye, ear, nose and throat symptoms. As outlined in **Chapter 14**, Water and Hydrology, the construction phase of the proposed development has the potential to alter the water quality and hydrological regime temporarily in the study area. Any effect on water quality has the potential to give rise to human health effects.

Inadequately disposed of or untreated waste may cause serious health problems for populations surrounding the area of disposal. Leaks from the waste may contaminate soils and water streams, and produce air pollution through contamination, creating health hazards. Waste generated during the construction phase of the proposed development will be segregated at source and disposed of appropriately. No potential effects on human health are therefore identified.

An assessment of the risk of the construction phase of the proposed development to give rise, or be vulnerable to, major accidents or disasters was undertaken. During the construction phase of the proposed development, the scenario with the highest risk score was identified as being 'quay wall/upper quay wall collapse.' In this occurrence, a potential human health effect is identified in that collapse of a structure could seriously injure those in its vicinity.

During the construction phase of the proposed development, there is potential for the temporary disruption of services which could give rise to human health effects. Disruptions in electricity or gas, for example, could result in a lack of heating to the household of an elderly person, and could represent a health risk.

[24] European Commission, 2015, *Noise Impacts on Health*

18.4.2.3 Indirect Effects

As outlined in **Section 18.4.2**, there is the potential for indirect effects on the population during the construction phase of the proposed development, in that additional construction jobs will also lead to an increase in employment in local businesses providing services to construction workers.

No indirect effects with regards human health have been identified during the construction phase of the proposed development.

18.4.2.1 Cumulative

There is the potential for a positive cumulative effect on the population during the construction phase of the proposed development. The proposed development, when considered alongside other developments in Dublin city, will collectively contribute to the employment of a significant number of construction workers in Dublin City.

During construction, there is the potential for negative temporary cumulative effects on human health when the construction of the proposed development is considered alongside the construction of other developments (Refer to **Chapter 21,** Cumulative Effects). Concurrent construction works of two or more developments could give rise to increased dust, noise and greenhouse gas emissions than those levels predicted for the proposed development in isolation.

18.4.3 Operational Phase

18.4.3.1 Population

Potential effects on the population during operation relate to issues such as residential and commercial provision, and the assimilation capacity of the local area.

The proposed development will provide much needed residential opportunities in a prime city centre area, which will help cater for the considerable and consistent demand in housing in Dublin. Some 481 residential units will be provided as part of the proposed development, accommodating over 1,100 No. residents, contributing to the delivery of a critical mass of population which will support a wide range of additional local businesses, services, transport infrastructure and employment opportunities. The provision of housing and increased number of residents is likely to result in a positive effect on the population of the local area.

Part V of the Planning and Development Act as amended[25], provides for social and affordable housing obligations for developers, in order to ensure the proper planning and sustainable development of the area. The proposed development will include the provision of 48 No. units under Part V, including a mix of apartment sizes.

[25] Government of Ireland (2018) Planning and Development Act, as emended. Stationary Office, Dublin.

This is likely to result in a likely, positive and permanent effect on the local population and will ensure that the community is accessible to a range of demographics. The proposed mix of housing will ensure that, taken with the existing homes in the Island Bridge, Arbour Hill and Smithfield area, the overall mix in the neighbourhood is conducive to maintaining a healthy balanced community.

The operational phase of the proposed development will also provide significant commercial opportunities in the local area, through the provision of office space, and cafes/restaurants. Further, a small number of operational employment will be provided for, through office management roles, facilities management etc. This is likely to result in a permanent, positive effect on the population, and is likely to have a multiplier effect on the wider area.

In addition, the proposed development will improve the vibrancy and vitality of the area and will help to support existing community and social infrastructure. The proposal seeks to create a new dynamic gateway in the city connecting to existing zones of retail, commercial, hospitality, cultural and residential activity. The creation of this high-quality quarter will provide a catalyst for the further regeneration of the area increasing footfall and a sense of local community with the introduction of cafes, food and beverage, commercial office and high quality residential uses along Parkgate Street.

The physical layout of the proposed development is designed to be an attractive, welcoming space, creating new linkages and unique public realm. A high level of residential amenity will be provided, including private communal courtyards which will benefit from high quality landscaping, private balconies, roof terraces and a second public open space. The public plaza will extend along the river, providing a public walkway that will extend onto the lands adjoining the subject site. The design of the proposed development is expected to reduce social segregation and enhance opportunities to incorporate the new residents into the wider community. The stone turret signals the gateway to the River walk along a colonnade behind the wall passing the café with framed views of the river. From here pedestrians arrive in the new public plaza where a section of the wall is lowered to embrace the opportunity to provide a unique public open space on the edge of the river within the city. The river walk continues along behind the wall once again with the square tower restored with gated access and an active use allowing people to walk in and view the structure from within and look across the river to Heuston Station through the existing window. Refer to **Chapter 3**, Description of the Proposed Development for further details on the proposed amenities.

As outlined in **Section 18.3.2**, at least 74 no. existing childcare spaces are available in existing operational facilities in proximity to the proposed development at the time of the assessment and 80 No. spaces currently predicted to be available for September 2020, and a further 100 no. spaces currently under consideration by the planning authority. The findings of the childcare needs assessment is that a further childcare facility to accommodate the proposed residential development at the application site is not required. There is sufficient capacity in the existing registered and permitted childcare facilities in the identified catchment to absorb this demand.

According to the findings of the school's assessment, the demand created for school places by the proposed development will be comfortably absorbed by the existing educational facilities in proximity to the application site. The most recent Department of Education and Skills enrolment data on post-primary schools indicates that there has been a general decline in enrolment in the area over the past number of years, and therefore the expected minimal demand for spaces arising from the proposed development should be comfortably met by the existing schools. While primary school enrolment in the area has increased over the same period, it is expected to decline steadily from 2019 year on year until 2036. In addition, the development of future schools under the DES Schools Building Programme in the Dublin 8 and Dublin 7 area will ensure that Primary and Post Primary school needs are effectively met. Furthermore, given the likely timeframe for permission, construction and occupation of the proposed development in its entirety, the DES would have an opportunity to consider local demand for school places and any requirement to expand existing or provide new facilities in this area in the next tranche of its Capital Investment for Schools Infrastructure, should the need arise. It is therefore concluded that the existing provision of schools in the area is sufficient to cater for the proposed development.

The proposed development is located within walking distance of a number of key transport options, including rail, LUAS, a Dublin Bikes station and numerous Dublin Bus routes, which is a key component of promoting sustainable development and compact urban form. Proximity to public transport networks will likely result in a positive effect on those living and working in the proposed development, once operational.

18.4.3.2 Human Health

Potential effects on human health arising during the operational phase of the proposed development relate generally to quality of life including; air quality, climate, noise, water and hydrology, resource and waste management, potential disruption of services and the risk of major accidents/disasters. While the assessment of effects relating to each of these environmental factors are dealt with separately elsewhere in this EIAR (Refer to **Chapters 6 - 20**), this section provides a summary as to how these effects have the potential to give rise to human health effects.

The development is designed to be inclusive for all users and will provide level access and a range of household sizes to cater for all users and ages and will present a positive aspect for all passers-by and not present barriers for access. The proposed development will provide for 3 no. disabled car parking spaces and 551 no. bicycle parking spaces. This is in accordance with the provisions of the Dublin City Development Plan 2016-2022, which states that "*where car parking is provided, whether for residents, employees, visitors or others, at least 5% of the total number of spaces should be designated car-parking spaces, with a minimum provision of at least one such space*."

As outlined in **Section 18.4.2**, poor air quality has the potential to affect human health. No likely significant effects on air quality are predicted during the operational phase of the proposed development.

The proposed gas boilers which will be used during the operational phase of the proposed development are not of a size considered significant with regards air quality. No human health effects resulting from air quality during operation are therefore identified.

Boilers used during the operational phase of the proposed development are not of a size which fall under the Greenhouse Gas Permitting scheme. Three different options have been proposed for the operational phase of the proposed development. All three options comply with the requirement to achieve a Nearly Zero Energy Building (NZEB). The proposed development, during operation, will not have a negative effect on the existing amenity space in terms of exposure to sunlight and daylight. No significant effect is therefore predicted. No likely significant climate effects are therefore predicted as a result and no consequent human health effects are identified.

As outlined in **Section 18.4.2**, excessive noise generation has the potential to affect human health. During the operational phase, the predicted change in noise levels associated with additional traffic in the surrounding area required to facilitate the development is predicted to give rise to imperceptible effects along the existing road network. Further, noise levels associated with mechanical plant are expected to be within the adopted day and night-time noise limits set out above, at the nearest noise sensitive properties taking into account the site layout, the nature and type of units proposed and distances to nearest residences. No human health effects resulting from noise generation during operation are therefore identified.

As outlined in **Section 18.4.2**, water contamination has the potential to affect human health. Surface water run-off during the operational phase of the proposed development will utilise a proposed new Sustainable Urban Drainage System (SuDS). The existing combined sewer network on Parkgate Street will also be upgraded as part of the development. No water related human health effects are therefore identified.

As outlined in **Section 18.4.2**, poorly managed waste has the potential to affect human health. During the operational phase, waste will be generated from the residents as well as the commercial tenants. Dedicated communal waste storage areas have been allocated throughout the development for residents. The residential waste storage areas have been appropriately sized to accommodate the estimated waste arisings in both apartments and shared residential areas. The commercial tenants will have dedicated waste storage areas allocated within the development and these can be viewed on the drawings submitted with the application. The waste storage areas have been allocated to ensure a convenient and efficient management strategy with source segregation a priority. Waste will be collected from the designated waste collection areas by permitted waste contractors and removed off-site for re-use, recycling, recovery and/or disposal. Thus, no waste related human health effects are identified.

The operational phase of the proposed development is unlikely to give rise to any significant effects in terms of health and safety.

The design of the proposed development has been formulated to provide for a safe environment for future resident's employees. The proposed development has been designed in accordance with all relevant safety and building standards and regulations.

An assessment was carried out of the risk of the operational phase of the proposed development giving rise to, or resulting in, major accidents or disasters. The scenario with the highest risk score in terms of a major accident and/or disaster during the operational phase of the proposed development was identified as being an 'incident at nearby Heuston Station.' This risk was identified as being 'very unlikely' to occur, but with 'very serious' consequences should it do so, indicating a 'medium risk scenario.' In this occurrence, a potential significant negative effect on human health could occur.

18.4.3.3 Indirect Effects

Transport Infrastructure Ireland has requested information regarding pedestrian movements across Sean Heuston Bridge and the potential interactions of the proposed development with Luas movements. In this context, the applicant has commissioned surveys to enable the identification of potential impacts of additional pedestrian movements at this location.

The survey results show that 1,065 pedestrians use Sean Heuston Bridge between 9.00 and 10.00 in the morning and 1,181 between 18.00 and 19.00 in the evening, equating to about 18 and 20 movements per minute on average, respectively.

The likely person trips generated by the development during the identified busiest periods at the bridge (as above) have been calculated using the TRICS (Trip Rate Information Computer System) trip rate database. It is predicted that the development will generate a total of 230-person trips in the morning (9.00-10.00) and 302 person trips the evening (18.00-19.00).

These trips were assigned to the various modes, of which the relevant ones were pedestrian (22%) and public transport (40%). The latter is relevant as it is considered that half of these will use the bridge as a connection to trains, Luas and buses. The pedestrian volumes were assigned to the local pedestrian network, with 20% of them using Sean Heuston Bridge.

The total flows on the bridge are therefore robustly estimated to be in the order of 59 in the morning (9.00-10.00) and 77 in the evening (18.00-19.00), equating to 5.5% and 6.5% of the present total peak hour flows, respectively. This is not considered to be significant in the context of an urban setting and the fact that the present proposals aim to encourage sustainable travel.

No indirect effects with regards human health have been identified during the operational phase of the proposed development.

18.4.3.4 Cumulative

The proposed development, when considered alongside other residential developments in Dublin city, will collectively help cater for the considerable and consistent demand in housing in Dublin, and will contribute to the delivery of a critical mass of population which will support a wide range of additional local businesses, services, transport infrastructure and employment opportunities.

The commercial component of the proposed development, when considered alongside other commercial ventures in the city centre, will result in a positive cumulative effect on economic growth in the city.

18.5 Mitigation and Monitoring

18.5.1 Mitigation

It should be noted that mitigation measures relating to those factors under which population and human health effects might occur have been addressed elsewhere in this EIAR, under the relevant environmental factors. Other than the mitigation measures outlined in **Chapters 6-20**, no further mitigation measures have been proposed with respect to population and human health. However, those relevant to this assessment are restated in **Section 18.5.1.1** and **18.5.1.2** for completeness.

18.5.1.1 Construction Phase

In order to mitigate potential temporary community disturbance during construction, a Construction Environmental Management Plan (CEMP) has been prepared and is included in Appendix 4.1. Further, a Site Manager will be appointed to ensure the proper running of the site, and the minimisation of community disturbance and the implementation of "good housekeeping" policy at all times. Potential effects on air quality, and consequently human health, will be mitigated during the construction phase and full account will be taken of the Transport Infrastructure Ireland (TII) guidance and the development of employee awareness. Measures that will be implemented for the proposed development will include:

- A c. 1.8m hoarding will be provided around the site works to minimise the dispersion of dust from the working areas;
- Any generators will be located away from sensitive receptors in so far as practicable;
- Stockpiles will be located as far as possible from sensitive receptors and covered and/or dampened during dry weather.

Where asbestos is uncovered on site during construction, the ACM will be double-bagged and removed from the site by a competent contractor and disposed of in accordance with the relevant procedures and legislation.

Noise control measures that will be implemented during the construction phase of the proposed development, in accordance with BS5228, include: the selection of

quiet plant, enclosures and screens around noise sources, and limiting the hours of work. Detailed comment is offered on these items in Section 2.2.1.4, and Appendix 9.1. The measures will ensure any potential human health effects from noise are controlled to within the adopted criteria.

In order to offset any potential effects on water, and consequently human health, earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding. Good housekeeping (site clean-ups, use of disposal bins, etc.) will be enforced by the contractor on the site to mitigate against the risk of spillages.

The potential risk of river wall collapse during construction will be mitigated by standard best practice construction measures, and lateral steel restraints will be provided to the existing stonework along the river, throughout construction.

Should any utility/service diversions or disturbances be required, these will only be carried out in agreement with the relevant service providers, and with notice to the affected public.

18.5.1.2 Operational Phase

The external plant items will be designed so that emissions will be within the noise criteria set for day and night-time periods at any noise sensitive locations. Notwithstanding this, noise control techniques will also be employed during operation in order to reduce the level of operational noise generation, and subsequent human health effects (Refer to **Chapter 9** Noise and Vibration).

The proposed development will incorporate SuDS features in order to improve water quality and reduce the quantity of surface water discharging into the receiving system. The water supply network will include low flow devices with the aim of minimising water usage.

A project specific Operational Waste Management Plan (OWMP) has been prepared and is included as **Appendix 17.2**. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the Eastern and Midlands Region (EMR) Waste Management Plan 2015 – 2021 and abiding by the Dublin City Council waste bye-laws. In addition, a number of waste mitigation measures will be employed (refer to **Chapter 17**, Resource and Waste).

18.5.2 Monitoring

It should be noted that monitoring measures relating to those factors under which population and human health effects might occur have been addressed elsewhere in this EIAR, under the relevant environmental factors. Other than the monitoring measures outlined in **Chapters 6-20**, no further monitoring measures have been proposed with respect to population and human health. However, those relevant to this assessment are restated in **Section 18.5.2.1** and **18.5.2.2** for completeness.

18.5.2.1 Construction Phase

Dust monitoring will be undertaken at a range of nearest sensitive receptors during the demolition and construction phases. The TA Luft dust deposition limit values of 350mg/m^2/day (averaged over one year) will be applied as a 30-day average.

Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criteria. Noise monitoring will be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development to ensure existing surface water runoff is draining from the site and is not exposed to any contaminants. The contractor will be required to ensure that the sanitary facilities for the site personnel are maintained and effluent storage is regularly emptied and disposed of. The contractor will be required to ensure that the water supply to the site is maintained and free of contaminants. The contractor is required to monitor the weather forecasts to inform the programming of earthworks and stockpiling of materials.

The management of waste during the construction phase will be monitored by the site manager to ensure compliance with relevant local authority requirements and effective implementation of the Construction & Demolition Waste Management Plan including maintenance of waste documentation.

18.5.2.2 Operational Phase

The management of waste during the operational phase will be monitored by the site manager to ensure effective implementation of the OWMP by the building management company and the nominated waste contractor(s).

Waste generation volumes will be monitored against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the Waste Storage Areas (WSAs) where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contactor costs.

18.6 Residual Effects

The proposed development is likely to give rise to a permanent, positive effect on the population, through the provision of residential, commercial and amenity opportunities in a prime city centre location.

Following the implementation of the mitigation measures outlined in **Section 18.5.1**, and elsewhere in this EIAR, no significant negative effects on human health are identified in respect of the proposed development.

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19 Material Assets

19.1 Introduction

This section describes the likely significant effects of the proposed development on material assets. Material assets are defined as:

"*Resources that are valued and that are intrinsic to specific places"*

The current *draft EPA Guidelines*[1] state that material assets: *"Can now be taken to mean built services and infrastructure.",* the purpose of this assessment is therefore to consider the likely significant effects of the proposed development on existing services and infrastructure, including:

- Land Use and Properties;
- Existing Infrastructure;
- Electricity;
- Telecommunications;
- Gas;
- Water Supply Infrastructure; *and*
- Foul and Surface Water Drainage.

Material assets of natural origin are addressed separately in other chapters of this EIAR, such as **Chapter 7**, Air Quality, **Chapter 8**, Climate, **Chapter 10**, Biodiversity, **Chapter 11**, Archaeology, **Chapter 12**, Architectural Heritage, **Chapter 14**, Water, **Chapter 15**, Lands and Soils, **Chapter 16**, Hydrogeology, with Traffic and Transportation assets considered in **Chapter 6**.

Chapter 3 provides a full description of the proposed development and **Chapter 4** describes the construction strategy for the proposed development. The following aspects are particularly relevant to the material assets assessment:

Design:

- Proximity of the proposed development to existing material assets;

Construction:

- Land-use requirements and removal/replacement of infrastructure;
- Intrusive construction activities occurring in proximity to existing material assets;
- Diversions required to undertake construction activities in the vicinity of existing material assets; and

[1] EPA, 2017. *Guidelines on Information to be contained in Environmental Impact Assessment Reports (draft).*

Operation:

- Operational demand requirements of the proposed development.

This assessment was undertaken by Clodagh O'Donovan and Ailsa Doyle of Arup. Refer to **Appendix 1.1** for details on relevant qualifications and experience.

19.2 Assessment Methodology

19.2.1 General

This chapter has been prepared having regard to the overarching EIA guidance as described in **Section 1.9.3** of **Chapter 1,** Introduction and Need for the Scheme. The significance of effects has been determined based on the severity of potential disturbance to existing material assets.

19.2.2 Guidance and Legislation

The significance criteria used to categorise significant effects on material assets is set out in Table 19.1 and has been developed based on the description of significant effects as outlined in the guidance[1].

Table 19.1: Significance criteria for likely significant effects on material assets

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

For the purpose of this assessment, likely significant effects on material assets are considered to be those effects that are categorised as significant, very significant or profound.

19.2.3 Study Area

The study area for this assessment is the site of the proposed development in its entirety, as described in **Chapter 3,** Description of the Proposed Development.

19.2.4 Site Visits

A site visit was undertaken on 27th February 2019, as part of this assessment. In order to inform the baseline material assets assessment, a desk study of existing service and utility information was carried out, as described in **Section 19.2.6.**

19.2.5 Consultation

Consultation with utility providers has been undertaken where applicable to determine the location and details of existing utilities including ESB Networks (ESBN), Gas Networks Ireland and Irish Water.

Consultation was also undertaken with Dublin City Council Drainage Division from May 2019.

19.2.6 Categorisation of the Baseline Environment

In order to inform the baseline material assets assessment, a desk study of existing service and utility information was carried out, including:

- Eir - maps downloaded from website 10th December 2018;
- ESB Networks – maps received 11th December 2018;
- Gas Networks – maps received 11th December 2018;
- Water supply- maps received 28th October 2018; and
- Drainage- maps received 28th October 2018

19.2.7 Impact Assessment Methodology

A desk study has been carried out to identify the existing material assets associated within the site and determine the likely significant effects of the construction and operation of the proposed development on those material assets.

Having regard to **Chapter 3,** Description of Development and **Chapter 4**, Construction Strategy, the likely significant effects of the proposed development on existing material assets have been assessed in the context of the significance criteria set out in Table 19.1.

19.3 Baseline Conditions

19.3.1 Land-use and Property

The existing land use is described in detail in **Section 1.7** of **Chapter 1**, Introduction and Need for the Scheme**.** The site is located at 42A Parkgate Street, the junction of Parkgate Street and Sean Heuston Bridge, along the river Liffey. The site borders the north bank of the river Liffey, situated directly opposite Heuston Station. The site is located in Dublin 8, under the authority of Dublin City Council.

The existing land-use of the proposed development site is classified by the European Community CORINE (Co-Ordinated Information on the Environment) Land Cover Mapping[2] as *'artificial surfaces'* of '*continuous urban fabric*'.

The land under the site is zoned under the *Dublin City Development Plan 2016-2022*[3] as *'Zone 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 site along the river is zoned separately as *'Z9: To preserve, provide and improve recreational amenity and open space and green networks'*.

The lands included in the red line boundary are within the ownership of the developer, Ruirside Developments Ltd. However, the development area will also include the portion of landscaped area east of the existing ESB substation on Parkgate Street, and an area of footpath and pavement along Parkgate Street. All areas outside the site ownership boundary but within the red line boundary are in the ownership or control of Dublin City Council (DCC).

19.3.2 Existing Infrastructure

A Dublin Bikes station (station 92) is located within the red line boundary of the proposed development site, within the land owned by DCC, as is the westbound bus stop for the 25, 26, 66/a/b, 67, and 69 bus routes.

Waste recycling bins are also located within the red line boundary of the proposed development site, within the land owned by DCC.

Refer to Figure 19.1 for the location of the above existing infrastructure on site.

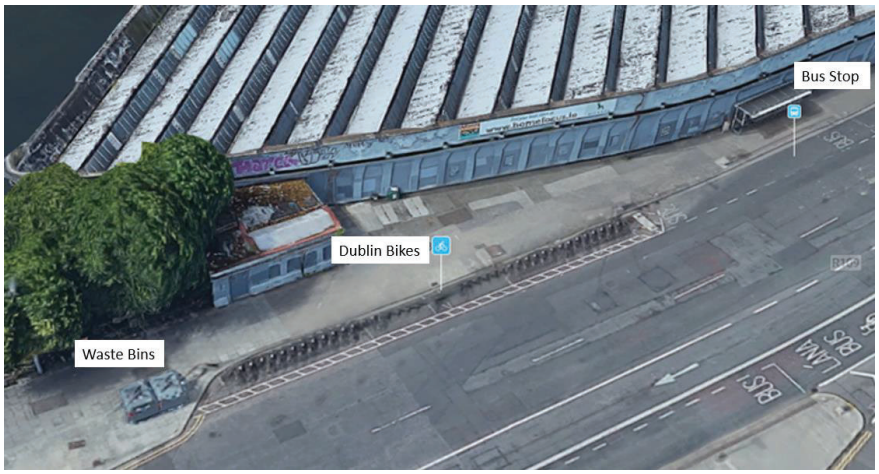

Figure 19.1: Existing Infrastructure

[2] EPA, 2018. *EPA Maps.* Available at https://gis.epa.ie/EPAMaps/. *Accessed 2/10/18.*
[3] DLRCC, 2016. *Dún Laoghaire Rathdown County Council Development Plan 2016-2022.*

19.3.3 Electricity

ESB maintains underground power lines within and around the proposed development site. ESB's infrastructure of relevance to the proposed development includes the following:

- Four (10KV/20KV/400V/230V) underground cables running along the north of the site boundary, under Parkgate Street;
- A number of these (10KV/20KV/400V/230V) underground cables which run along Parkgate Street also run under the eastern end of the proposed development site which are within the ownership of Dublin City Council, to the east of the site.
- A (10KV/20KV/400V/230V) underground ESB cable running along the west side of the site boundary, which ends at the river-edge of the site; *and*
- An existing ESB substation located on Parkgate Street, on the lands to the east of the proposed development site which are within the ownership of Dublin City Council. The ESB substation is not included in the red line boundary of the proposed development.

Refer to Figure 19.2 in **Appendix 19.1** which illustrates the existing ESB infrastructure on site.

19.3.4 Telecommunications

The telecommunication cables of relevance to the proposed development all run under Parkgate Street. The relevant telecommunication cables include:

- Aurora Telecom Fibre Optic Cable;
- Aurora Telecom Duct; and
- Eir Cable.

Figure 19.3 illustrates the telecommunications sites in proximity to the proposed development site. According to the Telecommunications site analysis undertaken by Independent Site Management (ISM) **(refer to Appendix 19.2),** the closest multiple telecommunication operator site is the Guinness Flaking Plant (112 James Street, Dublin 8), which is currently managed by ISM. Mobile base station sites have been installed on the site for Three Ireland, Vodafone Ireland and Eir.

Figure 19.4 illustrates the transmission links in proximity to the proposed development site.

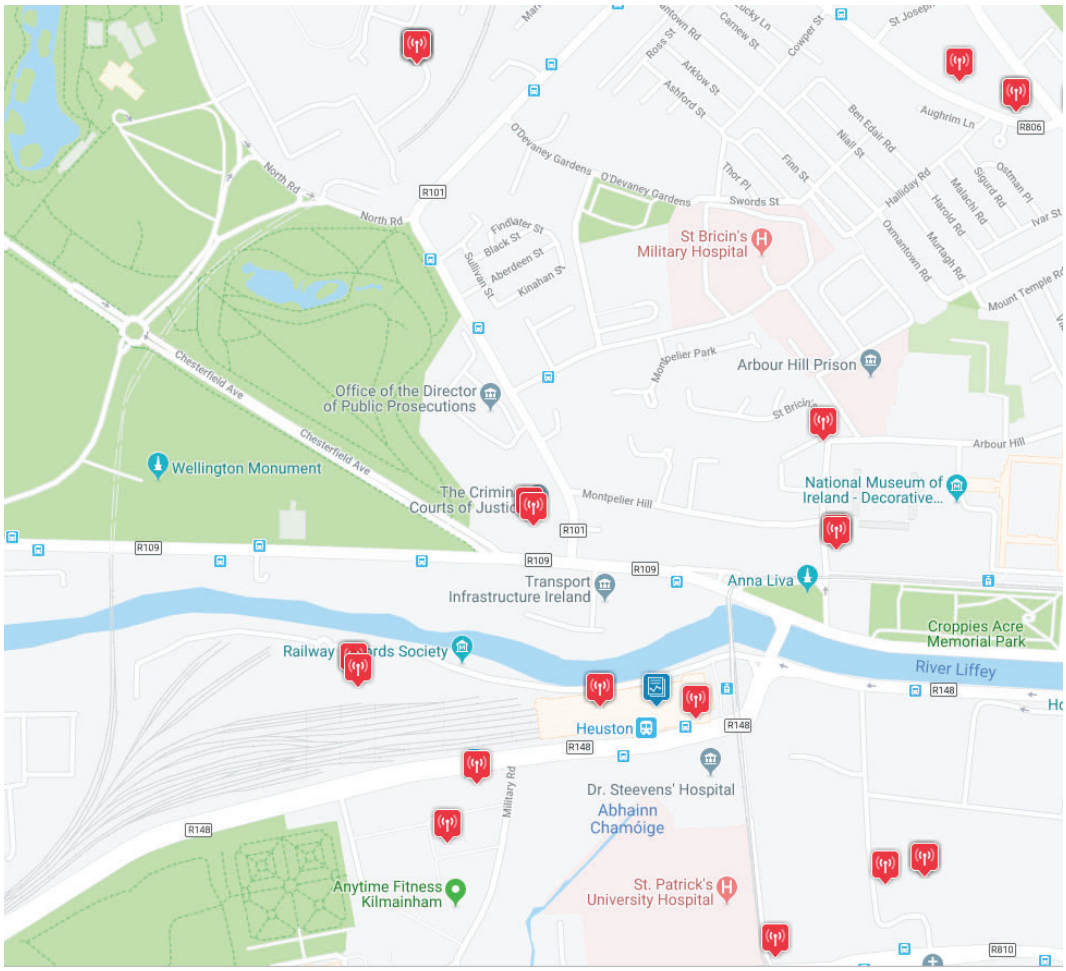

Figure 19.3: Telecommunications sites in proximity to the proposed development site

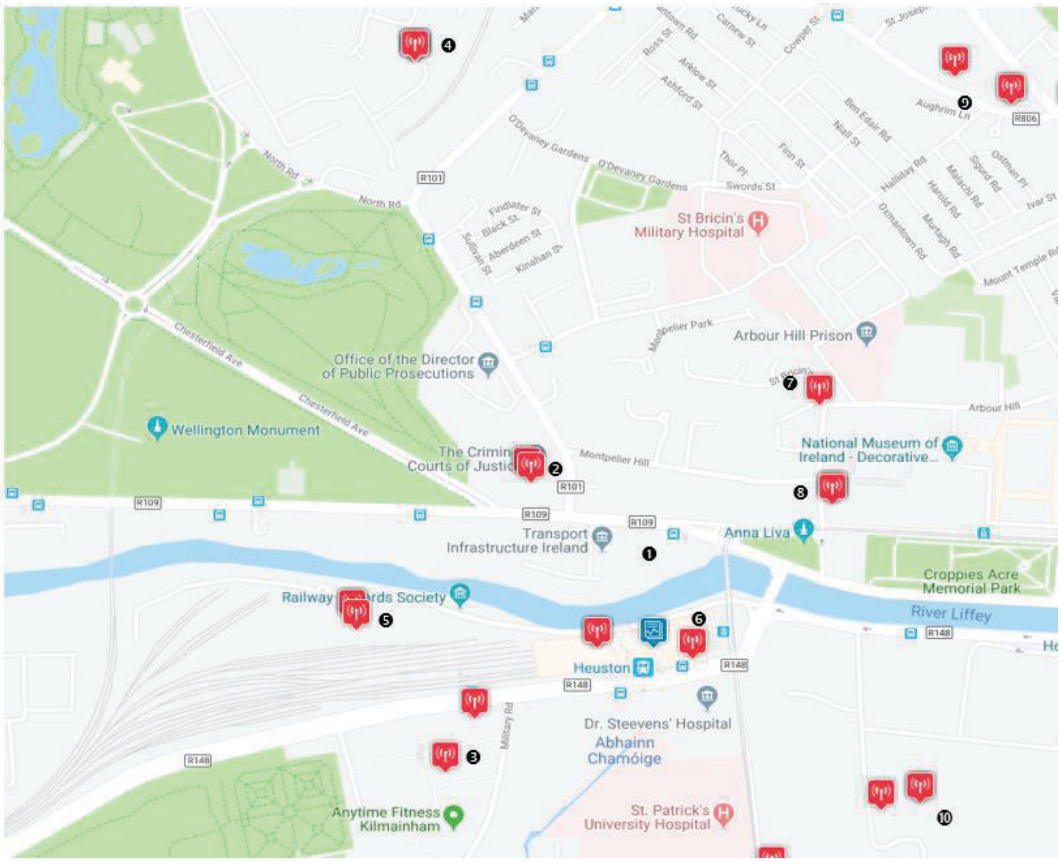

Figure 19.4: Transmission links in proximity to the proposed development

19.3.5 Gas

The gas mains of relevance to the proposed development are located at the following locations within and around the site:

- Distribution pipe (Medium Pressure) running under Parkgate Street, and under Sean Heuston bridge;
- Distribution pipe (Medium Pressure) that splits off from the main distribution pipe (Medium Pressure) running under Parkgate Street, and connects with an installation located between Parkgate House and the Dublin Bikes (Station No. 92);
- Distribution pipe (Abandoned) running under Parkgate Street; and
- Inserted pipe (Low Pressure) running underneath Parkgate Street.

Figure 19.5 in **Appendix 19.1** illustrates the existing gas infrastructure on site.

19.3.6 Water Supply

Records provided by Irish Water indicate that the site is serviced by a connection to an existing 150mm public water main on Parkgate Street. The existing building on the proposed site is currently in operation as a warehouse. There are under 10 persons working in the warehouse at any time and as such the water demand from the subject lands is estimated to be less than 0.6m^3/day.

Figure 19.6 in **Appendix 19.1** illustrates the existing water supply and drainage infrastructure on site.

19.3.7 Sewer Network and Drainage Infrastructure

Drainage records provided by Irish Water indicate that there are existing 300mm and 450mm diameter combined sewers on Parkgate Street discharging into city centre sewers and subsequently to the waste water treatment plant in Ringsend.

The capacity of the existing 450mm diameter combined sewer on Parkgate Street is approximately 107 l/s, with limited spare capacity during rainfall events. Figure 19.6 in of **Appendix 19.1** illustrates the existing water supply and drainage infrastructure on site.

19.4 Likely Significant Effects

19.4.1 Do-Nothing Scenario

In the scenario where the proposed development does not proceed as planned, the existing land and material assets in the study area will remain as currently identified in the desk study, site visits and site-specific investigations, and as described in **Section 19.3**.

19.4.2 Assessment of Effects During Construction

19.4.2.1 Land-Use and Property

The site of the proposed development is owned by the developer, Ruirside Development Limited. No acquisition of land will be required during the construction phase of the proposed development. The site is currently occupied by Hickeys fabric company and has been since the 1970s. As part of a leasing agreement, Hickeys will vacate the site in December 2019.

The development area will also include the portion of landscaped area east of the existing ESB substation on Parkgate Street, and an area of footpath and pavement along Parkgate Street. All areas outside the site ownership boundary but within the red line boundary are owned by Dublin City Council.

A letter of consent from Dublin City Council Parks Department has been obtained, which agrees to the proposed works on land that is in the ownership or control of DCC. An additional letter of consent has been obtained from DCC for the works along Parkgate Street. DCC consent to the submission of the planning application for the proposed development.

19.4.2.2 Existing Infrastructure

The construction and operation of the proposed development will require the removal and relocation of the existing Dublin Bikes stand and waste bins on Parkgate Street, as illustrated in Figure 19.1 in **Section 19.3.2**.

Every effort will be made to ensure that the relocation of these pieces of infrastructure will be to a location that is in as close proximity to their existing locations as possible.

A likely slight- negative, permanent effect is therefore identified.

19.4.2.3 Electricity

Electricity will be required for the construction activities for temporary lighting, equipment use etc. It is anticipated that a temporary connection to existing spurs at the site boundary will facilitate electricity supply to the site during construction, subject to the appropriate agreements. The power demands during the construction phase on the existing electricity network are considered to be a slight, negative and short-term effect.

As outlined in **Section 19.3.3**, a (10KV/20KV/400V/230V) underground ESB cables run in a north-south direction along the west side of the site boundary, to the river-walk. This electricity supply will be disconnected, and the services terminated from entering the site. Disconnections will be phased corresponding to the proposed progress of demolition and construction works on site.

Where the excavation strategy or temporary works require any temporary diversion of local services or utilities on the site perimeter, this would be undertaken with prior agreement of the relevant service provider.

A potential slight-negative, temporary effect is identified where utility diversions are required.

19.4.2.4 Telecommunications

There is no existing telecommunications infrastructure within the site of the proposed development- all existing telecommunication cables run along Parkgate Street. As such, there will be no likely significant effects on telecommunications infrastructure during the construction phase of the proposed development.

Where the excavation strategy or temporary works require any temporary diversion of local services or utilities on the site perimeter, this would be undertaken with prior agreement of the relevant service provider. A potential slight-negative, temporary effect is identified where utility diversions are required.

ISM have identified 2 No. telecommunications channels that will potentially be affected by the height and scale of the proposed development. Both are microwave link dishes installed by both Three and Vodafone on the Criminal Court of Justice building to serve their indoor mobile solutions.

The effect of the proposed development on the aforementioned microwave link dishes will likely occur during the construction period. A minor-adverse effect is identified.

19.4.2.5 Gas

As described in **Section 19.3.4**, a number of gas distribution pipes are located within the red line boundary of the proposed development, under Parkgate Street. There is no existing gas infrastructure within the existing Hickey site, all existing gas pipelines run along Parkgate Street.

As such, there will be no likely significant effects on gas infrastructure during the construction phase of the proposed development.

Where the excavation strategy or temporary works require any temporary diversion of local services or utilities on the site perimeter, this would be undertaken with prior agreement of the relevant service provider.

A potential slight-negative, temporary effect is identified where utility diversions are required.

19.4.2.6 Water Supply

As outlined in **Section 19.3.6**, the proposed development site is serviced by a connection to an existing 150mm public main on Parkgate Street which will continue to service the contractors' compound throughout the construction phase of the proposed development.

The water demands during the construction phase on the existing water supply network are considered to be an imperceptible and short-term effect.

Where the excavation strategy or temporary works require any temporary diversion of local services or utilities on the site perimeter, this would be undertaken with prior agreement of the relevant service provider.

A potential slight-negative, temporary effect is identified where utility diversions are required.

19.4.2.7 Sewer Network and Drainage Infrastructure

The proposed development includes a new wastewater drainage network for the site.

During the construction phase of the proposed development, an area of approximately 0.16ha of the Parkgate St. road catchment equivalent to a peak discharge of 22.4l/s (which currently drains to the 450mm trunk sewer) will be diverted into a new separate surface water drainage network.

During the construction phase of the proposed development, Sustainable urban Drainage Systems (SuDs) will be incorporated into the site, with surface water run-off from the development site discharging through a minimum of a two-stage treatment train process prior to discharge to the River Liffey.

Improvement works for surface water will occur along the south kerb on Parkgate Street, subject to Local Authority agreement, comprising:

1. Installation of new manholes constructed in Parkgate Street pavement;
2. Installation of new sections of surface water concrete pipework to connect new manholes and gullies;
3. Connection into existing surface water outfall;
4. Diversion of existing road gullies into new surface water sewer; and
5. Construction of new blockwork road gullies and connection into new surface water sewer.

Effluent and sanitary waste will be generated from facilities provided for the construction staff on site. This waste will be discharged to the existing combined sewer on Parkgate Street or as otherwise agreed with Dublin City Council. This would be considered a short-term effect and the significance of this effect is imperceptible.

In addition, the existing sprinkler system within the Hickey's warehouse will be emptied with the water contained therein discharged to sewer in agreement with Irish Water.

Given the predicted number of construction workers (600 - 700 maximum, not all on site at same time), the predicted quantity of construction generated foul water is not expected to be significant. As such, no likely significant effects on the existing sewerage infrastructure are identified.

19.4.2.8 Indirect Effects

No known potential indirect effects on material assets are identified during the construction phase of the proposed development.

19.4.2.9 Cumulative

Appendix 21.1 lists all those development applications within 1km of the proposed development which have been either approved, or applied for, at the time of writing this EIAR. For the purposes of this cumulative assessment, a review of those developments has been undertaken in order to ascertain if the proposed development would give rise to any potential cumulative effects on material assets during construction.

No potential cumulative effects are identified with regards the construction phase of the proposed development.

19.4.3 Assessment of Effects During Operation

19.4.3.1 Land-Use and Property

As described in **Section 19.4.2.1**, no land acquisition will be required in respect of the proposed development. No likely significant effect on land ownership is therefore identified.

As previously discussed, the proposed development site includes the portion of landscaped area east of the existing ESB substation on Parkgate Street, and an area of footpath and pavement along Parkgate Street. All areas outside the site ownership boundary but within the red line boundary are within the ownership or control of Dublin City Council. Letter of consent from Dublin City Council have been obtained regarding the proposed works.

No change in land-use will occur; the site of the proposed development will continue to be classified as 'continuous urban fabric' (CORINE, 2018). No likely significant effect on the land-use, in terms of its CORINE classification, is therefore identified.

19.4.3.2 Existing Infrastructure

As outlined in **Section 19.4.2.2**, the proposed development will require the permanent removal and relocation of the existing Dublin Bikes stand and waste bins on Parkgate Street, as illustrated in Figure 19.1 in **Section 19.3.2**.

Every effort will be made to ensure that the relocation of these pieces of infrastructure will be to a location that is in as close proximity to their existing locations as possible and will be agreed with DCC at a later date.

A likely slight-negative, permanent effect is therefore identified.

19.4.3.3 Electricity

There will be no effect on existing underground ESB cables during the operation of the proposed development.

The proposed development will increase demand on the electricity network in Dublin city centre due to the number of people who will be living and working in at the developed site. However, energy efficient initiatives have been incorporated into the design of the proposed development in so far as possible, which will somewhat offset this demand, such as building orientation which aims to maximise the daylight and the added benefits of passive solar gain for individual units.

All dwellings within the proposed development will be constructed to meet the current Part L Building Regulation with regard to energy efficiency.

The likely effect of the proposed development on the existing electricity network is considered to be permanent, but not significant.

19.4.3.4 Telecommunications

ISM have identified 2 No. telecommunications channels that will potentially be affected by the height and scale of the proposed development. Both are microwave link dishes installed both Three and Vodafone on the Criminal Court of Justice to serve their indoor mobile solutions. The effect of the proposed development on the aforementioned microwave link dishes will likely occur during the construction period and continue through to the operational period.

A minor, adverse but permanent effect is identified.

19.4.3.5 Gas

It is expected that the existing gas network in the vicinity will have the capacity to accommodate the increased demand in the same. The likely effect of the proposed development on the existing gas network is therefore considered to be permanent, but imperceptible.

There will be no effect on existing underground gas pipelines during the operation of the proposed development.

19.4.3.6 Water Supply

The proposed watermain system will be designed to supply water for the apartment buildings, office, retail and café with sluice valves and hydrants located in compliance with Part B of the Building Regulations and the local Fire Officers requirements.

The development consists of circa 481 apartment units, office, gym and amenity the proposal which will result in some additional demands on the existing water supply network. Irish Water have assessed the Pre-connection Enquiry Application relating to the proposed development and have confirmed adequate capacity in the existing public network to service the site.

The likely effect of the proposed development on the existing water supply infrastructure is therefore predicted to be permanent, but not significant.

19.4.3.7 Sewer Network and Drainage Infrastructure

As previously discussed, the proposed development includes a new wastewater drainage network for the site.

The proposed development will result in an additional effluent volume discharging to the public sewer. The proposed development will generate a peak flow of 8.45 l/s.

The existing 450mm combined sewer on Parkgate Street has limited spare capacity during rainfall events. It is therefore proposed to provide capacity by diverting an area of approximately 0.16ha of the Parkgate St. road catchment draining to the 450mm trunk sewer equivalent to a peak discharge of 22.4l/s into a new separate surface water drainage network.

This new surface water drainage network will discharge to the River Liffey via the existing 910mm surface water outfall pipe.

It is noted that the capacity of the Ringsend Water Treatment Plant, where effluent from the proposed development will be treated, is currently constrained. It is understood that several projects are currently being progressed by Irish Water to deliver the infrastructure and capacity necessary for predicted population growth within the Dublin Region.

In particular, the following key projects are applicable:

(i) Ringsend WWTP upgrade – An application for the upgrade was lodged with An Bord Pleanála in June 2018 and planning permission was granted in April 2019. Upgrade works are scheduled to increase the treatment capacity from 1.64 million p.e. to 2.4million p.e. This upgrade is currently programmed to be complete in 2025.

(ii) Greater Dublin Drainage Project – A planning application was lodged with An Bord Pleanála in June 2018, an oral hearing held in March 2019 and a decision is currently awaited.

(iii) 9C sewer duplication. A planning application for this project was lodged with FCC on 11th May 2017 and FCC granted planning permission on 5th July 2017. A subsequent appeal to An Bord Pleanála was declared invalid and therefore construction was due to commence in June 2019 and to be completed by September 2022.

(iv) The Liffey Siphons refurbishment project – Construction of this project commenced in May 2018 and is expected to be completed in December of this year.

The proposed development is therefore predicted to have an overall neutral effect within the study area in relation to wastewater.

19.4.3.8 Indirect Effects

No known potential indirect effects on material assets are identified during the construction phase of the proposed development.

19.4.3.9 Cumulative

Appendix 21.1 lists all those development applications within 1km of the proposed development which have been either approved, or applied for, at the time of writing this EIAR. For the purposes of this cumulative assessment, a review of those developments has been undertaken in order to ascertain if the proposed development would give rise to any potential cumulative effects on material assets.

A potential minor, negative cumulative effect on material assets is identified during the operational phase of the proposed development, when considered alongside other planned new large-scale residential or commercial developments in the wider Dublin area, resulting in a potential effect on utilities such as water supply, gas etc.

19.5 Mitigation Measures and Monitoring

19.5.1 Mitigation

19.5.1.1 Mitigation During Construction

The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and that all services and utilities are maintained, unless this has been agreed in advance with the relevant service provider and local authority.

All works in the vicinity of utilities apparatus will be carried out in ongoing consultation with the relevant utility company and/or local authority and will be in compliance with any requirements or guidelines they may have.

Where new services are required, the Contractor will apply to the relevant utility company for a connection permit where appropriate and will adhere to their requirements.

As outlined in **Section 19.5.1**, the proposed development is likely to give rise to a minor adverse effect on transmission links, once developed.

During the construction phase of the proposed development, Vodafone and Three will re-align the identified microwave links to new hop sites. In the unlikely event that the proposed development continues to impact on existing or new microwave channels, Ruirside Development Ltd. is committed to assisting in mitigating the issues as illustrated in Figure 19.7 below.

In the event additional infrastructure required to facilitate a new hop site, this has been assessed for visual impact, in **Chapter 13**, Landscape and Visual.

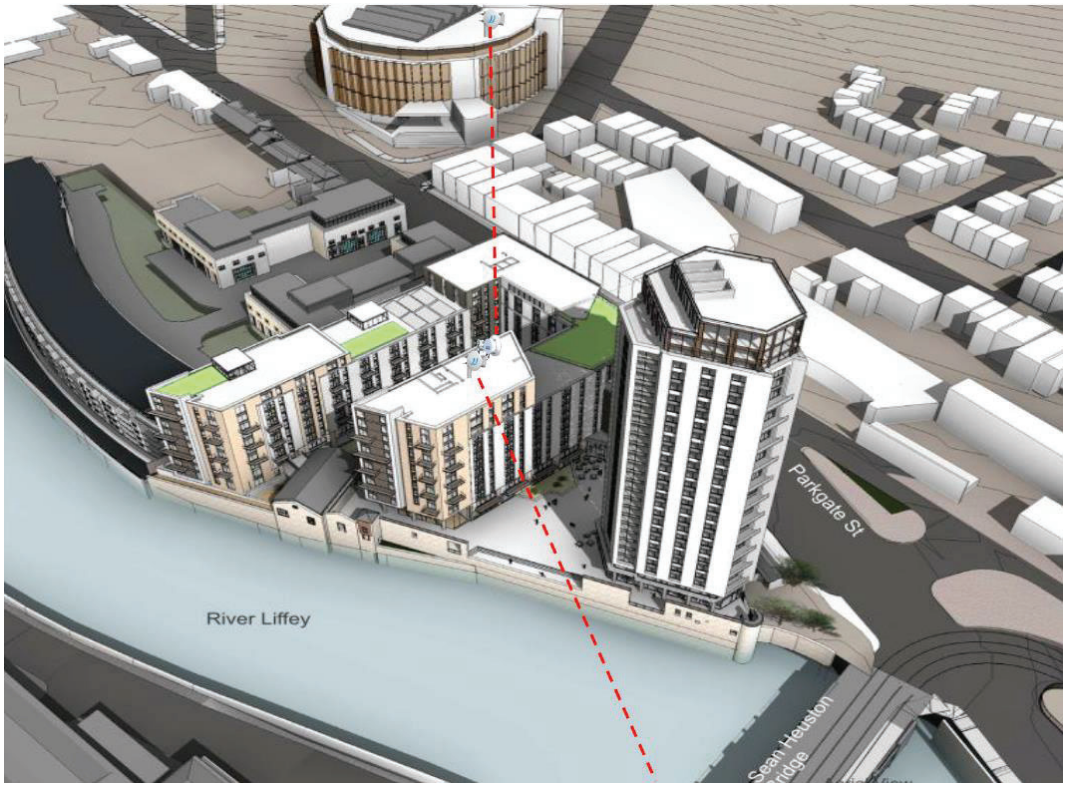

Figure 19.7: Potential Mitigation

19.5.1.2 Mitigation During Operation

Due to the measures already incorporated in the design as outlined above, i.e. SuDS, no mitigation measures will be necessary during the operational phase.

19.5.2 Monitoring

19.5.2.1 Monitoring During Construction

Construction phase mitigation measures have been proposed to ensure that significant negative effects on material assets will be avoided, prevented or reduced during the construction of the proposed development. As such, no monitoring measures are proposed during the construction phase.

19.5.2.2 Monitoring During Operation

As no significant, negative operational effects of the proposed development on material assets are identified, no operational monitoring measures have been proposed.

19.6 Residual Effects

Following implementation of mitigation measures outlined in **Section 19.5.1,** the residual impact on utility services is considered to be imperceptible. Cumulative effects have also been considered.

19.7 Difficulties Encountered

No difficulties were encountered during this assessment.

19.8 References

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20 Major Accidents and Disasters

20.1 Introduction

This chapter describes the proposed development in respect of its potential vulnerability to major accidents/disasters, and its potential to give rise to the same.

The assessment is carried out in compliance with the EIA Directive *on the assessment of the effects of certain public and private projects on the environment*[1] that entered into force on 16th May 2017 which states the need to assess:

"the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned"

The underlying objective of this assessment is to ensure that appropriate precautionary actions are taken for those projects which *"because of their vulnerability to major accidents and/or natural disasters, are likely to have significant adverse effects on the environment"*.

Based on the relevant legal requirements, this chapter seeks to determine:

- The relevant disasters, if any, that the proposed development could be vulnerable to;
- The relevant major accidents, if any, that the proposed development could give rise to;
- The potential for these major accidents and/or disasters to result in likely significant adverse environmental effect(s); and
- The measures that are in place, or need to be in place, to prevent or mitigate the likely significant adverse effects of such events on the environment.

This assessment was undertaken by Ailsa Doyle and Clodagh O'Donovan of Arup. Refer to **Appendix 1.1** for details on relevant qualifications and experience.

20.2 Assessment Methodology

20.2.1 General

The scope and methodology of this assessment is centred on the understanding that the proposed development will be designed, built and operated in line with best international current practice. As such, major accidents resulting from the proposed development would be very unlikely.

[1] Directive 2014/52/EU of the European Parliament and the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

The scope and methodology presented in the following sections is based on the provisions of the EIA Directive[1], the draft EPA Guidelines[2], EU Commission guidance[3] and other published risk assessment methodologies as described in **Section 20.2.7,** as well as professional judgement. This chapter has been prepared with due regard to the overarching guidance on EIA as outlined in **Section 1.9.3**.

A risk analysis-based methodology that covers the identification, likelihood and consequence of major accidents and/or disasters has been used for this assessment (Refer to **Section 20.2.7** for further detail on this approach).

The assessment of the risk of major accidents and/or disasters considers all factors defined in the EIA Directive that have been considered in this EIAR, i.e. population and human health, biodiversity, land, soil, water, air and climate and material assets, cultural heritage and the landscape.

20.2.2 Guidance and Legislation

20.2.2.1 Legislative Requirements

The following paragraphs set out the requirements of the EIA Directive[1] in relation to major accidents and/or disasters and their implementation in the Irish statutory code.

Recital 15 of the EIA Directive[1] states that:

"In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment. In order to avoid duplications, it should be possible to use any relevant information available and obtained through risk assessments carried out pursuant to Union legislation, such as Directive 2012/18/EU of the European Parliament and the Council and Council Directive 2009/71/Euratom, or through relevant assessments carried out pursuant to national legislation provided that the requirements of this Directive are met."

It is clear from the EIA Directive[1] that a major accident and/or disaster assessment is most readily applied to 'Control of Major Accident Hazards involving Dangerous Substances' (COMAH)[4] sites or major industrial/energy installations.

[2] EPA, 2017. Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
[3] EC, 2017. Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report.
[4] GoI, 2015. Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015.

Notwithstanding, the assessment of major accidents and disasters for the proposed development has been carried out for completeness given the strategic nature of the proposed development.

Article 3 of the EIA Directive[1] requires that the EIAR shall identify, describe and assess in the appropriate manner, the direct and indirect significant effects on population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and landscape deriving from (amongst other things) the "*vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned"*.

The information relevant to major accidents and/or disasters to be included in the EIAR is set out in Section 8 of Annex IV of the EIA Directive[1] as follows:

"(8) A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies".

Article 94 and paragraph 2 of Schedule 6 of the Planning and Development Regulations 2001, as amended, which implement the provisions of the EIA Directive, requires the following information to be provided, where relevant to the specific characteristics of the development or type of development concerned and to the environmental features likely to be affected:

"(h) a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for, and proposed response to, emergencies arising from such events."

20.2.2.2 Guidance Documents

A number of guidance documents and published plans have been reviewed and considered in order to inform this assessment, as described in the following sections.

- *Environmental Impact Assessment of Projects- Guidance on the preparation of the Environmental Impact Assessment Report (2017)3*
- *Draft EPA Guidelines (2017)2*
- *Guidance on Assessing and Costing Environmental Liabilities (2014)*[5]
- *A Framework for Major Emergency Management Guidance Document 1-A Guide to Risk Assessment in Major Emergency Management (2010)*[6]
- *A National Risk Assessment for Ireland 2017 (2017)*[7]
- *Dublin City Council Major Emergency Plan (2015)*[8]
- *A Guide to Risk Assessment in Major Emergency Management (2010)*[9]

20.2.3 Study Area

The study area for this assessment is the site of the proposed development in its entirety, as described in **Chapter 3**, Description of Proposed Development.

20.2.4 Site Visits

A site visit was undertaken on 27th February 2019 as part of this assessment.

20.2.5 Consultation

Chapter 1, Introduction and Need for the Scheme details the consultation process which was carried out as part of the proposed development. No consultation specific to this assessment was undertaken.

20.2.6 Categorisation of the Baseline Environment

A desk-based study has been undertaken in order to establish the baseline environment on which the risk assessment is based, as this will influence both the likelihood and the impact of a major accident and/or disaster.

As outlined in the guidance[5], establishing the local and regional context prior to completion of the risk assessment enables a better understanding of the vulnerability and resilience of the area to emergency situations. **Section 20.3** provides an overview of the baseline environment that has been considered for this assessment.

[5] EPA, 2014. *Guidance on Assessing and Costing Environmental Liabilities.*
[6] GoI, 2006. *A Framework for Major Emergency Management.*
[7] Department of Defence (2017) *A National Risk Assessment for Ireland 2017.*
[8] DLRCC, 2017. *Major Emergency Plan.*
[9] DEHLG, 2010. *A Guide to Risk Assessment in Major Emergency Management*.

20.2.7 Impact Assessment Methodology

20.2.7.1 Current Practice

As discussed above, the scope and methodology of this assessment is centred on the understanding that the proposed development would be designed, built and operated in line with best international current practice and, as such, the vulnerability of the proposed development to risks of major accidents and/or disasters is considered low.

Current EIA practice already includes an assessment of some potential accidents and disaster scenarios such as pollution incidents (e.g. spills) to ground and watercourses as well as assessment of flooding events. These are described in detail in the relevant EIAR assessment chapters (refer to **Chapters 14**, Water, **Chapter 15**, Land and Soils and **Chapter 16**, Hydrogeology for further detail).

20.2.7.2 Site-Specific Risk Assessment Methodology

Overview

A site-specific risk assessment identifies and quantifies risks focusing on unplanned, but possible and plausible events occurring during the construction and operation of the proposed development. The approach to identifying and quantifying risks associated with the proposed development by means of a site-specific risk assessment is derived from the EPA guidance2.

The criteria for categorising impact is derived from the DEHLG guidance[9] (Refer to Table 20.1 and Table 20.2).

The following steps were undertaken as part of the site-specific risk assessment:

- Risk identification;
- Risk classification, likelihood and consequence; and
- Risk evaluation.

Risk Identification

The identification of plausible risks has been carried out in consultation with relevant specialists. A Risk Register which was prepared during the design of the proposed development was also reviewed in order to inform the identification of risks for this assessment. The identification of risks has focused on non-standard but plausible incidents that could occur at the proposed development during construction and operation.

In accordance with the European Commission Guidance3 risks are identified in respect of the developments:

(1) Potential vulnerability to disaster risks; and

(2) Potential to cause accidents and/or disasters.

Risk Classification

Classification of Likelihood

Having identified the potential risks, the likelihood of occurrence of each risk has been assessed. An analysis of safety procedures and proposed environmental controls was considered when estimating likelihood of identified potential risks occurring. Table 20.1 defines the likelihood ratings that have been applied.

The approach adopted has assumed a 'risk likelihood' where one or more aspects of the likelihood description are met, i.e. any risk to the proposed development less than extremely unlikely to occur has been excluded from the assessment.

The likelihood rating assigned to each risk has assumed that all proposed mitigation measures and/or safety procedures are in place and have succeeded in reducing or preventing the major accident and/or disaster occurring.

Table 20.1: Risk Classification Table- Likelihood (Source DEHLG)[9]

Ranking	Likelihood	Description
1	Extremely Unlikely	May occur only in exceptional circumstances; once every 500 or more years
2	Very Unlikely	Is not expected to occur; and/or no recorded incidents or anecdotal evidence; and/or very few incidents in associated organisations, facilities or communities; and / or little opportunity, reason or means to occur; may occur once every 100-500 years.
3	Unlikely	May occur at some time; and /or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisation's worldwide; some opportunity, reason or means to occur; may occur once per 10-100 years.
4	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years
5	Very Likely	Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence. Will probably occur more than once a year.

Classification of Consequence

The consequence rating assigned to each risk has assumed that all proposed mitigation measures and/or safety procedures have failed to prevent the major accident and/or disaster occurring. Further the Dublin City Major Emergency Plan8, if implemented as intended, would work to reduce the consequence of any major accident or disaster. The consequence of the impact if the event occurs has been assigned as described in Table 20.2.

The consequence of a risk to the proposed development has been determined where one or more aspects of the consequence description are met, i.e. risks that have no consequence have been excluded from the assessment.

Table 20.2: Risk Classification Table – Consequence (Source DEHLG)[9]

Ranking	Consequence	Impact	Description
1	Minor	Life, Health, Welfare Environment Infrastructure Social	Small number of people affected; no fatalities and small number of minor injuries with first aid treatment. No contamination, localised effects <€0.5M Minor localised disruption to community services or infrastructure (<6 hours).
2	Limited	Life, Health, Welfare Environment Infrastructure Social	Single fatality; limited number of people affected; a few serious injuries with hospitalisation and medical treatment required. Localised displacement of a small number of people for 6 - 24 hours. Personal support satisfied through local arrangements. Simple contamination, localised effects of short duration €0.5-3M Normal community functioning with some inconvenience.
3	Serious	Life, Health, Welfare Environment Infrastructure Social	Significant number of people in affected area impacted with multiple fatalities (<5), multiple serious or extensive injuries (20), significant hospitalisation. Large number of people displaced for 6-24 hours or possibly beyond; up to 500 evacuated. External resources required for personal support. Simple contamination, widespread effects or extended duration €3-10M Community only partially functioning, some services available.
4	Very Serious	Life, Health, Welfare Environment Infrastructure Social	5 to 50 fatalities, up to 100 serious injuries, up to 2000 evacuated Heavy contamination, localised effects or extended duration €10 - 25M Community functioning poorly, minimal services available
5	Catastrophic	Life, Health, Welfare Environment Infrastructure Social	Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated. Very heavy contamination, widespread effects of extended duration. >€25M Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

Risk Evaluation

Once classified, the likelihood and consequence ratings have been multiplied to establish a 'risk score' to support the evaluation of risks by means of a risk matrix.

The risk matrix sourced from the DEHLG[9] guidance and as outlined in Table 20.3 indicates the critical nature of each risk. This risk matrix has therefore been applied to evaluate each of the risks associated with the proposed development. The risk matrix is colour coded to provide a broad indication of the critical nature of each risk:

- The red zone represents 'high risk scenarios';
- The amber zone represents 'medium risk scenarios'; and
- The green zone represents 'low risk scenarios'.

Table 20.3: Risk Matrix (Source DEHLG[9])

Likelihood Rating							
	Very likely	5					
	Likely	4					
	Unlikely	3					
	Very unlikely	2					
	Extremely Unlikely	1					
			Minor	Limited	Serious	Very Serious	Catastrophic
			1	2	3	4	5
			Consequence Rating				

20.3 Baseline Conditions

20.3.1 Vulnerability to Major Accidents/Disasters

Observations show that Ireland's climate is changing, and the observed scale and rate of change is consistent with regional and global trends. Ireland's geographic position means it is less vulnerable to disasters such as earthquakes or tsunamis, which might pose risk to developments of this nature and scale in other locations. However, in recent times there has been an increase in the number of severe weather events in the country, particularly those leading to flooding and flash flood incidents.

Indeed, sea level rise is already being observed and is projected to continue to rise into the future, which will increase both flood and erosion risk to coastal communities and infrastructural assets, as well as threaten coastal squeeze of inter-tidal habitats. In addition, it is projected that the number of heavy rainfall days per year may increase, which could lead to an increase in flooding incidents.

The site of the proposed development is located in close proximity to the River Liffey.

As outlined in **Chapter 14**, Water, there is a risk of fluvial and tidal/coastal flooding from the River Liffey along the southern boundary of the site. This determination was made following the examination of the OPW's Preliminary Flood Risk Assessment (PFRA)[10] mapping available to view on www.myplan.ie and the pluvial flood depth map produced as part of the "FloodResilientCity Project" included in the Dublin City Council Development Plan 2016-202216[11]. Both of these maps indicate that there is potential for pluvial flooding in the study area.

As the site is in close proximity to the River Liffey it can be expected that there will be hydraulic connectivity between groundwater levels and tidal levels. As the existing ground levels are higher than the tidal levels the risk of groundwater flooding is considered to be low.

Further vulnerabilities of the proposed development site to major accidents/ disasters include political unrest and terrorism. Over the past 12 months, conversations around these risks to Ireland and the Irish response capacity have increased. The Government of Ireland published the *National Risk Assessment 2019: Overview of Strategic Risks*[12] in August 2019, providing an opportunity for the identification, discussion and consideration of risks facing Ireland over the short, medium and long term.

The National Risk Assessment 2019[12] highlights the continued risk to Ireland from international terrorism. Like other countries, Ireland and its citizens has the potential to be negatively affected by terrorist incidents, depending on the location of such incidents and their wider impact.

Further, the *National Risk Assessment 2019* was one of the first official acknowledgments of the risks posed by a potential Brexit. According to the report, a no deal Brexit has the potential to become a focus for increased loyalist paramilitary recruitment and activity, including in response to dissident republican paramilitary actions and an increased public focus on a border poll.

20.3.2 Potential to Give Rise to Major Accidents

According to the most up-to-date *Dublin City Council Major Emergency Plan*[13] (DCC, 2015), there have been four incidents in Dublin over the last three decades which caused either loss of life, structural damage or economic disruption and were declared as Major Emergencies.

[10]OPW, 2012. The National Preliminary Flood Risk Assessment (PFRA) Overview Report. Available at http://www.cfram.ie/wordpress/wp-content/uploads/2013/06/PFRA-Main-Report.pdf. Accessed October 2018.
[11] DCC, 2016. Dublin City Development Plan 2016-2022. Available at http://www.dublincity.ie/main-menu-services-planning-city-development-plan/dublin-city-development-plan-2016-2022. Accessed March 2019.
[12] GoI, 2019. National Risk Assessment 2019: Overview of Strategic Risks.
[13] DCC, 2015. Dublin City Major Emergency Plan.

These incidents were the fire in the Stardust nightclub (Artane: 1981), the building collapse at Raglan House (Ballsbridge: 1987); the coastal flood event that affected large areas of the city in November 2002 and the pluvial/ fluvial flooding that affected large parts of the city in October 2011.

Any development which will accommodate large number of people has the potential to give rise to major accidents.

20.4 Risk Assessment

This section outlines the possible risks associated with the proposed development for the construction phase and operational phase.

These risks have been assessed in accordance with the relevant classification (Refer to Table 20.1 and Table 20.2).

As outlined in **Section 20.2.7**, the consequence rating assigned to each potential risk assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster.

20.4.1 Assessment of Effects During Construction

A risk register has been developed which contains all the potential, relevant risks identified during the construction phase of the proposed development. These are presented in Table 20.4.

Based on the understanding that the construction phase of the proposed development will be carried out in accordance with construction best-practice, all relevant health and safety guidance and legislation, the mitigation measures outlined in this EIAR, as well as the provisions of the CEMP, a number of the potential risks identified have been disregarded from further assessment. Where potential risks are not identified for further assessment, a statement as to why is included in Table 20.4.

Table 20.4: Risk Register- Construction Phase

Risk ID	Potential Risk	Possible Cause	Requirement for further assessment?
Potential vulnerability to accidents and/or disasters			
A	Flooding of site	Proximity to the River Liffey. Extreme weather- periods of heavy rainfall, taking into account climate change, strong winds and tidal events	No. The proposed development will have no impact on floodplain storage and conveyance and will also not increase flood risk off site during construction. Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding.

Risk ID	Potential Risk	Possible Cause	Requirement for further assessment?
			Refer to findings of the Flood Risk Assessment, **Appendix 14.1** for the proposed development.
Potential to cause major accidents and/or disasters			
B	Fire/Explosion	• Damage to unmapped services/utilities during earth works • Vehicle and vehicle collision	No. The construction phase of the proposed development will be carried out in accordance with all relevant health and safety guidance and legislation, as well as the provisions of the CEMP.
C	Quay wall/upper quay wall collapse	• Excavation/piling associated with the construction phase of the proposed development	Yes
D	Unplanned outages/ disruption to services	Damage to unmapped services/utilities during earth works	No. Disruption to services not considered to constitute a 'major accident or disaster' for the purposes of this assessment.
E	Road traffic accidents resulting from construction phase traffic or temporary construction traffic management measures	• Driver error • Object on road • Failure of vehicle control systems • Public confusion	No. The construction phase of the proposed development will be carried out in accordance with all relevant health and safety guidance and legislation, as well as the provisions of the CEMP, see **Appendix 4.1**.
F	Contamination of the groundwater/ surface water	Construction phase spills or leakages	No. The construction phase of the proposed development will be carried out in accordance with construction best-practise and provisions of the CEMP. See **Appendix 4.1**.
G	Falling debris from construction vehicles/cranes or cranes striking luas overhead cables or poles	• Inadequate securing • Overloading of vehicles	Yes.
H	Release of asbestos fibres to atmosphere or surface water	• Inadequate handling and removal of Asbestos Containing Materials (ACMs) • Removal of un-surveyed ACM	No. The construction phase of the proposed development will be carried out in accordance with construction best-practise and provisions of the CEMP. See **Appendix 4.1**.

The potential construction phase risks identified for further assessment include: C 'Quay wall/upper quay wall collapse' and G 'Falling debris from construction vehicles/cranes or cranes striking Luas overhead cables or poles.'

20.4.2 Assessment of Effects During Operation

A risk register has been developed which contains all the potential, relevant risks identified during the operational phase of the proposed development. These are presented in Table 20.5.

Based on the understanding that the proposed development will be designed, built and operated in line with best international current practice, and will be compliant with all relevant Health and Safety and Fire regulation and guidance, as well as the mitigation measures outlined in this EIAR, a number of the potential risks identified have been disregarded from further assessment. Where potential risks are not identified for further assessment, a statement as to why is included in Table 20.5.

Table 20.5: Risk Register- Operation

Risk ID	Potential Risk	Possible cause	Requirement for further assessment?
Potential vulnerability to disaster risks			
I	Flooding of site	Extreme weather- periods of heavy rainfall, taking into account climate change, strong winds and tidal events	No. The risk of surface water ingress to the proposed building is very low as ground levels around the site perimeter generally fall away from the buildings. There is a low point on Parkgate Street where there is potential for surface water to pond. In order to mitigate against this a drainage channel will be provided at this point which is between the entrance to the two buildings. In addition to this all doorways and entrance points to the building will either be raised slightly above external ground levels or have a drainage channel installed across the entrance point. A minor fall will also be provided on all paved surfaces to direct surface water to the drainage system. Refer to findings of the Flood Risk Assessment of the proposed development, **Appendix 14.1**.
J	Incident at nearby SEVESO site resulting in off-site environmental impact	• Fire/Explosion; and • Equipment /Infrastructure failure	No. A “consultation distance” is very broadly defined under Regulation 2 of the COMAH Regulations as “a distance or area relating to an establishment, within which there are potentially significant consequences for human health or the environment from a major accident at the establishment.

Risk ID	Potential Risk	Possible cause	Requirement for further assessment?
			The consultation distance for some types of COMAH facility ranges from 300m for establishments where the risk is from flammable non-pressurised materials, to 1 km for establishments where chemical processing involving flammable or toxic substances takes place, to 2km for establishments with bulk storage of pressurised or toxic substances, triggering an obligation on the Planning Authority to notify the HSA. There are no COMAH sites within 2km of the proposed development site.
K	Incident at nearby Heuston Station- such as explosion from terrorist attack	• Fire/explosion • Act of terrorism	Yes.
Potential to cause accidents and / or disasters.			
L	Fire/Explosion	• Equipment or infrastructure failure; • Act of terrorism; • Electrical problems	No. The proposed development will be designed, built and operated in line with best international current practice, and will be compliant with all relevant Health and Safety and Fire regulation and guidance.
M	Collision of Aircraft	• Failure of air traffic control systems • Act of terrorism	Yes
N	Public safety along River Walk or in the open space.	• Crime • Public negligence	No. Individual accidents/incidents are not considered to constitute a 'major accident/disaster' for the purposes of this assessment
O	Vehicle collisions on site	• Public negligence; and • Failure of vehicular operations.	No. The facilitation of private vehicle use on site will be minimal and those limited number of vehicles that will access the site will be doing so to park, and thus travelling at low speeds. Further, individual accidents/incidents are not considered to constitute a 'major accident/disaster' for the purposes of this assessment

The potential operational phase risks identified for further assessment include: K 'Incident at nearby Heuston Station' and M 'Collision of Aircraft'.

These risks have been assessed in accordance with the relevant classification (Refer to Table 20.1 and Table 20.2) and the resulting risk analysis is given in Table 20.6.

The risk register is based upon possible risks associated the proposed development. As outlined in **Section 20.2.7,** the consequence rating assigned to each potential risk assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster.

Table 20.6 Risk Assessment

Risk ID	Potential Risk	Possible cause	Environmental effect	Likelihood Rating	Consequence Rating	Risk Score (Consequence x Likelihood)
Construction phase						
C	Quay wall/upper quay wall collapse	Excavation/piling associated with the construction phase of the proposed development	• Injury • Sedimentation of the River Liffey	2	2	4
Basis of Likelihood: Standard best practice construction measures will be implemented by the contractor during construction. Lateral steel restraints will be provided to the existing stonework along the river, throughout construction, to avoid risk of collapse. The risk of the quay wall collapsing during construction is therefore considered 'very unlikely' in that it has 'little opportunity or means to occur.' **Basis of Consequence:** In the event of the collapse of the quay wall, a 'limited' consequence is expected in that a 'limited number of people would be affected, with localised displacement of a small number of people for 6-24 hours, simple contamination, localised effects of short duration, and normal community functioning with some inconvenience'.						
G	Falling debris from construction vehicles/cranes or cranes striking Luas overhead cables or poles	• Employee negligence or error • Vehicle/crane failure	• Injury/loss of life	1	3	3
Basis of Likelihood: Transport Infrastructure Ireland (TII) (formerly the Railway Procurement Agency) suspend a 'cradle' supporting overhead line equipment over the Sean Heuston Bridge, which involves four poles and diagonal suspension wires at NW, NE, SW and SE corners of the bridge. TII has highlighted the potential for objects suspended from the crane used in the construction phase of the proposed development to come into contact with the overhead line equipment or poles. The potential for falling debris or objects from the crane during construction has also been considered. However, standard best practice construction measures will be implemented by the contractor during construction. All crane operators will be fully trained, and all works will be undertaken in accordance with the '*Code of Practice for Working On, Near or Adjacent to the Luas Tram System*[14].' An 'extremely unlikely' likelihood of this risk is therefore identified in that it may 'only occur in exceptional circumstances' **Basis of Consequence:** In the event of falling debris or objects from a crane, or indeed the crane coming into contact with the overhead cables or poles resulting in their felling, a 'serious' consequence would be likely, in that a 'significant number of people' could be affected, with' multiple or serious injuries.'						
Operational Phase						
K	Incident at nearby Heuston Station	• Fire/explosion • Act of terrorism	• Illness, injury or death • Degradation of aquatic habitat and species • Air quality effects	2	4	8

[14] TII, 2016. Code of Practice for Working On, Near or Adjacent to the Luas Tram System.

Risk ID	Potential Risk	Possible cause	Environmental effect	Likelihood Rating	Consequence Rating	Risk Score (Consequence x Likelihood)
Basis of Likelihood: Whilst the *National Risk Assessment 2019*[7] has identified the risk to Ireland from both domestic and international terrorism, such an incident is considered 'very unlikely' in that there are no similar 'recorded incidents or anecdotal evidence' of an attack of this magnitude in Ireland. **Basis of Consequence:** Such an attack in Ireland could have significant impact in terms of public safety and security in the short term. Likewise, a breakdown in international peace and security arising from inter-state wars or other armed conflicts could have significant repercussions for Ireland and the EU, including potential impacts on energy supplies, transport routes or the environment**.** Thus, a 'very serious' consequence is identified in that such an even would result in numerous injuries and possibly fatalities, and there would be 'localised effects for an extended duration.'						
M	Collision of Aircraft	• Failure of air traffic control systems • Act of terrorism	• Injury or loss of life	1	5	5
Basis of Likelihood: The collision of aircraft with the 29-storey commercial building is considered an 'extremely unlikely risk' in that it may only occur in exceptional circumstances. Consultation with the Aviation Authority has taken place and will continue prior to construction and operation of the proposed development. In consideration of a collision resulting from a potential act of terrorism, again an 'extremely unlikely' risk is identified. **Basis of Consequence:** Should the collision of an aircraft with the proposed development occur, a 'catastrophic' consequence is predicted, in that a 'large numbers of people' would be impacted with 'significant numbers of fatalities (>50)'.						

This risk assessment in Table 20.7 categorises each of the potential risks by their 'risk score'. A corresponding risk matrix is provided in Table 20.8 which is colour coded in order to provide an indication of the critical nature of each risk. As outlined in **Section 20.2.7.2**, the red zone represents 'high risk scenarios', the amber zone represents 'medium risk scenarios' and the green zone represents 'low risk scenarios.'

Table 20.7: Risk Scores

Risk ID	Potential Risk	Likelihood Rating	Consequence Rating	Risk Score
Construction Phase				
C	Quay wall/upper quay wall collapse	2	2	4
G	Falling debris from construction vehicles/cranes or cranes striking luas overhead cables or poles	1	3	3
Operational Phase				
K	Incident at nearby Heuston Station	2	4	8
M	Collision of aircraft	1	5	5

Table 20.8: Risk Matrix

Likelihood Rating							
	Very likely	5					
	Likely	4					
	Unlikely	3					
	Very unlikely	2		C		K	
	Extremely Unlikely	1			G		M
			Minor	Limited	Serious	Very Serious	Catastrophic
			1 2		3 4		5
			Consequence Rating				

20.5 Likely Significant Effects

20.5.1 Do-Nothing Scenario

In the event that the proposed development does not proceed, the land-use of the proposed development site, and number of people utilising the site would remain as it is currently. In the absence of an increased number of people residing, working or visiting the site, and in the absence of the proposed change in use of the site, there would be no increase in the risk of major accidents occurring due to human interaction, should a disaster take place.

Under the 'Do-Nothing' Scenario, the quay wall, as well as the existing buildings on the site of the proposed development will not undergo any remediation works and will continue to deteriorate at their current rate. The risk of building and/or quay wall collapse, and the associated risk of major accident occurring will therefore increase under the 'Do-Nothing' Scenario.

20.5.2 Construction Phase Risks

From examining the plausible risks presented in Table 20.6, the scenario with the highest risk score in terms of a major accident and/or disaster during the construction phase of the proposed development was identified as being 'quay wall/upper quay wall collapse.'

The risk of quay wall/upper quay wall collapse during construction was given a risk score of 4 indicating a scenario that is 'very unlikely' to occur, and which would have 'limited' consequences should it do so. According to the risk matrix provided in Table 20.8, this is indicative of a 'low risk scenario.'. Temporary design measures such as lateral steel restraints will be provided to the existing stone wall along the river throughout construction.

20.5.3 Operational Phase Risks

From examining the plausible risks presented in Table 20.7, the scenario with the highest risk score in terms of a major accident and/or disaster during the operational phase of the proposed development was identified as being an 'incident at nearby Heuston Station.'

The risk of an incident at Heuston Station was given a risk score of 8 indicating a scenario that is 'very unlikely' to occur, but which would have 'very serious' consequences should it do so. According to the risk matrix provided in Table 20.8, this is indicative of a 'medium risk scenario.'

The *Global Terrorism Index (GTI*[15]*)* is a comprehensive study analysing the impact of terrorism for 163 countries and which covers 99.7 per cent of the world's population. In 2018, Ireland had a 'Global Terrorism Index Score' of 3[16], and ranked as the 65th country most impacted by terrorism of the 163 countries.

Whilst the *National Risk Assessment 2019*[7] has identified the risk to Ireland from both domestic and international terrorism, there are no similar 'recorded incidents or anecdotal evidence' of an attack of this magnitude in Ireland.

[15] Institute for Economics and Peace, 2018. Global Terrorism Index 2018.
[16] The four factors counted in each country's yearly score are: total number of terrorist incidents in a given year, total number of fatalities caused by terrorists in a given year, total number of injuries caused by terrorists in a given year, a measure of the total property damage from terrorist incidents in a given year

20.5.4 Indirect Effects

By their nature, major accidents and/or disasters have the potential to give rise to indirect effects such as effects on the economy, tourism, transport, human health etc.

As outlined in **Section 20.5.2** and **20.5.3**, no likely risks of a major accident/disaster occurring are identified in respect of the proposed development. Thus, no indirect effects are identified.

20.5.5 Cumulative Effects

As outlined in **Section 20.5.2** and **20.5.3,** no likely risks of a major accident/disaster occurring are identified in respect of the proposed development. Thus, no cumulative effects are identified.

20.6 Mitigation and Monitoring

20.6.1 Construction Phase

The mitigation measures relevant to each environmental factor outlined in Chapters 7-20 will be implemented during the construction phase of the proposed development and will collectively work to mitigate the risk of major accidents and disasters occurring during this time.

As previously discussed, temporary design measures such as lateral steel restraints will be provided to the existing stone wall along the river throughout construction.

The construction phase of the proposed development will also be carried out in accordance with best practise site management measures relating to health and safety and emergency response. These measures are described below and included in the CEMP. They will be developed further by the contractor prior to construction.

Health and Safety Measures

The appointed Contractor will be required to ensure all Health & Safety requirements are agreed with Ruirside.

All construction staff and operatives will be inducted into the security, health and safety and logistic requirements on site prior to commencing work.

All contractors will be required to progress their works with reasonable skill, care and diligence and to proactively manage the works in a manner most likely to ensure the safety, health and welfare of those carrying out construction works, all other persons accessing the subject site and interacting stakeholders.

Contractors will also have to ensure that, as a minimum, all aspects of their works and project facilities comply with legislation, good industry practice and all necessary consents.

Particular cognisance will be taken by the contractor to managing the use of machinery in a public environment.

The requirements of the Safety, Health and Welfare at Work Act 2005, the Safety, Health and Welfare at Work (Construction) Regulations, 2006 and other relevant Irish and EU safety legislation will be complied with at all times.

As required by the Regulations, a Health and Safety Plan will be formulated which will address health and safety issues from the design stages through to completion of the construction and maintenance phases. This plan will be reviewed and updated as required, as the development progresses.

In accordance with the Regulations, a "Project Supervisor Construction Stage" will be appointed as appropriate. The Project Supervisor Construction Stage will assemble the Safety File as the project progresses.

Further, any requirements of the Irish Aviation Authority (IAA) with regards to lighting, crane operation etc. will be fully complied with.

Emergency Response Provision

The Contractor will maintain an emergency response action plan which will cover all foreseeable risks, i.e. fire, spill, flood, etc. The response plan will be developed in accordance with the site emergency plan. Appropriate site personnel will be trained as first aiders and fire marshals. In addition, appropriate staff will be trained in environmental issues and spill response procedures.

Equipment and vehicles will be locked, have keys removed and be stored securely in the works area.

20.6.2 Operational Phase

No mitigation or monitoring measures are proposed specific to reducing the risk of major accident/disaster during operation.

20.7 Residual Effects

The risk of a major accident and/or disaster during the construction phase of the proposed development is considered low.

The risk of a major accident and/or disaster occurring during the operational phase of the proposed development is considered medium.

Cumulative effects have also been considered.

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21 Cumulative and Interactive Effects

21.1 Introduction

This chapter summarises the residual effects that have been identified in **Chapters 6 – 20** and determine whether they give rise to cumulative and/or interactive effects based on best scientific knowledge. Accordingly, when a topic is not mentioned, the authors have concluded that there are no likely residual significant effects that could give rise to cumulative and/or interactive effects.

Cumulative effects are changes to the environment that are caused by an action in combination with other actions. They can arise from and this EIAR will look at:

- the interaction between all of the different permitted and planned projects in the same area in combination with this proposed development; and
- the interaction between the various effects within this proposed development.

Cumulative effects will consider whether the addition of many minor or significant effects of the proposed development itself or the cumulation of effects of other permitted or planned projects have the potential to result in larger, more significant effects when combined with the effects of the proposed development.

Interactive effects will consider the interaction between the various environmental aspects, for example the interaction between noise and ecology.

21.2 Assessment Methodology

21.2.1 Overview

The assessment of cumulative effects has been undertaken on a qualitative basis by each of the environmental topic leads based on best scientific knowledge.

The approach has aligned with the overarching EIA guidance as outlined in **Section 1.9.3** of **Chapter 1** (including the draft EPA guidance and EC guidance) as well as per the methodology adopted for each environmental factor as described in **Chapters 6 – 20**. A summary of these effects is provided herein based on best scientific knowledge.

21.2.2 Cumulative Effects

The EIAR has considered and assessed cumulative effects arising from the construction and operation of the proposed development. A cumulative assessment has been undertaken based on best scientific knowledge in accordance with Part 5 of Annex IV of the EIA Directive:

"*e) 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 requirement has been transposed into Irish law by Article 94 of the Planning and Development Regulations 2001, as amended, and Schedule 6, paragraph 2 thereof, as follows:

"2. Additional information, relevant to the specific characteristics of the development or type of development concerned and to the environmental features likely to be affected, on the following matters, by way of explanation or amplification of the information referred to in paragraph 1:…

(e) (i) a description of the likely significant effects on the environment of the proposed development resulting from, among other things— …

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

21.2.3 Interactive Effects

The EIAR has considered and assessed the interactive effects arising from the construction and operation of the proposed development. Interactive effects (or interactions), refer to any direct or indirect effects caused by the interaction of environmental factors as outlined in Part 1(e) in Article 3 of the EIA Directive which states:

"The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:

(a) population and human health;

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

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

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

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

This requirement is reflected in the definition of "*environmental impact assessment*" under Section 171A, para. (b)(V) of the *Planning and Development Act 2000,* as amended.

All environmental factors are inter-related to some extent, and the relationships can range from tenuous to inextricable. The interactions between the identified environmental effects have already been considered and assessed within the individual chapters of this EIAR.

There have been numerous discussions and communications between the environmental specialists and the design team throughout the design process which helped to identify and minimise the potential for significant interaction of effects.

Measures to minimise effects have been incorporated into the design and are also included in all of the individual assessments and the residual effects have been assessed.

For example, where it has been established in **Chapter 14,** Water that there is potential for emissions to the existing stormwater drainage network, this has also been assessed in **Chapter 10,** Biodiversity. Similarly, where **Chapter 7**, Air Quality and **Chapter 9,** Noise and Vibration have established that there will be air and noise emissions during both the construction and operational phases, **Chapter 18,** Population and Human Health has assessed the effect of those emissions on human health. Measures to minimise the air and noise emission effects have been designed with consideration to those interactions and have been included in the assessments and the residual effects have been identified.

Table 21.1 presents the potential interactions between the environmental factors in a matrix format. The purpose of the effects matrix is to identify potential effects in different media. Actual effects and their significance are dealt with in the most relevant chapter.

21.3 Cumulative Effects

21.3.1 Overview

The assessment of cumulative effects has considered likely significant effects that may arise during construction and operation of the proposed development.

Cumulative effects were assessed to a level of detail commensurate with the information that was available at the time of assessment based on best scientific knowledge.

The assessment specifically considers whether any of the proposed and/or recently approved schemes in the local area have a potential to exacerbate (i.e. alter the significance of) effects associated with the proposed development based on best scientific knowledge. Proposed and permitted developments, most likely to result in cumulative effects arising from the construction and operation of the proposed development, have been listed in **Appendix 21.1**. Any other existing projects not identified in this chapter, do not have the potential to exacerbate effects.

Cumulative effects are addressed under separate headings in each individual EIAR chapter. Refer to **Chapters 6-20** of the EIAR for a detailed description of potential cumulative effects.

21.4 Interactive Effects

21.4.1 Overview

The assessment of interactive effects has considered potential for interactive effects during construction and operation of the proposed development. A summary of these effects is presented in the matrix in Table 21.1.

If there is the potential for interactive effects during construction, this is indicated by the 'C' in the matrix. Similarly, 'O' in the matrix indicates the potential interactive effects during operation. If it is not considered that there is potential for interactive effects, the box contains a '-.'

The purpose of the matrix in Table 21.1 is to identify potential for interactive effects of significance. The matrix only indicates that there is potential for interactive effects between two environmental factors and does not specify which factor would be the cause of the effect. Where, for example, the Traffic and Transportation specialist has not identified a potential interactive effect with Climate during construction, but the Climate specialist has identified a potential interactive effect with Traffic and Transportation during construction, a 'C' will be included in both interface boxes, for completeness.

Actual effects and the description of significance are dealt with in the most relevant chapter (Refer to **Chapters 6** – **20** for further detail).

Table 21.1: Interactive effects summary matrix [C: Construction, O: Operational].

	Traffic and Transportation	Air Quality	Climate	Noise and Vibration	Biodiversity	Archaeology	Architectural Heritage	Landscape and Visual	Water	Land and Soils	Hydrogeology	Resource and Waste Management	Population and Human Health	Material Assets	Major Accidents Disasters
Traffic and Transportation		CO	CO	C	-	-	-	-	-	-	-	-	CO	-	-
Air Quality	CO		CO	-	CO	-	CO	-	CO	C	-	-	CO	-	-
Climate	CO	CO		-	CO	-		-	CO	-	-	-	CO	-	-
Noise and Vibration	-	-	-		-	-	CO	-	-	C	-	-	CO	-	-
Biodiversity	-	CO	CO	-		-	-	-	CO	-	-	-	-	CO	-
Archaeology	-	-	-	-	-		CO	-	-	-	-	-	-	-	-
Architectural Heritage	-	CO	-	CO	-	CO		CO	-	-	-	-	-	-	CO
Landscape and Visual	-	-	-	-	-	-	CO		-	CO	-	-	CO	-	-
Water	-	CO	CO	-	CO	-	-	-		CO	C	C	-	CO	-
Land and Soils	C	C	-	C	-	-	-	CO	CO		C	C	-	C	-
Hydrogeology	-	-	-	-	-	-	-	-	C	C		-	-	-	-
Resource and Waste Management	-	-	-	-	-	-	-	-	C	C	-		-	-	-
Population and Human Health	CO	CO	CO	CO	-	-	-	CO	-	-	-	-		-	-
Material Assets	-	-	-	-	CO	-	-	CO	CO	C	-	-	-		-
Major Accidents and Disasters	-	-	-	-	-	-	CO	-	-	-	-	-	CO	-	

21.4.2 Interactive Effects during Construction

- **Traffic and transportation** effects have the potential to interact with air quality, climate, noise and vibration, land and soils and population and human health effects during the construction phase of the proposed development, and vice versa. These potential effects are dealt with in detail in **Chapter 6**, Traffic and Transportation, **Chapter 7**, Air Quality, **Chapter 8**, Climate, **Chapter 9**, Noise and Vibration, **Chapter 15,** Land and Soils and **Chapter 18**, Population and Human Health.
- **Air quality** effects have the potential to interact with traffic and transportation, climate, biodiversity, architectural heritage, water, land and soils and population and human health effects during the construction phase of the proposed development, and vice versa. These potential effects are dealt with in detail in **Chapter 6**, Traffic and Transportation, **Chapter 7**, Air Quality, **Chapter 8**, Climate, **Chapter 10**, Biodiversity, **Chapter 12**, Architectural Heritage, **Chapter 14**, Water, **Chapter 15**, Land and Soils and **Chapter 18**, Population and Human Health.
- **Climate** effects have the potential to interact with traffic and transportation, air quality, biodiversity, water and population and human health effects during the construction phase of the proposed development, and vice versa. These potential effects are dealt with in detail in **Chapter 6,** Traffic and Transportation, **Chapter 7**, Air Quality, **Chapter 8**, Climate, **Chapter 10**, Biodiversity, **Chapter 14**, Water and **Chapter 18**, Population and Human Health.
- **Noise and Vibration** effects have the potential to interact with traffic and transportation, architectural heritage, land and soils and population and human health effects during the construction phase of the proposed development. These effects are dealt with in detail in **Chapter 6**, Traffic and Transportation, **Chapter 9,** Noise and Vibration, **Chapter 12**, Architectural Heritage, **Chapter 15**, Land and Soils and **Chapter 18**, Population and Human Health.
- **Biodiversity** effects have the potential to interact with air quality, climate, water and material assets effects during the construction phase of the proposed development, and vice versa. These potential effects are dealt with in detail in **Chapter 7**, Air Quality, **Chapter 8**, Climate, **Chapter 10**, Biodiversity, **Chapter 14**, Water and **Chapter 19,** Material Assets.
- **Archaeology** effects have the potential to interact with architectural heritage effects during the construction phase of the proposed development, and vice versa. These potential effects are dealt with in detail in **Chapter 11**, Archaeology and **Chapter 12,** Architectural Heritage.
- **Architectural Heritage** effects have the potential to interact with air quality, noise and vibration, archaeology, landscape and visual effects, as well as major accidents during the construction phase of the proposed development. These effects are dealt with in detail in **Chapter 7**, Air Quality, **Chapter 9,** Noise and Vibration, **Chapter 11**, Archaeology, **Chapter 12**, Architectural Heritage, **Chapter 13**, Landscape and Visual and **Chapter 20**, Major Accidents and Disasters.

- **Landscape and Visual** effects have the potential to interact with architectural heritage, land and soils, material assets and population and human health effects during the construction phase of the proposed development. These effects are dealt with in detail in **Chapter 12**, Architectural Heritage, **Chapter 13**, Landscape and Visual, **Chapter 15**, Land and Soils, **Chapter 18**, Population and Human Health and **Chapter 19,** Material Assets.
- **Water** effects have the potential to interact with air quality, climate, biodiversity, land and soils, hydrogeology, resource and waste management and material assets effects during the construction phase of the proposed development. These effects are dealt with in detail in **Chapter 7**, Air Quality, **Chapter 8**, Climate, **Chapter 10**, Biodiversity, **Chapter 14**, Water, **Chapter 15**, Land and Soils, **Chapter 16**, Hydrogeology, **Chapter 17**, Resource and Waste Management and **Chapter 19**, Material Assets.
- **Land and Soils** effects have the potential to interact with traffic and transportation effects, air quality, noise and vibration effects, landscape and visual, water, hydrogeology, resource and waste management and material assets effects. These effects are dealt with in detail in **Chapter 6**, Traffic and Transportation, **Chapter 7**, Air Quality, **Chapter 9**, Noise and Vibration, **Chapter 13**, Landscape and Visual, **Chapter 14**, Water, **Chapter 15,** Land and Soils, **Chapter 16**, Hydrogeology, **Chapter 17**, Resource and Waste Management and **Chapter 19**, Material Assets.
- **Hydrogeology** effects have the potential to interact with water and land and soils effects during the construction phase of the proposed development. These effects are dealt with in detail in **Chapter 14**, Water, **Chapter 15**, Land and Soils and **Chapter 16**, Hydrogeology.
- **Resource and Waste Management** effects have the potential to interact with water and land and soils effects during the construction phase of the proposed development. These effects are dealt with in detail in **Chapter 14**, Water, **Chapter 15**, Land and Soils and **Chapter 17**, Resource and Waste Management.
- **Population and Human Health** effects have the potential to interact with traffic and transportation, air quality, climate, noise and vibration and landscape and visual effects, as well as the risk of major accidents and disasters. These effects are dealt with in **Chapter 6**, Traffic and Transportation, **Chapter 7**, Air Quality, **Chapter 8**, Climate, **Chapter 9**, Noise and Vibration, **Chapter 13**, Landscape and Visual, **Chapter 18**, Population and Human Health, and **Chapter 20**, Major Accidents and Disasters.
- **Material Assets** effects have the potential to interact with biodiversity, landscape and visual, water, land and soils effects during the construction phase of the proposed development. These effects are dealt with in detail in **Chapter 10**, Biodiversity, **Chapter 13**, Landscape and Visual, **Chapter 14**, Water, **Chapter 15,** Land and Soils and **Chapter 19,** Material Assets.
- **Major Accidents and Disasters** risks have the potential to interact with architectural heritage and population and human health effects during the construction phase of the proposed development.

These risks/effects are dealt with in detail in **Chapter 12**, Architectural Heritage, **Chapter 18**, Population and Human Health and **Chapter 20,** Major Accidents and Disasters.

21.4.3 Interactive Effects during Operation

- **Traffic and transportation** effects have the potential to interact with air quality, climate and population and human health effects during the operational phase of the proposed development, and vice versa. These potential effects are dealt with in detail in **Chapter 6**, Traffic and Transportation, **Chapter 7**, Air Quality, **Chapter 8**, Climate and **Chapter 18**, Population and Human Health.
- **Air quality** effects have the potential to interact with traffic and transportation, climate, biodiversity, architectural heritage, water and population and human health effects during the operational phase of the proposed development, and vice versa. These potential effects are dealt with in detail in **Chapter 6**, Traffic and Transportation, **Chapter 7**, Air Quality, **Chapter 8**, Climate, **Chapter 10**, Biodiversity, **Chapter 12**, Architectural Heritage, **Chapter 14**, Water and **Chapter 18**, Population and Human Health.
- **Climate** effects have the potential to interact with traffic and transportation, air quality, biodiversity, water and population and human health effects during the operational phase of the proposed development, and vice versa. These potential effects are dealt with in detail in **Chapter 6,** Traffic and Transportation, **Chapter 7**, Air Quality, **Chapter 8**, Climate, **Chapter 10**, Biodiversity, **Chapter 14**, Water and **Chapter 18**, Population and Human Health.
- **Noise and Vibration** effects have the potential to interact with population and human health effects during the operational phase of the proposed development. These effects are dealt with in detail in **Chapter 9,** Noise and Vibration and **Chapter 18**, Population and Human Health.
- **Biodiversity** effects have the potential to interact with air quality, climate, water and material assets effects during the operational phase of the proposed development, and vice versa. These potential effects are dealt with in detail in **Chapter 7**, Air Quality, **Chapter 8**, Climate, **Chapter 10**, Biodiversity, **Chapter 14**, Water and **Chapter 19**, Material Assets
- **Archaeology** effects have the potential to interact with architectural heritage effects during the operational phase of the proposed development, and vice versa. These potential effects are dealt with in detail in **Chapter 11**, Archaeology and **Chapter 12,** Architectural Heritage.
- **Architectural Heritage** effects have the potential to interact with air quality, archaeology, landscape and visual effects during the operational phase of the proposed development. These effects are dealt with in detail in **Chapter 7**, Air Quality, **Chapter 11**, Archaeology, **Chapter 12**, Architectural Heritage and **Chapter 13**, Landscape and Visual.

- **Landscape and Visual** effects have the potential to interact with architectural heritage, material assets and population and human health effects during the operational phase of the proposed development. These effects are dealt with in detail in **Chapter 12**, Architectural Heritage, **Chapter 13**, Landscape and Visual, **Chapter 18**, Population and Human Health and **Chapter 19**, Material Assets.
- **Water** effects have the potential to interact with air quality, climate, biodiversity, land and soils and material assets effects during the operational phase of the proposed development. These effects are dealt with in detail in **Chapter 7**, Air Quality, **Chapter 8**, Climate, **Chapter 10**, Biodiversity, **Chapter 14**, Water, **Chapter 15**, Land and Soils and **Chapter 19**, Material Assets.
- **Land and Soils** effects have the potential to interact with water effects during the operational phase of the proposed development. These effects are dealt with in detail in **Chapter 14,** Water and **Chapter 15,** Land and Soils.
- **Population and Human Health** effects have the potential to interact with traffic and transportation, air quality, climate, noise and vibration, landscape and visual effects, as well as the risk of major accidents, during the operational phase of the proposed development. These effects are dealt with in detail in **Chapter 6**, Traffic and Transportation, **Chapter 7**, Air Quality, **Chapter 8,** Climate, **Chapter 9**, Noise and Vibration, **Chapter 13**, Landscape and Visual, **Chapter 18**, Population and Human Health and **Chapter 20,** Major Accidents and Disasters.
- **Material Assets** effects have the potential to interact with biodiversity, landscape and visual, water, land and soils effects during the operational phase of the proposed development. These effects are dealt with in detail in **Chapter 10**, Biodiversity, **Chapter 13**, Landscape and Visual, **Chapter 14**, Water, **Chapter 15,** Land and Soils and **Chapter 19,** Material Assets.
- **Major Accidents and Disasters** risks have the potential to interact with population and human health effects during the operational phase of the proposed development. These risks/effects are dealt with in detail in **Chapter 18**, Population and Human Health and **Chapter 20**, Major Accidents and Disasters.

22 Summary of Mitigation, Monitoring and Residual Effects

22.1 Introduction

This chapter provides a summary of the proposed mitigation and monitoring measures as well as an overview of the residual likely significant effects associated with the proposed development (as identified in **Chapters 6 – 20**).

This chapter has been prepared with due regard to the overarching guidance on EIA as outlined in **Section 1.9.3**.

22.2 Summary of Mitigation Measures

A number of safeguards and management measures have been identified in order to mitigate negative environmental effects during construction and operation as described in detail in **Chapters 6 – 20**.

It should be noted that this generally excludes any inherent measures and elements that have been incorporated in the design as these design measures have been documented as part of **Chapter 3**. Further, any environmental management measures during construction that have been identified and are associated with construction activity and methodology are documented in the Construction Environmental Management Plan (CEMP) which is available in **Appendix 4.1.**

The mitigation measures that have been established to minimise any likely significant negative effects arising from the proposed development on the surrounding environment are summarised in **Sections 22.2.1- 22.2.2**.

In the event that permission is granted for the proposed development and it is considered appropriate to condition the mitigation measures set out in this EIAR, the mitigation measures set out in **Appendix 4.1** (where not expressly incorporated below) and **Sections 22.2.1- 22.2.2** shall be regarded for the purposes of any such condition as having been incorporated as part of the mitigation measures in this chapter.

22.2.1 Construction Phase

22.2.1.1 Traffic & Transport

The following mitigation measures are proposed for the construction phase of the scheme:

Construction Environmental Management Plan and Construction Traffic Management Plan

A Construction Environmental Management Plan (CEMP) has been prepared (**see Appendix 4.1.**) and is incorporated in the planning application documentation.

The Construction Management Plan will be included as a section within the CEMP. The contractor will develop the CEMP and a Construction Traffic Management Plan (CTMP) in order to implement the requirements of the CEMP prepared as part of this application. This will be developed by the appointed contractor in advance of the works and will be agreed with Dublin City Council and An Garda Síochána.

22.2.1.2 Air Quality

The assessment of likely significant effects during construction (contained in **Section 7.4.2**) includes for the implementation of 'standard mitigation', as stated in the TII guidance[1]. The measures which are appropriate to the proposed development and which will be implemented include:

- Spraying of exposed earthwork activities and site haul roads during dry weather;
- Provision of wheel washes at exit points;
- Covering of stockpiles;
- Control of vehicle speeds, speed restrictions and vehicle access; and
- Sweeping of hard surface roads.

In addition, the following measures will be implemented during the construction phase of the proposed development:

- Facades of buildings will be covered and sprayed with water while being demolished;
- A c. 1.8m hoarding will be provided around the site works to minimise the dispersion of dust from the working areas;
- Any generators will be located away from sensitive receptors in so far as practicable; and
- Stockpiles will be located as far as possible from sensitive receptors and covered and/or dampened during dry weather.

Employee awareness is also an important way that dust may be controlled on any site. Staff training and the management of operations will ensure that all dust suppression methods are implemented and continuously inspected.

During the construction phase of the proposed development it is possible that disturbance of Asbestos Containing Materials (ACMs) on site could cause asbestos fibres to be released into the ambient environment. An asbestos audit will be carried out on the buildings scheduled for demolition prior to demolition

[1] TII, 2011. Guideline for the Treatment of Air Quality During the Planning and Construction of National Road Schemes. Available at: *https://www.tii.ie/technical-services/environment/planning/Guidelines-for-the-Treatment-of-Air-Quality-during-the-Planning-and-Construction-of-National-Road-Schemes.pdf*

works. Any asbestos discovered will be removed by a Specialist Contractor in accordance with *Safety, Health, and Welfare at Work (exposure to Asbestos) Regulations 2006/2013*[2], and disposed of by specialist contractors to an appropriately licenced facility. Traceable records of this activity, including the disposal licence, will be kept.

22.2.1.3 Climate

Carbon emissions

Due to the nature of effects predicted in **Section 8.4.2.2**, no mitigation measures are proposed during the construction phase of the proposed development.

Wind

As no significant impacts are predicted during the construction phase, no mitigation measures are proposed.

Daylight and Sunlight

As no significant impacts are predicted during the construction phase, no mitigation measures are proposed.

22.2.1.4 Noise & Vibration

Noise

The impact assessment conducted for the construction activity during the construction phase has highlighted that the predicted construction noise levels are above the adopted criteria at distances of 20m or less, and that a negative impact on nearby receivers will occur.

The following mitigation measures will be implemented during construction activities in order to reduce the noise and vibration impact to nearby noise sensitive areas. The contractor will provide proactive community relations and will notify the public and vibration sensitive premises before the commencement of any works forecast to generate appreciable levels of noise or vibration, explaining the nature and duration of the works.

The contractor will distribute information circulars informing people of the progress of works and any likely periods of significant noise and vibration.

During the construction and demolition phases, the proposed development shall comply with British Standard 5228 “Noise Control on Construction and open sites Part 1. Code of practice for basic information and procedures for noise control.

BS5228 includes guidance on several aspects of construction site mitigation measures. Noise control measures that will be implemented during the construction phase of the proposed development, and in accordance with BS5228, include: the

[2] Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013).

selection of quiet plant, enclosures and screens around noise sources, and limiting the hours of work. Detailed comment is offered on these items in **Appendix 9.1**.

Vibration

Any construction activities undertaken on the site will be required to operate below the recommended vibration criteria set out in **Section 9.6.2.1.**

22.2.1.5 Biodiversity

Terrestrial Environment

Mammals

The buildings on site present roosting potential to bats. However, none were recorded in two separate surveys at the appropriate time of the year. There are no proposed mitigation measures for bats with regard to the demolition of buildings.

There will be no direct lighting of the river during the construction period. All arc or flood lighting will be directed into the site and away from the river to reduce potential effects on commuting otters and bats during night time hours.

Birds

There are no specific measures required for birds during construction.

Aquatic Environment

Surface Water

Surface water from the proposed development will discharge to the River Liffey. A foreshore consent will be sought for this discharge. Mitigation measures relating to the protection of surface water quality and status are described in **Chapter 14**, Water and Hydrology and are summarised below.

> "*The employment of good construction management practices will minimise the risk of pollution of soil, surface water and groundwater. The following site-specific measures will be implemented for the proposed development which will include:*
>
> - *Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding;*
> - *Run-off will be controlled to minimise the water effects in outfall areas;*
> - *All concrete mixing and batching activities will be located in areas away from watercourses and drains; and*
> - *Good housekeeping (site clean-ups, use of disposal bins, etc.) will be implemented on the site.*
>
> *In order to prevent the accidental release of hazardous materials (fuels, cleaning agents, etc.) during construction site activity, all hazardous materials*

will be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks will be used on the site during the construction phase of the project. Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the proposed development. The contractor's sanitary facilities will discharge into the existing combined sewer on Parkgate Street or as otherwise agreed with Dublin City Council."

Construction management measures including specific measures to prevent pollution of the River Liffey have also been incorporated into the CEMP, see **Appendix 4.1,** which will ensure that there are no likely effects on the River Liffey from surface water runoff.

The CEMP has been formulated in consideration of standard best practice and, as expanded on by the contractor, will align with the guidance set out in the following documents:

- CIRIA – Guideline Document C532 Control of Water Pollution from Construction Sites (CIRIA, 2001)[3]; and
- CIRIA – Guideline Document C624 Development and Flood Risk - guidance for the construction industry (CIRIA, 2004)[4]; and
- CIRIA (2015) Environmental Good Practice on Site C692 (4th Edition) (C762)[5].

22.2.1.6 Archaeology

All archaeological and cultural heritage issues will be resolved during the pre-construction phase, or in advance of the main construction stage, during the site clearance / ground reduction / demolition stage.

22.2.1.7 Architectural Heritage

As is detailed above, repair and refurbishment works are proposed in the case of all the protected structures on the site and the retained historic structures. No other mitigation measures have been proposed with respect to effects from the construction of the proposed development.

22.2.1.8 Landscape & Visual

No mitigation measures have been proposed with respect to effects from the construction of the proposed development.

[3] CIRIA, 2001. Guidance Document C532 Control of Water Pollution from Construction Site: https://www.ciria.org [Accessed October 2018]
[4] CIRIA, 2004. Guidance Document C624 Development and Floor Risk – guidance for the construction industry: https://www.ciria.org [Accessed October 2018
[5] CIRIA, 2015. Environmental Good Practice on Site C692 (4th Edition): https://www.ciria.org [Accessed October 2018]

22.2.1.9 Water

The employment of good construction management practices will minimise the risk of pollution of soil, surface water and groundwater. The following site-specific measures will be implemented for the proposed development which will include:

- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding;
- Run-off will be controlled to minimise the water effects in outfall areas;
- All concrete mixing and batching activities will be located in areas away from watercourses and drains; and
- Good housekeeping (site clean-ups, use of disposal bins, etc.) will be implemented on the site.

In order to prevent the accidental release of hazardous materials (fuels, cleaning agents, etc.) during construction site activity, all hazardous materials will be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks will be used on the site during the construction phase of the project. Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the proposed development. The contractor's sanitary facilities will discharge into the existing combined sewer on Parkgate Street or as otherwise agreed with Dublin City Council.

These mitigation measures will be in accordance with:

- *ICE (2015) Earthworks, A Guide (2nd Edition)[6]; and*
- *TII (2013) Specification for Road Works Series 600 - Earthworks.[7]*

In addition to the above, construction phase mitigation measures for the proposed development are described in a detailed Construction Environmental Management Plan (CEMP) which is contained in **Appendix 4.1**. The CEMP will be implemented by the Contractor for the duration of the construction phase. The CEMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the procedures.

The CEMP for the proposed development will be formulated in consideration of standard best practice and will align with the guidance set out in the following documents:

[6] Institute of Civil Engineers ICE, 2015. Earthworks, A Guide (2nd Edition) https://www.icevirtuallibrary.com/isbn/9780727741851 [Accessed October 2018]

[7] Transport Infrastructure Ireland, 2013. Specification for Road Works Series 600 – Earthworks (including Erratum No. 1, dated June 2013) http://www.tiipublications.ie/library/CC-SPW-00600-03.pdf [Accessed October 2018]

- CIRIA – Guideline Document C532 Control of Water Pollution from Construction Sites (CIRIA, 2001)[8]; and
- CIRIA – Guideline Document C624 Development and Flood Risk - guidance for the construction industry (CIRIA, 2004)[9]; and
- CIRIA (2015) Environmental Good Practice on Site C692 (4th Edition) (C762)[10].

The CEMP will comprise all of the construction mitigation measures, which are set out in this EIAR, and any additional measures which are required by the conditions attached to the An Bord Pleanála decision.

22.2.1.10 Land & Soils

General

A Construction Environmental Management Plan (CEMP) is contained in **Appendix 4.1.**

Precautionary measures will be taken to contain any areas within the planning boundary at risk of contaminated run-off.

- Potential pollutants shall be adequately secured against vandalism and will be provided with proper containment according to the relevant codes of practice. Any spillages will be immediately contained, and contaminated soil shall be removed from the proposed development and properly disposed of in an appropriately licenced facility;
- Dust generation shall be kept to a minimum through the wetting down of haul roads as required and other dust suppression measures;
- Any stockpiles of earthworks and site clearance material shall be stored on impermeable surfaces and covered with appropriate materials;
- Silt traps shall be placed in gullies to capture any excess silt in the run-off from working areas;
- Soil and water pollution will be minimised by the implementation of good housekeeping (daily site clean-ups, use of disposal bins, etc.) and the proper use, storage and disposal of these substances and their containers as well as good construction practices; and

A CEMP has been prepared for the proposed development and is included in **Appendix 4.1**. This CEMP includes good housekeeping and emergency response measures to be implemented during the construction phase of the project, including actions for dealing with any potential pollution incidents, in accordance

[8] CIRIA, 2001. Guidance Document C532 Control of Water Pollution from Construction Site: https://www.ciria.org [Accessed October 2018]
[9] CIRIA, 2004. Guidance Document C624 Development and Floor Risk – guidance for the construction industry: https://www.ciria.org [Accessed October 2018
[10] CIRIA, 2015. Environmental Good Practice on Site C692 (4th Edition): https://www.ciria.org [Accessed October 2018]

with CIRIA Guidance (as described in **Section 22.2.1.9**). The following measures will be put in place in accordance with CIRIA guidance:

- Containment measures;
- Emergency discharge routes;
- List of appropriate equipment and clean-up materials;
- Maintenance schedule for equipment;
- Details of trained staff, location and provision for 24-hour cover;
- Details of staff responsibilities;
- Notification procedures to inform the EPA or Environmental Department of the Dublin City Council;
- Audit and review schedule;
- Telephone numbers of statutory water consultees; and
- List of specialist pollution clean-up companies and their telephone numbers.

Compression of Substrata

Excavations shall be kept to a minimum, using shoring or trench boxes where appropriate. For more extensive excavations, a temporary works designer shall be appointed to design excavation support measures in accordance with all relevant guidelines and standards.

Loss of Overburden

- All excavated material will, where possible, be reused as construction fill. The appointed contractor will ensure acceptability of the material for reuse for the proposed development with appropriate handling, processing and segregation of the material. This material would have to be shown to be suitable for such use and subject to appropriate control and testing according to the Earthworks Specification(s);
- These excavated soil materials will be stockpiled using an appropriate method to minimise the impacts of weathering. Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff; and
- Any surplus suitable material excavated that is not required elsewhere for the proposed development, shall be used for other projects where possible, subject to appropriate approvals/notifications.

Earthworks Haulage

- Earthworks haulage will be along agreed predetermined routes along existing national, regional and local routes. Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to an acceptable condition. Where practicable, compaction of any soil or subsoil which is to remain in situ will be avoided; and

- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe runoff and prevent ponding and flooding. Runoff will be controlled through erosion and sediment control structures appropriate to minimise the possible impacts.

Impact on surrounding ground:

- Ground settlement, horizontal movement and vibration monitoring will be implemented during construction activities to ensure that the construction does not exceed the design limitations; and
- Ground settlements will be controlled through the selection of a foundation type and construction methods which are suitable for the particular ground conditions.

22.2.1.11 Hydrogeology

A CEMP is contained in **Appendix 4.1.**

Pollution from Construction Activities

The construction management of the site will implement the recommendations of the CIRIA guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams et al., 2001) to minimise as far as possible the risk of soil, groundwater and surface water contamination.

Measures that will be implemented to minimise the risk of spills and contamination of soils and waters include:

- Excavated spoil will be treated to remove excess fluid prior to stockpiling and transportation;
- Transfer of excess soil materials from stockpile areas off-site will be preferentially undertaken during dry periods;
- Stockpile and transfer of excess soil material will be restricted to specified and impermeable areas that are isolated from the surrounding environment;
- Wheel washes will be provided at site entrances to clean vehicles prior to exiting the work site;
- All staff will be trained and follow vehicle cleaning procedures. Details of these procedures will be posted in all work sites for easy reference;
- The implementation of the above measures will ensure that the risk of pollution of groundwater and nearby water bodies resulting from the construction activities will be minimised;
- Training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures;
- Careful consideration will be given to the location of any fuel storage facilities. These will be designed in accordance with guidelines produced by CIRIA (as described in **Section 2.2.1.9**), and will be fully bunded;
- All vehicles and plant will be regularly inspected for fuel, oil and hydraulic fluid leaks. Suitable equipment to deal with spills will be maintained on site;

- Ensure that all areas where liquids are stored, or cleaning is carried out are in designated impermeable areas that are isolated from the surrounding area e.g. by a roll-over bund, raised kerb, ramps or stepped access;
- Minimise the use of cleaning chemicals; and
- Use trigger-operated spray guns, with automatic water-supply cut-off.

22.2.1.12 Resource & Waste Management

As previously stated, a project specific C&D WMP has been prepared in line with the requirements of the guidance document issued by the DoEHLG and is included as **Appendix 17.1**. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the proposed development. Prior to commencement, the contractor(s) will be required to refine/update the C&D WMP or submit an addendum to the C&D WMP to DCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to ‘design out waste’;
- On-site segregation of waste materials will be carried out where practical to increase opportunities for off-site reuse, recycling and recovery – the following waste types, at a minimum, will be segregated:
    - Concrete rubble (including ceramics, tiles and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and
    - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials will be re-used on-site, where possible;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);

- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with *Article 27 of the EC (Waste Directive) Regulations (2011)* [11]. EPA approval will be obtained prior to moving material as a by-product.

These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996, as amended*, associated Regulations, the *Litter Pollution Act 1997* [12] and the *EMR Waste Management Plan (2015-2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

22.2.1.13 Population & Human Health

In order to mitigate potential temporary community disturbance during construction, a Construction Environmental Management Plan (CEMP) has been prepared and is included in **Appendix 4.1**. Further, A Site Manager will be appointed to ensure the proper running of the site, and the minimisation of community disturbance and the implementation of "good housekeeping" policy at all times. Potential effects on air quality, and consequently human health, will be mitigated during the construction phase and full account will be taken of the Transport Infrastructure Ireland (TII) guidance and the development of employee awareness. Measures that will be implemented for the proposed development will include:

- A c. 1.8m hoarding will be provided around the site works to minimise the dispersion of dust from the working areas;
- Any generators will be located away from sensitive receptors in so far as practicable;

[11] EC (2011) Article 27 of the EC (Waste Directive) Regulations
[12] Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended

- Stockpiles will be located as far as possible from sensitive receptors and covered and/or dampened during dry weather.

Where asbestos is uncovered on site during construction, the ACM will be double-bagged and removed from the site by a competent contractor and disposed of in accordance with the relevant procedures and legislation.

Noise control measures that will be implemented during the construction phase of the proposed development, in accordance with BS5228, include: the selection of quiet plant, enclosures and screens around noise sources, and limiting the hours of work. Detailed comment is offered on these items in **Section 2.2.1.4**, and **Appendix 9.1**. The measures will ensure any potential human health effects from noise are controlled to within the adopted criteria.

In order to offset any potential effects on water, and consequently human health, earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding. Good housekeeping (site clean-ups, use of disposal bins, etc.) will be enforced by the contractor on the site to mitigate against the risk of spillages.

The potential risk of river wall collapse during construction will be mitigated by standard best practice construction measures, and lateral steel restraints will be provided to the existing stonework along the river, throughout construction.

Should any utility/service diversions or disturbances be required, these will only be carried out in agreement with the relevant service providers, and with notice to the affected public.

22.2.1.14 Material Assets

The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and that all services and utilities are maintained, unless this has been agreed in advance with the relevant service provider and local authority.

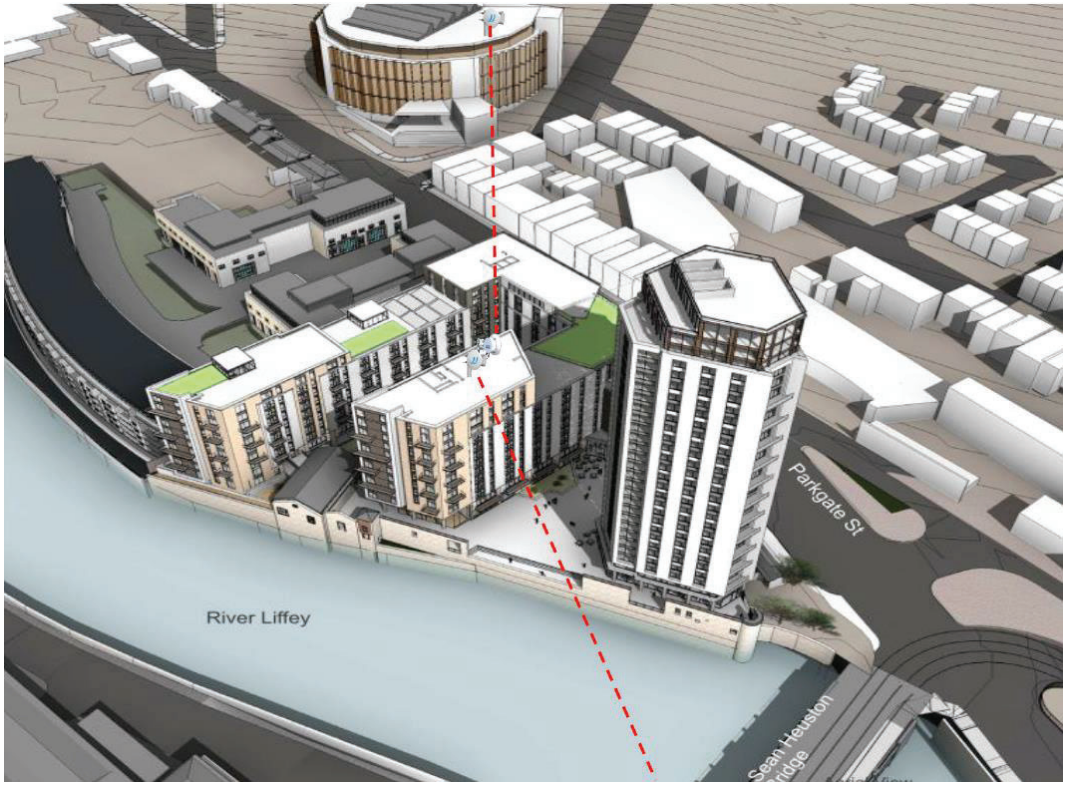
All works in the vicinity of utilities apparatus will be carried out in ongoing consultation with the relevant utility company and/or local authority and will be in compliance with any requirements or guidelines they may have.

Where new services are required, the Contractor will apply to the relevant utility company for a connection permit where appropriate and will adhere to their requirements.

As outlined in **Section 19.5.1**, the proposed development is likely to give rise to a minor adverse effect on transmission links, once developed.

During the construction phase of the proposed development, Vodafone and Three will re-align the identified microwave links to new hop sites. In the unlikely event that the proposed development continues to impact on existing or new microwave channels, Ruirside Development Ltd. is committed to assisting in mitigating the issues as illustrated in Figure 19.7 (Refer to Chapter 19), as reproduced below.

In the event additional infrastructure required to facilitate a new hop site, this has been assessed for visual impact, in **Chapter 13**, Landscape and Visual.



22.2.1.15 Major Accidents & Disasters

As previously discussed, the construction phase of the proposed development will be carried out in compliance with the mitigation measures described above and, in the CEMP.

Lateral steel restraints will be provided to the existing stonework along the river, throughout construction, to avoid risk of collapse. Refer to **Chapter 4**, Construction Strategy for further information. An asbestos audit will be carried out on the buildings scheduled for demolition prior to demolition works. Any asbestos discovered will be removed by a Specialist Contractor in accordance with *Safety, Health, and Welfare at Work (exposure to Asbestos) Regulations 2006/2013*[13], and disposed of by specialist contractors to an appropriately licenced facility. Traceable records of this activity, including the disposal licence, will be kept.

[13] Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013). Available at: *https://www.hsa.ie/eng/Legislation/New_Legislation/SI_291_2013.pdf*

22.2.2 Operational Phase

22.2.2.1 Traffic & Transport

The development will have a pro-active Mobility Management Plan (MMP) that will include measures to further encourage sustainable transport trips. A Framework MMP has been included in the Transport Statement, which is submitted as part of the planning application documentation.

22.2.2.2 Air Quality

As there are no significant effects on air quality predicted during the operational phase of the proposed development, no mitigation measures are proposed.

22.2.2.3 Climate

Carbon emissions

As the proposed development complies with the NZEB criteria for new developments, no mitigation measures are proposed during the operation phase of the proposed development.

Wind

A small area of rooftop amenity space on the 9th floor was identified as being 'suitable for business walking'. The potential negative effect in this area will be mitigated through the use of localised planting. Localised planting and a canopy located at the base of the tower will provide additional mitigation in some other minor areas of amenity space identified as being 'suitable for business walking'. No other mitigation measures are required.

Due to the nature of effects predicted, no mitigation measures are proposed during the operation phase of the proposed development.

Sunlight and Daylight

The design development has ensured that there are no significant effects associated with sunlight and daylight. As a result, no mitigation measures are proposed during the operation phase of the proposed development.

22.2.2.4 Noise & Vibration

Noise

The external plant items will be designed so that emissions will be within the noise criteria set for day and night-time periods and the impact at any noise sensitive locations. The following forms of noise control techniques will be employed:

- duct mounted attenuators on the atmosphere side of air moving plant;
- splitter attenuators or acoustic louvres providing free ventilation to internal plant areas;
- solid barriers screening any external plant;

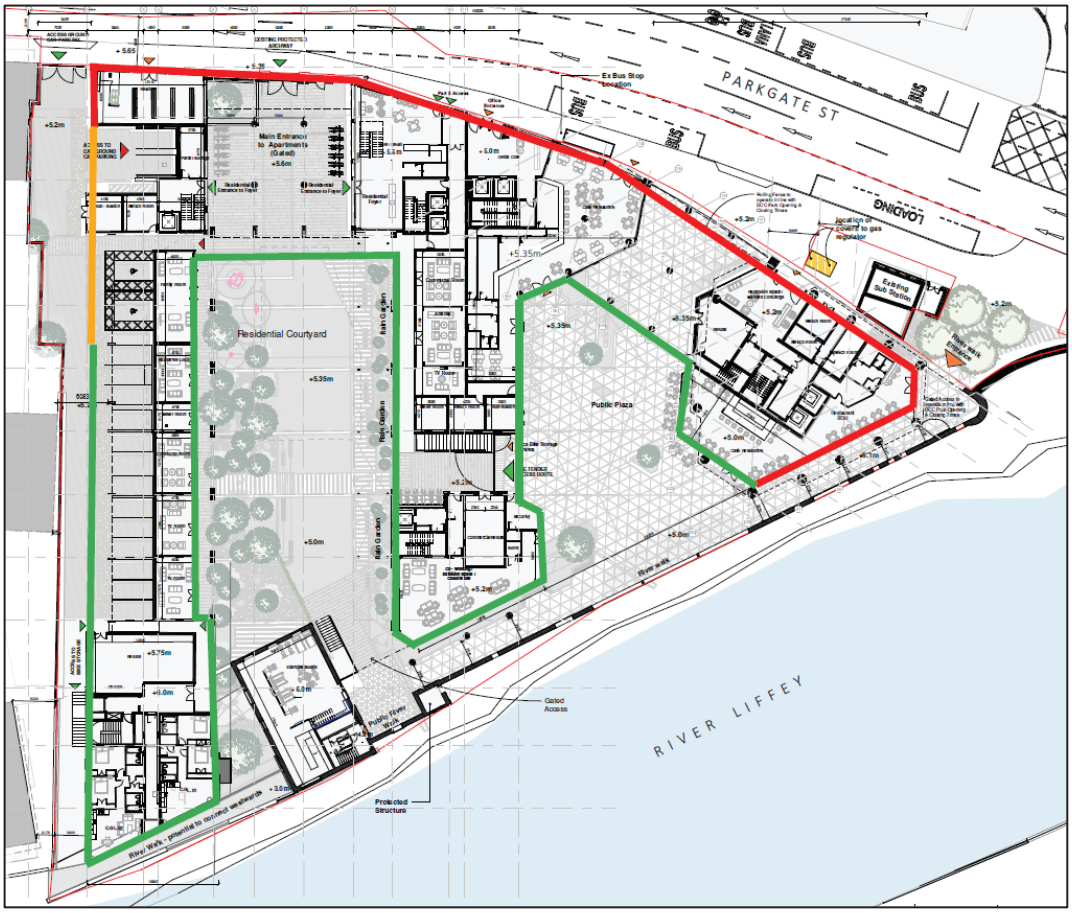
- anti-vibration mounts on reciprocating plant.

In addition to the above, it is proposed that the following practices be adopted to minimise potential noise disturbance for neighbours.

- All mechanical plant items e.g. motors, pumps etc. shall be regularly maintained to ensure that excessive noise generated any worn or rattling components is minimised;
- Any new or replacement mechanical plant items, including plant located inside new or existing buildings, shall be designed so that all noise emissions from site do not exceed the noise limits outlined in this document.

Inward Noise

Section 4.2 of the inward noise impact assessment report (**Appendix 9.2**) presents recommended mitigation in the form of enhanced double glazing to facades overlooking Parkgate Street. The locations of the range of required acoustic performances are illustrated in Figure 9.3 (Refer to Chapter 9), as reproduced below.



In order to achieve the required internal noise levels, set out in **Section 9.2.2.3** the facades will be provided with glazing that achieves the minimum sound insulation performance as set out in Table 9.12 (Refer to Chapter 9), as reproduced below.

Glazing Specification	Octave Band Centre Frequency (Hz)						R_w
	125	250	500	1k	2k	4k	
Red	27	24	34	39	42	49	37
Orange/Green	17	21	30	38	36	35	33

The glazing performance requirement for the various facades can be confirmed by reviewing Figure 9.3 above.

The overall R_w outlined above are provided for information purposes only. The over-riding requirement is the Octave Band sound insulation performance values which may also be achieved using alternative glazing configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Table 9.12 or greater.

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

The window supplier will be required to provide laboratory tests confirming the sound insulation performance. It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system when installed on site.

Vibration

No vibration effects are expected in association with the operational phase therefore no mitigation measures are recommended.

22.2.2.5 Biodiversity

Terrestrial Environment

Mammals

Lighting along the river will be directed inward toward the developed areas. This will be achieved by appropriate lighting design and placement and the use of directional features such as cowls.

Aquatic Environment

Surface Water

The proposed development will incorporate SuDS features in order to improve water quality and reduce the quantity of surface water discharging into the receiving system. The water supply network will include low flow devices with the aim of minimising water usage.

22.2.2.6 Archaeology

All archaeological and cultural heritage issues will be resolved during the pre-construction and construction phase.

22.2.2.7 Architectural Heritage

The public will have access to the retained and refurbished historic structures, and these structures will be maintained into the future. No other mitigation measures have been proposed with respect to effects from the operation of the proposed development.

22.2.2.8 Landscape & Visual

The subject application proposes the development of site designated as a Strategic Development and Regeneration Area under the *Dublin City Development Plan 2016-2022*, which was the subject of major re-development in order to accommodate medium and high density residential development in recent years. In these circumstances, during the construction or operational phases scope for mitigation measures, which would preserve a sustainable level of density, is limited.

22.2.2.9 Water

The proposed development will incorporate SuDS features in order to improve water quality and reduce the quantity of surface water discharging into the receiving system. The water supply network will include low flow devices with the aim of minimising water usage.

22.2.2.10 Land & Soils

No mitigation has been proposed with respect to effects from operation of the proposed development in relation to soils and geology.

22.2.2.11 Hydrogeology

No mitigation measures are considered necessary for the operational phase of the proposed development as no significant effects are predicted.

22.2.2.12 Resource & Waste Management

As previously stated, a project specific OWMP has been prepared and is included as **Appendix 17.2**. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the *EMR Waste Management Plan 2015 – 2021* and abiding by the *DCC waste bye-laws*.

In addition, the following mitigation measures will be implemented:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
    - Organic waste;
    - Dry Mixed Recyclables;
    - Mixed Non-Recyclable Waste;
    - Glass;
    - Waste electrical and electronic equipment (WEEE);
    - Batteries (non-hazardous and hazardous);
    - Cooking oil;
    - Light bulbs;
    - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.);
    - Furniture (and from time to time other bulky waste); and
    - Abandoned bicycles.
- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available and
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities.

22.2.2.13 Population & Human Health

The external plant items will be designed so that emissions will be within the noise criteria set for day and night-time periods at any noise sensitive locations. Notwithstanding this, noise control techniques will also be employed during operation in order to reduce the level of operational noise generation, and subsequent human health effects (Refer to **Chapter 9,** Noise and Vibration).

The proposed development will incorporate SuDS features in order to improve water quality and reduce the quantity of surface water discharging into the receiving system. The water supply network will include low flow devices with the aim of minimising water usage.

A project specific Operational Waste Management Plan (OWMP) has been prepared and is included as **Appendix 17.2**. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the Eastern and Midlands Region (EMR) Waste Management Plan 2015 – 2021 and abiding by the Dublin City Council waste bye-laws. In addition, a number of waste mitigation measures will be employed (refer to **Chapter 17**, Resource and Waste Management).

22.2.2.14 Material Assets

Due to the measures already incorporated in the design as outlined above, i.e. SuDS, no mitigation measures will be necessary during the operational phase.

22.2.2.15 Major Accidents & Disasters

The mitigation measures relevant to each environmental factor outlined in **Chapters 7-20** will be implemented during the construction phase of the proposed development and will collectively work to mitigate the risk of major accidents and disasters occurring during this time.

As previously discussed, temporary design measures such as lateral steel restraints will be provided to the existing stone wall along the river throughout construction.

The construction phase of the proposed development will also be carried out in accordance with best practise site management measures relating to health and safety and emergency response. These measures are described below and included in the CEMP. They will be developed further by the contractor prior to construction.

Health and Safety Measures

The appointed Contractor will be required to ensure all Health & Safety requirements are agreed with Ruirside.

All construction staff and operatives will be inducted into the security, health and safety and logistic requirements on site prior to commencing work.

All contractors will be required to progress their works with reasonable skill, care and diligence and to proactively manage the works in a manner most likely to ensure the safety, health and welfare of those carrying out construction works, all other persons accessing the subject site and interacting stakeholders.

Contractors will also have to ensure that, as a minimum, all aspects of their works and project facilities comply with legislation, good industry practice and all necessary consents.

Particular cognisance will be taken by the contractor to managing the use of machinery in a public environment.

The requirements of the *Safety, Health and Welfare at Work Act 2005*, the Safety, Health and Welfare at Work (Construction) Regulations, 2006 and other relevant Irish and EU safety legislation will be complied with at all times.

As required by the Regulations, a Health and Safety Plan will be formulated which will address health and safety issues from the design stages through to completion of the construction and maintenance phases. This plan will be reviewed and updated as required, as the development progresses.

In accordance with the Regulations, a “Project Supervisor Construction Stage” will be appointed as appropriate. The Project Supervisor Construction Stage will assemble the Safety File as the project progresses.

Further, any requirements of the Irish Aviation Authority (IAA) with regards to lighting, crane operation etc. will be fully complied with.

Emergency Response Provision

The Contractor will maintain an emergency response action plan which will cover all foreseeable risks, i.e. fire, spill, flood, etc. The response plan will be developed in accordance with the site emergency plan. Appropriate site personnel will be trained as first aiders and fire marshals. In addition, appropriate staff will be trained in environmental issues and spill response procedures.

Equipment and vehicles will be locked, have keys removed and be stored securely in the works area.

22.3 Summary of Monitoring Measures

A range of monitoring measures has been identified to demonstrate that the proposed development conforms to the predictions made as part of this EIAR. This monitoring will take place after consent is granted and provide assurance that aspects of the proposed development are functioning as intended and thus not generating significant effects.

Monitoring has been identified to occur after consent is granted in order to provide assurance that aspects of the proposed development are functioning as intended (and thus not generating significant effects) as described in detail in **Chapters 6 – 20**. Where appropriate, remedial actions have also been identified.

22.3.1 Construction Phase

22.3.1.1 Traffic & Transportation

No monitoring has been proposed with respect to effects from construction traffic associated with the proposed development.

22.3.1.2 Air Quality

Dust monitoring will be undertaken at a range of nearest sensitive receptors during the demolition and construction phases. The TA Luft dust deposition limit values of 350 mg/m^2/day (averaged over one year) will be applied as a 30-day average.

22.3.1.3 Climate

As no significant impact is predicted to occur during the construction phase of the proposed development, no monitoring measures are required.

22.3.1.4 Noise & Vibration

Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to

check compliance with the construction noise criteria. Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise. Details of monitoring are presented in **Appendix 9.1**.

Vibration monitoring will be implemented during construction activities to ensure that vibration levels are in accordance with criteria set out in **Section 9.2.7.2**. Monitoring will be more rigorous in the proximity of any protected structures; including more frequent monitoring and additional monitoring points. Monitoring points will be located on the face of the structures and centred every 1m.

22.3.1.5 Biodiversity

During the construction phase when and if dewatering of excavations is required, the Contractor will be responsible for monitoring the suspended solids content of the adjacent River Liffey water. The discharge of treated surface water from construction activities will be monitored to ensure that the discharged treated water will be in accordance to the Dublin City Council Discharge Licence if required.

The settlement tank and silt bag will be monitored by a Site Environmental Manager who will direct the control of settlement and whether a silt bag needs to be changed.

22.3.1.6 Archaeology

No construction phase monitoring measures are proposed with respect to archaeology.

22.3.1.7 Architectural Heritage

No monitoring has been proposed with respect to effects from construction of the proposed development.

22.3.1.8 Landscape & Visual

No monitoring has been proposed with respect to visual effects from of the proposed development.

22.3.1.9 Water

Hydrology, Water Quality and Drainage

Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development to ensure existing surface water runoff is draining from the site and is not exposed to any contaminants.

Wastewater

The contractor will be required to ensure that the sanitary facilities for the site personnel are maintained and effluent storage is regularly emptied and disposed of.

Water Supply

The contractor will be required to ensure that the water supply to the site is maintained and free of contaminants.

Flood Risk

The contractor is required to monitor the weather forecasts to inform the programming of earthworks and stockpiling of materials.

22.3.1.10 Land & Soils

Excavations in made ground will be monitored by an appropriately qualified person to ensure that any contaminated material is identified, segregated and disposed of appropriately. Any identified hotspots shall be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the hotspot does not cross-contaminate clean soils elsewhere.

Any excavation shall be monitored during earthworks to ensure the stability of side slopes and to ensure that the soils excavated for disposal are consistent with the descriptions and classifications according to the waste acceptance criteria testing carried out as part of the site investigations.

Ground settlement, horizontal movement and vibration monitoring will be implemented during construction activities to ensure that the construction does not exceed the design limitations. Monitoring will be more rigorous in the proximity of any protected structures. This will include more frequent monitoring and additional monitoring points. Monitoring points will be located on the face of the structures and centred every 1m. Horizontal, vertical and rotational displacement in all directions will be monitored.

Movement monitoring shall be carried out during any activities which may result in ground movements or movements of any nearby structures.

22.3.1.11 Hydrogeology

In relation to soils contamination a suitably experienced environmental consultant will be required to oversee the excavation works for the proposed development so that potential contamination can be segregated, classified and suitably disposed.

The works will be monitored by a Resident Engineer.

Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development to ensure the groundwater resource is not impacted by the proposed development.

22.3.1.12 Resource & Waste Management

The management of waste during the construction phase will be monitored by the site manager to ensure compliance with relevant local authority requirements and effective implementation of the C&D WMP including maintenance of waste documentation.

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. The C&D WMP specifies the need for a waste manager to appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and the identification of trends. The data will be maintained to advise on future projects.

22.3.1.13 Population & Human Health

Dust monitoring will be undertaken at a range of nearest sensitive receptors during the demolition and construction phases. The TA Luft dust deposition limit values of 350 mg/m^2/day (averaged over one year) will be applied as a 30-day average.

Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criteria. Noise monitoring will be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development to ensure existing surface water runoff is draining from the site and is not exposed to any contaminants. The contractor will be required to ensure that the sanitary facilities for the site personnel are maintained and effluent storage is regularly emptied and disposed of. The contractor will be required to ensure that the water supply to the site is maintained and free of contaminants. The contractor is required to monitor the weather forecasts to inform the programming of earthworks and stockpiling of materials.

The management of waste during the construction phase will be monitored by the site manager to ensure compliance with relevant local authority requirements and effective implementation of the Construction & Demolition Waste Management Plan including maintenance of waste documentation.

22.3.1.14 Material Assets

Construction phase mitigation measures have been proposed to ensure that significant negative effects on material assets will be avoided, prevented or reduced during the construction of the proposed development. As such, no monitoring measures are proposed during the construction phase.

22.3.1.15 Major Accidents & Disasters

No monitoring is proposed specific to reducing the risk of major accidents/disasters during construction.

22.3.2 Operational Phase

22.3.2.1 Traffic & Transportation

No monitoring has been proposed with respect to effects from operational traffic associated with the proposed development.

22.3.2.2 Air Quality

As no significant effects are predicted to occur during the operation of the proposed development, no monitoring measures are required.

22.3.2.3 Climate

As no significant impact is predicted to occur during the operational phase of the proposed development, no monitoring measures are required.

22.3.2.4 Noise & Vibration

No noise or vibration monitoring measures are proposed during the operational phase of the development.

22.3.2.5 Biodiversity

No monitoring has been proposed with respect to effects from operation of the proposed development.

22.3.2.6 Archaeology

No operational monitoring measures are proposed with respect to archaeology.

22.3.2.7 Architectural Heritage

No monitoring has been proposed with respect to effects from operation of the proposed development.

22.3.2.8 Landscape & Visual

No monitoring has been proposed with respect to visual effects from of the proposed development.

22.3.2.9 Water

There are no monitoring activities required during the operation phase of the proposed development.

22.3.2.10 Land & Soils

No monitoring is specified as no impacts were identified for the operational phase of the works.

22.3.2.11 Hydrogeology

No monitoring is proposed during operation of the proposed development.

22.3.2.12 Resource & Waste Management

The management of waste during the operational phase will be monitored by the site manager to ensure effective implementation of the OWMP by the building management company and the nominated waste contractor(s).

Waste generation volumes will be monitored against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the Waste Storage Areas (WSAs) where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contactor costs.

22.3.2.13 Population & Human Health

The management of waste during the operational phase will be monitored by the site manager to ensure effective implementation of the OWMP by the building management company and the nominated waste contractor(s).

Waste generation volumes will be monitored against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the Waste Storage Areas (WSAs) where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contactor costs.

22.3.2.14 Material Assets

As no significant, negative operational effects of the proposed development on material assets are identified, no operational monitoring measures have been proposed.

22.3.2.15 Major Accidents & Disasters

No monitoring measures are proposed specific to reducing the risk of major accident/disaster during operation.

22.4 Residual Significant Effects

This EIAR has been prepared by competent experts in accordance with Article 1(2)(g) of the EIA Directive to identify the likely significant effects associated with the proposed development in accordance with the relevant legislation and guidance.

A range of likely significant effects have been avoided or reduced through the implementation of mitigation measures and monitoring, therefore leading to the residual effects as outlined in **Sections 22.4.1 - 22.4.2** below.

Cumulative effects have also been considered.

22.4.1 Construction Phase

22.4.1.1 Traffic & Transportation

Since no significant traffic effect is predicted to arise from either the construction or operational stages, there are no residual effects anticipated. Cumulative effects have also been considered.

22.4.1.2 Air Quality

With the implementation of the mitigation measures outlined in **Section 7.5**, no significant residual negative effects on air quality are envisaged during the construction or operation of the proposed development.

22.4.1.3 Climate

No significant residual impacts are predicted on climate during the construction or operational phase of the proposed development.

22.4.1.4 Noise & Vibration

Noise

During the construction phase of the project there is the potential for significant impacts on nearby noise sensitive properties due to noise emissions from site activities, in the absence of mitigation. The application of binding noise limits, hours of operation, along with the implementation of appropriate noise control measures, will ensure that noise impact at NSLs less than 30m from construction works will have a ***negative***, ***moderate*** and ***short-term*** impact on the surrounding environment.

At distances of 30m and greater from the works, the predicted construction noise levels are below the construction noise criteria and therefore the expected residual impact will be ***negative, slight*** and ***short-term.***

Vibration

Due to the distances between sensitive locations and anticipated major works and considering the low vibration levels predicted in the vicinity of piling rigs, etc., it is expected that the vibration impact will be ***negative***, ***not significant*** and ***short-term***. In order to minimise any vibration, good practice measures have been presented in **Appendix 9.1**.

22.4.1.5 Biodiversity

Having regard to the mitigation measures outlined in **Section 10.5.1**, no residual effects during construction are predicted.

22.4.1.6 Archaeology

No residual effects were identified during the course of the assessment on archaeology. Should any archaeological remains be uncovered, they will be fully resolved prior to the main construction stage, either through preservation *in situ* or preservation by record (as detailed in **Section 11.5.1**). The provision of information panels will result in a slight positive residual effect on cultural heritage.

22.4.1.7 Architectural Heritage

The residual effects of the proposed development on the architectural heritage will be as described under **Section 12.4** above. Cumulative effects have also been considered.

22.4.1.8 Landscape & Visual

As no mitigation measures are proposed, the residual visual effects of the proposed development on the built environment will be as described under **Section 12.4**.

22.4.1.9 Water

Hydrology, Drainage and Water Quality

With the implementation of mitigation measures described in **Section 14.5.1**, there will be no significant residual effect on hydrology, drainage characteristics of the site or water quality during construction.

Waste Water

There are no significant residual effects expected in relation to waste water arising from the construction phase of the proposed development.

Water Supply

There are no significant residual effects expected in relation to water supply arising from the construction phase of the proposed development.

Flood Risk

There will be no significant residual effect on flood risk caused by the construction of the proposed development.

22.4.1.10 Land & Soils

Having regard to the mitigation and monitoring measures outlined in **Section 15.4.1**, no residual effects during construction are predicted.

22.4.1.11 Hydrogeology

No residual effects during construction are expected.

22.4.1.12 Resource & Waste Management

A carefully planned approach to waste management as set out in **Section 17.5.1.1** and adherence to the C&D WMP during the construction and demolition phase will ensure that the effect on the environment will be **short-term**, **imperceptible** and **neutral**.

22.4.1.13 Population & Human Health

The proposed development is likely to give rise to a permanent, positive effect on the population, through the provision of residential, commercial and amenity opportunities in a prime city centre location.

Following the implementation of the mitigation measures outlined in **Section 18.5.1,** and elsewhere in this EIAR, no significant negative effects on human health are identified in respect of the proposed development.

22.4.1.14 Material Assets

Following implementation of mitigation measures outlined in **Section 19.5.1,** the residual impact on utility services is considered to be **imperceptible**.

22.4.1.15 Major Accidents & Disasters

The risk of a major accident and/or disaster during the construction phase of the proposed development is considered low.

22.4.2 Operational Phase

22.4.2.1 Traffic & Transportation

Since no significant traffic effect is predicted to arise from either the construction or operational stages, there are no residual effects anticipated.

22.4.2.2 Air Quality

With the implementation of the mitigation measures outlined in **Section 7.5**, no significant residual negative effects on air quality are envisaged during the construction or operation of the proposed development.

22.4.2.3 Climate

No significant residual impacts are predicted on climate during the construction or operational phase of the proposed development.

22.4.2.4 Noise & Vibration

Noise

Considering the busy, urban location of the site and the low number of vehicles coming to and from the development overall in comparison to the existing traffic, it is expected that operational traffic associated with the development will be ***neutral*, *imperceptible* and *long-term*.**

Noise levels associated with mechanical plant are expected to be within the adopted day and night-time noise limits at the nearest noise sensitive properties taking into account the site layout, the nature and type of units proposed and distances to nearest residences. Assuming the operational noise levels do not exceed the adopted design goals, the resultant residual noise impact from this source will be a ***neutral, imperceptible, long term impact.***

Vibration

No vibration impact is expected in association with the operational phase therefore no vibration measures are recommended.

22.4.2.5 Biodiversity

Having regard to the mitigation measures outlined in **Section 10.5.1,** no residual effects during operation are predicted.

22.4.2.6 Archaeology

No residual effects were identified during the course of the assessment on archaeology. Should any archaeological remains be uncovered, they will be fully resolved prior to the main construction stage, either through preservation *in situ* or preservation by record (as detailed in **Section 11.5.1**). The provision of information panels will result in a slight positive residual effect on cultural heritage.

22.4.2.7 Architectural Heritage

The residual effects of the proposed development on the architectural heritage will be as described under **Section 12.4** above. Retained and repaired historic structures

will be maintained in sustainable use. Cumulative effects have also been considered.

22.4.2.8 Landscape & Visual

As no mitigation measures are proposed, the residual visual effects of the proposed development on the built environment will be as described under **Section 12.4**.

22.4.2.9 Water

Hydrology, Drainage and Water Quality

As the proposed development is predicted to have an overall neutral long-term impact on water and hydrology within the study area there no mitigation measures required and as such there will be no significant residual effect on hydrology, drainage characteristics of the site or water quality during operation.

Waste Water

There is no significant impact expected to the public sewer as a result of the proposed development. Any increase in discharge will be compensated by a reduction in the expected surface water runoff into the combined sewers from the proposed development.

Water Supply

The development will result in additional demands on the public water network however the instillation of low flow devices will minimise the impact of the proposed development on the existing water supply network.

Flood Risk

There will be no significant residual effect on flood risk caused by the operation of the proposed development.

22.4.2.10 Land & Soils

Having regard to the mitigation measures outlined in **Section 15.4.2**, no residual effects during operation are predicted.

22.4.2.11 Hydrogeology

No residual effects during operation are expected.

22.4.2.12 Resource & Waste Management

During the operational phase, a structured approach to waste management as set out in **Section 17.5.1.2** will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will be **long-term, imperceptible** and **neutral**.

22.4.2.13 Population & Human Health

The proposed development is likely to give rise to a permanent, positive effect on the population, through the provision of residential, commercial and amenity opportunities in a prime city centre location.

Following the implementation of the mitigation measures outlined in **Section 18.5.1**, and elsewhere in this EIAR, no significant negative effects on human health are identified in respect of the proposed development.

22.4.2.14 Material Assets

Following implementation of mitigation measures outlined in **Section 19.5.1,** the residual impact on utility services is considered to be **imperceptible**.

22.4.2.15 Major Accidents & Disasters

The risk of a major accident and/or disaster occurring during the operational phase.