

# Environmental Impact Assessment Report (EIAR) Non-Technical Summary

Mixed Use Development - Opera Site, Limerick

Limerick City and County Council

March 2019



Prepared for:

Limerick City and County Council

© 2018 AECOM Limited. All Rights Reserved.

This document has been prepared by AECOM Limited ("AECOM") for sole use of our client (the "Client") in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between AECOM and the Client. Any information provided by third parties and referred to herein has not been checked or verified by AECOM, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of AECOM.

## Table of Contents

<b>1</b>	<b>Non-Technical Summary</b>
1.1	Introduction
1.2	Description of Development
1.3	Planning and Development Context
1.4	Examination of Alternatives
1.5	Population and Human Health
1.6	Land, Soils, Geology and Groundwater
1.7	Water
1.8	Air Quality and Climate
1.9	Noise and Vibration
1.10	Microclimate
1.11	Landscape and Visual
1.12	Traffic and Transport
1.13	Waste Management
1.14	Material Assets
1.15	Biodiversity
1.16	Archaeological and Cultural Heritage
1.17	Architectural Heritage
1.18	Interactions
1.19	Mitigation and Monitoring

## Figures

Figure A: Location and red line boundary of the Proposed Development

Figure B: Numbered Building Parcels on the Proposed Development Site

Figure C: Access Arrangements

Figure D: View of Alternative Heights from George's Quay Towards Bank Place (height to width ratio highlighted)

Figure E: View of Alternative Heights from O'Connell Street Towards Patrick Street

## Tables

Table A: Potential Interactions of Environmental Effects

Table B: Summary of Mitigation and Monitoring

# 1 Non-Technical Summary

The following is a summary in non-technical language of the Environmental Impact Assessment Report (EIAR). It is presented under the same chapter headings as the main EIAR. A summary of the proposed mitigation measures contained within the EIAR is appended to this document.

The EIAR is split across three volumes:

Volume I – Non Technical Summary

Volume II – EIAR

Volume III – Figures and Appendices

The planning application (including the EIAR) will be placed on display for public inspection for a statutory period of at least six weeks from the date of lodgement of the application. Any person may make a submission or observation to An Bord Pleanála, 64 Marlborough Street, Dublin 1 in relation to the application during this period.

A copy of the consent application and each document accompanying the application including this Environmental Impact Assessment Report may be inspected free of charge, during normal office or opening hours at the following locations:

- An Bord Pleanála, 64 Marlborough Street, Dublin 1, D01 V902
- Limerick City and County Council, Dooradoyle Road, Dooradoyle, Limerick, V94 WV78

All planning documents will also be available for download from the Limerick City and County Council website, i.e. <https://www.limerick.ie/council/services/planning-and-property>.



## 1.1 Introduction

Limerick City and County Council (herein referred to as LCCC) is proposing to redevelop an existing city block located in Limerick City Centre, hereafter referred to as the Opera site. The Opera Site is a c. 2.35 ha site. The Opera site has been identified as an opportunity not only to provide much needed accommodation, but also to challenge and inform the scale of future development in the city centre.

Currently the Opera Site is a brownfield site at the heart of Limerick City Centre. The overall urban block is largely vacant and underutilised but has retained a number of active uses. The objective for the proposed development is to bring this key site back to full and productive use and make a major contribution to strengthening the city centre.

The proposed planning application boundary is presented in Figure A.

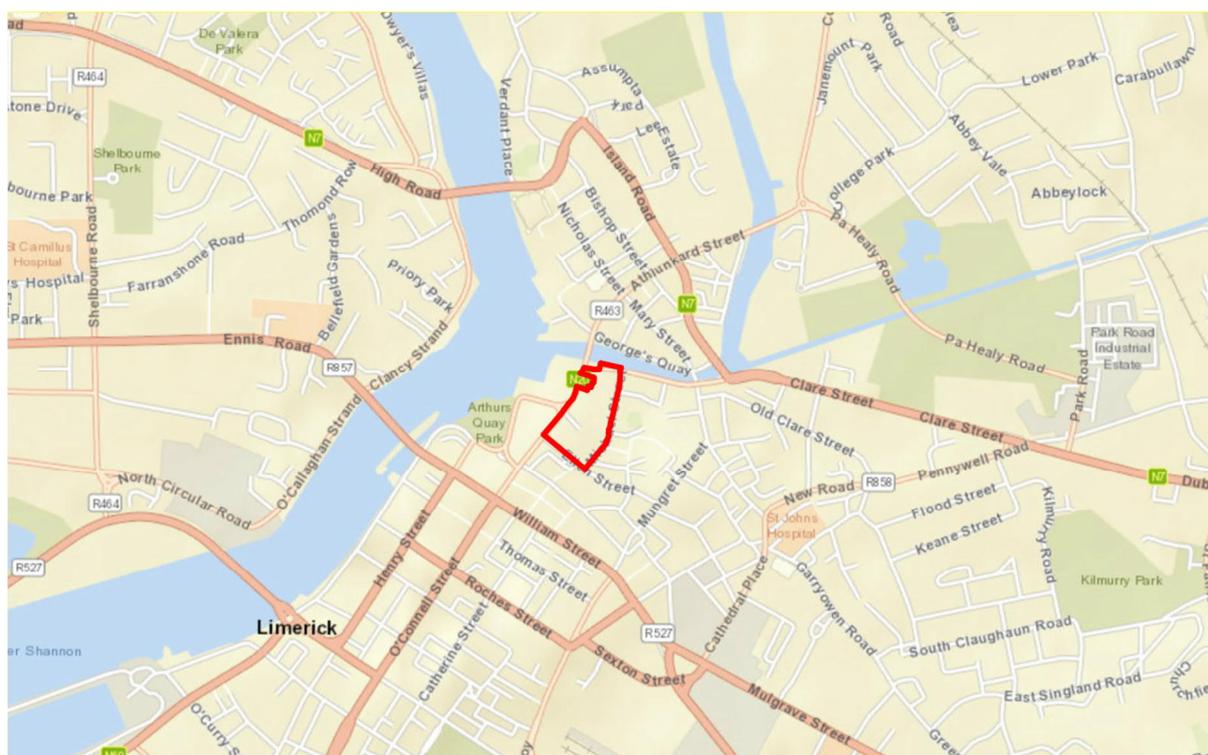


Figure A: Location and red line boundary of the Proposed Development

The general background to the requirement for Environmental Impact Assessment (herein referred to as EIA) for certain types and scales of development is set out in the EIA Directives (2011/92/EU and 2014/52/EU); the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (the majority of which came into operation in September 2018), the Planning and Development Acts 2000 (as amended) and the Planning and Development Regulations 2001 – 2018. This EIAR report is prepared in accordance with the 2011 EIA Directive 92011/92/EU), as amended by the 2014 EIA Directive.

This EIAR has been prepared pursuant to Section 175 of the Planning and Development Act, 2000 as amended ('The Act'), Part 10 of the Planning and Development Regulations 2001 -2018 and any other applicable legislation and guidance.

On the existing proposed development site there are three Protected Structures / Features located on the subject site; the former Town Hall on Rutland Street (RPS 014) and the Granary on Michael Street (RPS 272); and a doorway at No. 6 Rutland Street (RPS 317). The protected structures, referenced above, are also recorded on the National Inventory of Architectural Heritage (NIAH), together with some 5 no. additional buildings on the subject site including; a range of existing terraced Georgian houses along Rutland Street, Patrick Street and Ellen Street, which are interspersed by Twentieth Century interventions on the corner of Patrick Street/Ellen Street (6, 7/8 Patrick Street) and at 6 and 7 Rutland Street. The development site also includes various Twentieth Century Industrial/ warehousing/ workspace buildings, primarily located towards the centre of the site at Bogues Yard and Watch House Lane, and north of the site at the former Cahill May Roberts building, fronting Bank Place. A surface carpark with c.100 spaces is located to the south-east corner of the site.

## 1.2 Description of Development

The re-development will include both new-build elements and proposed renovation and adaptive re-use of Protected Structures and the majority of other structures of heritage value within the site. This will require the demolition of all the Twentieth Century buildings and later additions to the rear of existing heritage structures. The combined re-development comprises a total gross floor area of c.45,170sq m exclusive of ancillary basement and car parking.

The proposed development comprises the demolition of the following:

Existing industrial/warehouse/workspace buildings at Bogues Yard and Watch House Lane towards the centre of the site;

- The former Cahill May Roberts office building fronting Bank Place;
- Modern additions/extensions to the rear of the Granary Building (a Protected Structure) and to the rear of heritage structures fronting onto Rutland Street, Patrick Street and Ellen Street, respectively;
- The existing Ellen Street surface car park;
- Nos. 6 & 7 Rutland Street<sup>1</sup>, Nos. 6 & 7/8 Patrick Street, and No. 3 Ellen Street; and
- The structure adjoining to the south of the former Town Hall (In order to facilitate widening of the existing east-west access route into the site).

The proposed development also comprises the construction of a number of new build elements, repair and restoration of heritage assets and the provision of public realm enhancements including new open spaces and access routes. Given the size of the proposed development, the areas of the proposed works have been categorised into individual parcels and assigned numbers for ease of reference (see Figure B).

---

<sup>1</sup> The doorway currently located within the façade of No. 6 Rutland Street does not form a part of the demolition works.



Figure B: Numbered Building Parcels on the Proposed Development Site

The development comprises a mixed-use scheme of primarily office uses, supported by a range of retail / non-retail services, café/restaurant, licenced premises, apart-hotel, civic/cultural uses (including the City Library), residential use, open spaces, access routes and ancillary areas. The development also includes environmental improvement works to the adjacent public streets.

Details of proposed development comprise the construction of:

- A new 6-storey office building on the corner of Michael Street and Ellen Street (Parcel 1) replacing the existing car park, the proposed new building ranges in height from 4-6 storeys with roof level plant and comprises office, retail and restaurant/café/bar uses at ground floor level and office use on upper levels, providing c. 12,654sq m office use and c. 1,390sq m non-office uses (excluding basement accommodation);
- An apart-hotel on the corner of Patrick Street and Ellen Street (Parcel 2A) replacing No. 6-8 Patrick Street and No. 3 Ellen Street) of 5 storeys with roof level plant and extending to the rear

from ground floor level to 4th floor level including a café/bar/restaurant at ground floor. Nos. 4–6 Ellen Street are to be refurbished and modified as required, with retail at ground and basement floor levels of c. 1,366.9m<sup>2</sup>. Upper levels, will comprise apart-hotel units, linked by bridge access from the new apart-hotel building, providing a total floor area for the apart-hotel (including new build and refurbished areas) of c. 5,151 sq. m;

- Refurbishment and modification of No. 9 Ellen Street (Parcel 2B) for the provision of bar/restaurant/café uses at all floor levels, comprising 1,260sq m excluding basement;
- A new City Library within the exiting Town Hall and adjoining structures (Parcel 3A & 3A4) comprising renovation and adaption of the Town Hall (a Protected Structure) and No. 8/9 Rutland Street, replacement of building extensions to the rear with a full height glazed atrium, and connection with new-build structures replacing 6 & 7 Rutland Street, extending and stepping-up to the rear over 4/5 no. floor levels with roof plant (providing a total floor space of c. 4,515 sq m including renovation and new-build areas). A café/restaurant is also proposed at the basement level of the library (c. 446sq m). The new-build structure to the rear is split, providing for commercial office floor space over 4-5 storeys (Parcel 3A4 providing c. 2,981sq m);
- Refurbishment and adaptive re-use of 9 no. Georgian terraced houses (3no. NIAH) at Nos. 7-8 Ellen Street, Nos. 1-5 Patrick Street and Nos. 4-5 Rutland Street, respectively, to provide for retail use at ground and basement levels (comprising a total of 1,014 sq m retail floor space) and residential use on upper levels (c. 1,367sq m). A total of 16 no. residential units are proposed; 3 no. 1 bed apartments, 9 no. 2 bed apartments, 1 no. 2 bed townhouses, 1no. three bed townhouse and 2 no. 4 bed townhouses. Private open space is proposed to be provided in new balconies to the rear or ground/podium level private gardens as appropriate.
- To the north of the site fronting Bank Place, is a proposed landmark building. This building is principally 14-storeys with a 15 storey element providing for enclosed plant.<sup>2</sup>
- The existing 4-storey Granary Building (a Protected Structure) is proposed to be retained in office use (c. 2,303sq m) and restaurant/licenced premises use (580sq m), with the addition of a circulation core to the rear in place of the former (modern) library structure (providing a total floor space of c. 2,883 sq m).
- A significant new public square/plaza is proposed at the centre of the site (c. 4,013sq m) linked by east-west connections to Michael Street/Patrick Street, to the south via the existing archway connecting to Ellen Street (under no. 7 Ellen Street), and to the north via a new north-south public space to the rear of the Granary Building ('the Granary Courtyard', c. 778sq m), which links with an enhanced public space at Bank Place (c. 1,775sq m).
- A basement car park, accessed from Michael Street, will be provided with parking for 155 no. cars and 311 no. secure bicycle spaces, together with shower and changing facilities and ancillary plant, attenuation, storage, refuse management and associated areas.

---

<sup>2</sup> This building is generally described through the EIAR as either a 14 storey, 11-14 storey or as a 14 storey + plant building.

- The proposed development also includes environmental improvement works to the adjacent public streets, hard and soft landscaping changes, signage and flagpoles, lighting, change in level, substations, diversion of underground services, set-down areas, and all related site development and excavation works above and below ground.
- The Bruce House Doorway, Rutland Street (a protected Structure) will be relocated to the internal gable of No. 8 Rutland Street within the new library building atrium.

The sequence of development on the Opera site is expected to align with these main stages:

- Condition schedules and baseline monitoring surveys. Survey monitoring will be required at all stages through to project completion;
- Install temporary works to buildings to be retained;
- Carefully demolish structures to be removed;
- Commence the repair works to the retained structures;
- The proposed foul and storm water sewers in Michael Street will be laid and commissioned to allow the existing combined sewer crossing the site to be diverted;
- Install earthworks support to the basement perimeter;
- Excavate basement area;
- Construct new basement;
- Construct new buildings;
- Complete the development service connections; and,
- Complete public realm and landscaping.

The construction phase as a whole will likely last a number of years and will be undertaken in two phases following enabling works:

- Enabling works, including demolition and site clearance;
- Phase 1 encompasses development of the northern site, Parcels 3A, 3B, 4, 5 and 6; and,
- Phase 2 encompasses development of the southern site, Parcels 1, 2A and 2B.

## 1.3 Planning and Development Context

The planning and development context considers local planning policy, regional policy guidance and national policy guidance. The Opera site was identified within the Limerick City Development Plan 2010-2016 and the Limerick 2030 – An Economic and Spatial Plan for Limerick.

The Limerick City Development Plan 2010-2016 identifies that “*one of the most important aspects in defining the urban form of the Opera Site will be the successful retention and restoration of buildings on Rutland/Patrick Street and Ellen Street*”.

The Opera Site has been identified within the Limerick City Development Plan 2010-2016 as an opportunity not only to provide much needed accommodation, but also to challenge and inform the scale of future development in the city centre.

The Limerick City Development Framework supports the use of increased scale on the site, and states “*In order to optimise the potential of the city centre, and to accommodate the range and scope of uses envisaged, it will be necessary to develop a building form that will be larger in scale than its immediate surroundings*”.

Policy CC.1 of the Development Plan states that it is policy of the Planning Authority to secure the goals and objectives set out in Limerick 2030.

Limerick 2030 – An Economic and Spatial Plan for Limerick identifies the Opera Site as “*a critically important site*” with an urgent need to bring it back into full and productive use, making a major contribution to strengthening the city centre, and it also recognises the site as one of the main city centre transformational projects.

This proposal recognises the importance of the existing historical building stock, and seeks to retain and refurbish a large number of the original buildings on the site, supplementing them where appropriate with new build intervention. The proposed development is a sensitive regeneration of Opera Site resulting in a variety of mixed-use refurbishment opportunities combined with integrated modern new build commercial units.

The design brief, Opera Site, Limerick City is a non -statutory Design Brief which was prepared for the Opera Site in order to fulfil the requirements of the Limerick 2030 Plan. The design brief sets out Limerick City & County Council’s planning approach to the redevelopment of the Opera site. This Design Brief describes the provisions of the Limerick 2030 Plan and sets out a list of development parameters for the site having regard to the provisions of that Plan and an appraisal of the sites setting and context. The Brief is intended to help guide the development process and to inspire the highest possible standards, whilst reducing uncertainty and improving efficiency of the planning and development process.

It is envisaged that the conservation, public realm and urban design strategies set out in the Design Brief will further refine planning policy to deliver a business-led mix of uses to ensure that this important new quarter will be a vibrant and successful addition to the City Centre. Its intent is to redress one of the primary structural challenges identified for Limerick City Centre and to develop the

Opera Site both as an attraction in its own right and a stimulus to the continued development of the commercial core.

### **1.3.1 The Need for the Proposed Project**

The Proposed Development of the Opera Site will transform the prominent brownfield site within Limerick City Centre in line with Limerick 2030: An Economic and Spatial Plan for Limerick (Limerick 2030 Plan) adopted as Variation No. 4 of the Limerick City Development Plan. The proposed development will assist in the achievement of a comprehensive redevelopment of the Opera Site to serve as a catalyst to the economic, social and physical renaissance of Limerick City Centre. The development will provide an appropriate quantum of development to provide adequate capacity to rejuvenate the Opera Site and adjoining areas.

The proposed development has been based on the Design Brief which was prepared for the site in order to fulfil the requirements of the Limerick 2030 Plan.

In line with the Design Brief the proposed development for the site seeks to provide “A New Business Offer” for the City, tying into the heart of the City’s shopping offer. The Plan envisages a business-led mixed-use solution for this Site including significant office development and a range of supplementary uses.

The re-development of the site will also provide for public realm and permeability requirements for the site and links with other City Centre projects.

## 1.4 Examination of Alternatives

The proposed development of the Opera Site will transform the prominent brownfield site within Limerick City Centre in line with Limerick 2030: An Economic and Spatial Plan for Limerick (Limerick 2030 Plan) adopted as Variation No. 4 of the Limerick City Development Plan. A Design Brief for the Opera Site was developed in response to the Limerick 2030 Plan to further define development parameters for the site. This was submitted in April 2018 to Limerick City and County Council following a public consultation period.

### 1.4.1 Land Uses Proposed On the Site

The Limerick 2030 Plan also identifies land uses for the site. During the masterplanning phase, these uses were split along the following geographical lines:

- Northern: cultural uses in support of office use; and,
- Southern: retail, restaurant, café, medical, residential and hotel use, in support of office.

The mix of uses proposed for the site has been further examined and refined to complement surrounding uses. The existing buildings to be retained have been assessed in terms of their size, layout, history, condition, and location, to ensure that the most appropriate use is assigned to each building.

This along with the urban design of the city block and the creation of a new central square with access points in each direction has established four quarters:

- A civic and cultural quarter to the north west;
- A commercial quarter to the north east;
- A commercial quarter to the south east; and
- Residential quarter to the south west.

Retail and bar/ restaurant uses are to be dispersed throughout the site, primarily at ground floor level, to ensure active street frontage and a vibrant public realm.

### 1.4.2 Land Uses Considered on the Site

#### 1.4.2.1 Educational and Medical

The Limerick 2030 Plan also noted that the office accommodation could allow for 'Innovation Hub' accommodation for UL and LIT.

Almost all of the new building accommodation is to be used for office and residential uses, which best meets the brief and ensures 24hr activity on the site. The mix of office accommodation is well suited to meet the needs of 'Innovation Hub' accommodation for UL and LIT related enterprises and is flexible to respond to the demand.

Medical uses were also considered on the site. This specialised use would need to be provided in new buildings. A significant facility would reduce the quantum of office accommodation to below the requirements of the Design Brief. A medical use would also require significant additional parking, set down and possible ambulance facilities, which would negatively impact the opportunity for pedestrian friendly, active street scape. The nearby George's Quay currently provides a medical quarter. As the medical requirement in the area is considered to be addressed by Georges Quay, and the option of a multi-storey basement car park has been ruled out as discussed below due to the potential for significant environmental effect, the provision of a medical centre on site has been ruled out for similar reasons.

#### **1.4.2.2 Basement Car Parking**

The design intent for the site is a car free pedestrian zone, with all parking below ground. The quantum of parking required for the development, circa 620 car spaces, would require a multi-level basement to accommodate all of the cars on site.

The potential for significant environmental impact in adding a multi-storey underground carpark to serve this need was a major factor in ruling out this alternative. This would have a greater impact on the constructability of the project in close proximity to protected structures and occupied buildings. This would have significantly increased spoil removal quantum and associated noise, dust air and vibration impact in addition to significant addition of concrete and other raw materials to the project.

An assessment of the alternative parking approaches identified available capacity in the surrounding public multi storey car parks, which reduced the requirement for on-site parking to 155 cars. This parking requirement is provided in a single level basement and thus reducing the impact of its construction and avoiding the potential for the above mentioned potential environmental impacts.

#### **1.4.3 Access Arrangement Alternatives**

The basement carpark access is provided under Parcel 1 on Michael Street, close to the corner with Ellen Street. Alternative locations were considered where new significant building would facilitate a ramped access: mid-way along Michael Street and Bank Place.

Access from Bank Place (red arrow) (Figure C) would result in an access approach across Bank Place, introducing vehicular movements across a space in conflict with the Design Brief's objective for its enhanced for pedestrian use. A ramp in the basement in this location would limit the basement area available to serve the tall building, complicate the structural design and impact negatively on the building's relationship to Bank Place at street level.

Access at midway along Michael Street (orange arrow) would introduce a ramp access along the edge of the parcel 1 building at the pedestrian access route into the new square from Michael Street. A vehicular ramp would provide an unattractive or blank edge to this pedestrian route which would be undesirable.

The proposed access point at the southern end of Michael Street (green arrow) is the most suitable entrance point, allowing a suitable approach on the quieter Michael Street and impacting least on the

building useable layout. This location also provides an additional opportunity to introduce an additional pedestrian route into the site close to the corner of Michael Street and Ellen Street.

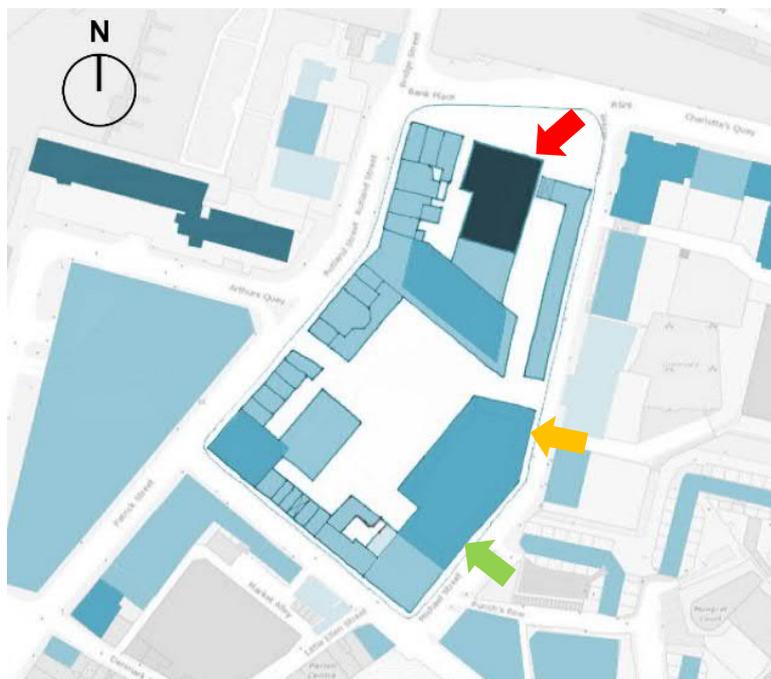


Figure C: Access Arrangements

### 1.4.4 Landmark Building Requirements

In addition to the business uses proposed as a result of the requirements of the Limerick 2030 Plan, there was also a requirement to establish a landmark tall building to the northern side of the site at Bank Place.

The building forms and heights were also assessed for their overshadowing impact and sunlight penetration into the urban spaces.

The most important element of the study was the height of the tall building. The Design Brief examined the city and the immediate context to establish the range of heights to be considered for the tall building.

The lower height of 12 storeys was established to be distinctive above the range of taller buildings between 7-10 storeys, west of O'Connell Street and some individual buildings close to the site.

The upper height of 16 storeys was established to be slightly lower than comparative tall buildings in Limerick city, due to the adjacency of protected structures.

The tall building form was split to provide a composition of forms with stepped heights, to provide a visual variety and a vertical slenderness appropriate to an elegant tall building.

3 alternative heights were considered:

- 12 storeys with a lower element of 10 storeys (2 storey step)
- 14 storeys with a lower element of 11 storeys (3 storey step)
- 16 storeys with a lower element of 12 storeys (4 storey step)

In each alternative a full storey height of plant space is allowed for in the main element. Alternatives of 13 and 15 storeys provided imperceptible differentiation to these heights.

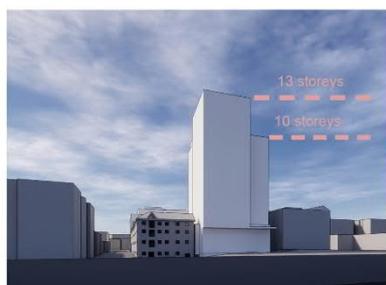


Fig. 55: View A from North side of river towards 13 storey building to Bank Place



Fig. 56: View A from North side of river towards 15 storey building to Bank Place

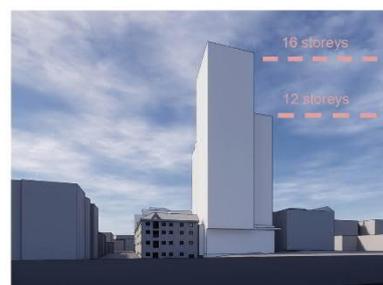


Fig. 57: View A from North side of river towards 16 storey building to Bank Place

Figure D: View of Alternative Heights from George’s Quay Towards Bank Place (height to width ratio highlighted)

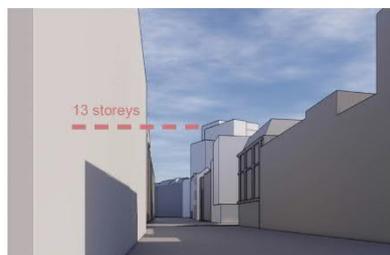


Fig. 64: View D from O’Connell St. to north east with 13 storey building to Bank Place. Lack of visual prominence as landmark building



Fig. 65: View D from O’Connell St. to north east with 15 storey building to Bank Place. Clear distinction to general building height, vertical emphasis appropriate as city landmark



Fig. 66: View D from O’Connell St. to north east with 16 storey building to Bank Place. Provides additional visual prominence and landmarking

Figure E: View of Alternative Heights from O’Connell Street Towards Patrick Street

The masterplan concluded that the 14-storey height building provided the most successful balance of providing:

- A visible landmark from the North and the South of the site; 12 storeys did not provide sufficient presence on the important vista from O’Connell Street, appearing as a higher roof profile rather than a distinctive landmark; and
- 
- A slender, elegant tall building form in particular to Bank Place; 12 storeys appeared insufficiently tall at a 3:1 ratio, 14 storeys is more elegant at close to 4:1 ratio, 16 storeys unnecessarily taller and has a greater impact on the adjacent protected structures.

The chosen alternative in the context of building height is principally a matter of interest to Landscape and Visual impact and to Architectural heritage assessments of the proposed scheme.

With regard to landscape and visual impact, the proposed development will transform the existing site from a place with mainly vacant and derelict structures to a new city quarter with a range of buildings at various heights, whilst also providing new permeability through the quarter and public open spaces within the site. The retention and refurbishment of a number of historic buildings along the edge of the site will anchor the proposed development within its urban context. The highest direct townscape effects will arise from the density and height of the proposed development elements resulting in a Very High magnitude of townscape change.

The proposed development will considerably alter existing views, particularly due to introduction of the 14-storey tower, which will exceed the height of adjacent buildings. The development will become a prominent focus in these close distance views but also a new anchor in the overall townscape. The stepped down tower to the west and south of the main tower softens the overall proposed height and helps to connect better to the adjacent existing buildings.

From an Architectural Heritage viewpoint, the proposed 14 storeys building considerably exceeds the ridgelines of the historic buildings in this area. It should be noted that the historic setting of the surviving buildings to Bank Place has been changed considerably since their construction, with a number of Georgian terraced houses now demolished and replaced by 20th century buildings.

To mitigate against the potential visual impact of the height of the proposed building, the proposed 11-14 storey building is designed with a solid base, with increased levels of glazing to the upper levels. This solid base continues to the courtyard between it and the Granary building, reflecting the height of the historic building it faces across this outdoor space.

The masterplan visual study concluded the specific height for each building, which included allowance for roof top plant space, with the following conclusion:

- South East Commercial Quarter: Overall recommended height is 6 storeys + plant, with 4 storeys to the corner of Ellen St and Michael St rising to 5 towards Granary with a setback 6 storey element.
- South West Residential Quarter: A 5 storey building to the corner of Ellen St. and Patrick St with a 4 storey (+ plant) rear block within site behind the existing terraced houses on Patrick St.
- North West Civic and Cultural Quarter: 4 storey infill is recommended to Rutland St with a setback fifth storey as the building extends to the north side of the internal square.
- North East Commercial Quarter: A height of 14 storey (+ plant) with a 'shoulder' of an 11-storey element is recommended for the tall building to Bank Place, in a simple form with consideration of slenderness in its external expression.

The proposed development has been subject to multiple types of alternative to meet the requirements of the Design Brief and associated Limerick 2030 Plan.



## 1.5 Population and Human Health

The Population and Human Health chapter describes the potential impacts of the proposed development on Population and Human Health. This has been prepared in accordance with the requirements of the relevant EIA legislation and guidance on preparation and content of EIAR (i.e. the Planning and Development Acts 2000-2017 (and any regulations made thereunder) and the Environmental Impacts Assessment Directive 2011/92/EU and 2014/52/EU) and examines issues including social consideration, land use and Health and Safety. Impacts on humans from other issues including air quality, noise, vibration, traffic, soil, hydrogeology and landscape are discussed in separate EIAR chapters.

A Health Impact Assessment (HIA) was conducted for the proposed development in order to understand how the development could directly and indirectly impact on key determinants of health.

The HIA identified the following benefits associated with the proposed development:

- Job creation (through provision of employment floorspace) which can potentially result in positive health impacts associated with increased income, the establishment of networks, job satisfaction and a sense of self-worth;
- Improvements in the environment and the provision of improved communal areas with a high amenity value, will result in increased social cohesion and encourage social interaction due to the removal of physical barriers; and
- Improvements to the public realm to improve and create high quality streets so that they are more connected and safer to use. These improvements will potentially result in higher levels of active travel in the area as improvements to the public realm will encourage more people to walk or cycle.

## 1.6 Land, Soils, Geology and Groundwater

The proposed development is located in the commercial and historic heart of Limerick city. It is currently completely covered by buildings/hardstanding and is primarily used for commercial purposes, though several buildings are derelict.

The site is underlain by made ground, which in turn is underlain by marine/estuarine silts and clays. A site investigation conducted in 2017 identified fragments of construction and demolition material within the made ground, including fragments of: brick, slate, cobbles and tiles. In addition, small amounts of ash were noted at a limited number of site investigation locations. No asbestos containing material was noted in soils logged during the investigation and, apart from a slight hydrocarbon odour in one soil sample, no other physical evidence of contamination was observed.

Bedrock beneath the site has been mapped as Dinantian Pure Bedded Limestones; during the 2017 site investigation, bedrock was encountered at two locations at depths of 2.6 m and 5.2 m below ground level (bgl).

Depth to groundwater appears to be shallow, ranging between 0.97 m and 1.85 m bgl in May 2018. While the site is located 100 m east of the River Shannon Estuary, tidal fluctuation of groundwater appears to be minimal. The direction of groundwater flow beneath the site appears to be to the north-west toward the River Shannon.

Soil and groundwater samples in 2017 were analysed for a broad suite of potential contaminants that could be present beneath the site. A potential risk to future site users was identified from PAHs and metals in made ground at the site. However, as the proposed development will require excavation for foundations and basement construction this will remove a large proportion of made ground. In addition, the majority of the site will be covered in buildings or hardstanding, thus shielding future workers and residents from exposure by breaking potential pathways.

The greatest potential impacts to land, soil, geology and groundwater will be during the construction phase, and include: excavation, importation of fill material, spills and leaks, and the use of concrete.

There will be no direct discharges to soil or groundwater during the operational phase of the proposed development.

A variety of mitigation measures will be implemented to manage potential risks during the construction phase, including:

- Preparation of a Construction Methodology and Phasing Management Plan;
- Controlled work practises to avoid repetitive handling of excavated material;
- Designated storage areas for soil stockpiles and inspections for signs of possible contamination;
- Imported material shall be sourced from carefully selected and vetted suppliers who are in compliance with planning requirements;
- Designated fuel storage and refuelling areas shall be established that are distant from drains or dewatering points;
- Fixed plant shall be self-bunded;

- Spill kits will be kept with mobile plant and located at various points around the site; and,
- Measures to protect soil and ground water concrete, including measures to prevent discharge of alkaline wastewaters or wash water to surface water drainage system or to the underlying subsoil and groundwater.

Taking into account the construction and operational potential impacts and the specified mitigation measures, it is considered that the residual impact of the development on land, soil, geology and groundwater will be slight due to measures inherent to the building design and provided that appropriate mitigation measures are applied.

## 1.7 Water

The Water Chapter for the EIAR has been prepared to assess potentially significant impacts upon the hydrological environment as a result of constructing and operating the Proposed Development. It describes water, hydrology and flooding issues associated with the development site.

The development site is located in a built-up urban area within Limerick City and there are no watercourses within or around the site. The development is situated approximately 30m south of Abbey River and 150m east of the River Shannon. Both the River Shannon and the Abbey River are tidal in the vicinity of the Proposed Development site.

Records available from Limerick City and County Council show that there are no existing separate storm water drainage systems within or around the site proposed development site. There is an existing combined sewer network in the area. The existing road gullies on Michael Street, Ellen Street, Patrick Street, and Rutland Street are likely to discharge into the local combined sewer network. Existing gullies on Bank Place discharge directly to the Abbey River.

Within the site, a separate storm water drainage network will be provided to serve the proposed development. This network will collect, attenuate and treat runoff generated within the development. In addition to the proposed foul sewer in Michael Street a new storm water sewer will be provided. Existing gullies which currently discharge to the combined sewer in Michael Street will be diverted to the proposed surface water sewer. Surface water run-off collected by this sewer will discharge to the Abbey River through a proposed outfall in the quay wall.

The existing site is currently served by an existing 350mm diameter brick work culvert combined sewer. It is proposed to decommission the existing 350mm diameter culvert crossing the site. It is proposed to provide a new 450 mm diameter sewer in Michael Street which will intercept flow and allow the existing sewer within the site to be decommissioned. This new sewer will divert flows around the site and discharge to the existing combined sewer on Bank Place, which then discharges to an existing interceptor sewer in the Abbey River. Within the proposed development, a separate foul water drainage network will be provided to serve all new buildings. This network will discharge foul flows to the diverted sewer in Michael Street and to the existing 600mm diameter combined sewer on Bank Place.

As the proposed development is close to the Shannon and Abbey Rivers, coastal flooding is considered to pose the primary risk. A review of the Shannon CFRAM Study indicates that the proposed development is located in an area at risk during a 1 in 1,000 year return period (0.1% AEP) coastal flood event. The estimated 1 in 200 year return period (0.5% AEP) event water level in the area is 4.72 m OD Malin while the 1 in 1000 year return period event water level is 5.15 m OD Malin. This places most of the site of the proposed development in Flood Zone B.

Based on a 1 in 200 year return period coastal flood level of +4.72 m, a climate change allowance of 500mm and an allowance of 100mm for land movement, the appropriate Finished Floor Level is 5.32mOD Malin. It is noted that all essential infrastructure serving the proposed development, such as primary transport and utility distribution including electricity generating power sub-stations etc., which

are considered highly vulnerable development elements will be sited above the 0.1% AEP event coastal flood water level of 5.15 m OD Malin.

The development design incorporates super-elevated entrance/exits as a mitigation measure to prevent any flood waters entering the main structure or the underground structure. In case of emergency, vehicular access to the building for Fire and Ambulance services is available from Patrick Street and Ellen Street westbound. These roads are located within Flood Zone C.

The risk of potential significant impacts occurring during the construction and operational phases have been assessed and appropriate mitigation measures and/or monitoring have been proposed.

## 1.8 Air Quality and Climate

On site activities during the construction phase of development have the potential to generate emissions of particulate matter, including dust. The scheme includes a series of good practice measures to control the generation of dust at source to protect residential and commercial properties on Michael Street, Rutland Street and Ellen Street. In addition to this, there is an anticipated increase in traffic on local roads as a result of the construction. This has been assessed using guidance from The National Roads Authority, in conjunction with The Environmental Protection Agency's Draft Guidance on Preparation of the Environmental Impact Assessment Report (2017). The outcome of the assessment predicts that there will be no change in nitrogen dioxide and particulate matter concentrations, relative to the present baseline conditions, as a result of construction traffic. Ambient concentrations of nitrogen dioxide and particulate matter will remain comfortably within Limit Values for protection of human health.

The Operational phase of the proposed development is also predicted to result in an increase of road traffic. This has been assessed using the same guidance as for the construction traffic assessment. In a similar manner to the construction traffic assessment, it is predicted that with the future scenario in which the development goes ahead, there will be a small increase in concentrations of nitrogen dioxide relative to a future scenario without the development. Annual mean concentrations of on nitrogen dioxide and particulate matter will still be substantially below Limit Values. These pollutant concentrations in the future with the development in place are predicted to be lower than the present day baseline conditions experienced in Limerick City centre.

In relation to climate effects, the mass of carbon dioxide for the transport sector as suggested in the Irish Greenhouse Gas Emissions Projections 2017-2035 indicates a total mass of 13 Mt for 2017 increasing to 14.8 Mt by 2035. The difference in mass of road derived carbon dioxide with the proposed development in place in 2037 relative to the proposed development not going ahead is 48 tonnes per year. This value represents less than 0.0004% of the national total for transport.

## 1.9 Noise and Vibration

A construction noise and vibration assessment has been carried out based on the methodology outlined in BS 5228-1: 2009 '*Code of practice for noise and vibration control on construction and open sites*'.

At the majority of the closest sensitive receptors to the site, worst-case predicted noise levels, assuming closest approach between construction noise source and receptor, are likely to result in a significant adverse noise effect. However, with appropriate noise mitigation measures employed during construction works, noise from construction will be lower than predicted. In addition, noise from construction will be temporary. The overall significance of construction noise is assessed as slight adverse.

Piling works are anticipated to be undertaken using rotary bored piling techniques. Measured vibration levels from BS 5228-2 indicate that vibration levels will result in a low impact. The overall significance of ground borne vibration effects due to construction works is assessed as slight.

An assessment of the noise impacts resulting from construction traffic on the surrounding highway network has been carried out. The significance of noise effects resulting from construction and traffic on the surrounding highway network is assessed as Negligible/Slight.

An operational noise assessment has been carried out. A noise propagation model has been developed in the SoundPLAN suite of programs, which implements a range of calculation methods, including the CRTN calculation method for road traffic noise which is applicable to this assessment.

The change in road traffic noise levels upon existing sensitive receptors has been predicted to result in a significance of effect of negligible. Internal noise levels within proposed offices, commercial and cultural premises are predicted to achieve the recommended levels given in BS 8233. At some of the proposed residential properties and at the Aparthotel, internal noise levels are expected to exceed the recommended internal noise levels given in BS 8233 assuming standard double-glazing. With appropriate noise mitigation incorporated into the design of the residential properties and the Aparthotel, the recommended internal noise levels will be achieved and the significance of operational noise effects is assessed as Negligible.

Noise within external amenity areas has also been assessed against the upper guideline below in BS 8233. Predicted levels indicate noise levels will be significantly below the guideline level and a significance of effect of neutral has been assessed.

Overall, the significance of operational noise effects is assessed as Negligible.

## 1.10 Microclimate

The proposed assessment for microclimate is split into two separate assessments,

- Pedestrian Wind Comfort and Distress; and,
- Sunlight, Daylight and Shadow Analysis

The results of each assessment are reported within the chapter.

### 1.10.1 Pedestrian Wind Comfort and Distress

The proposed development was assessed to identify if it would create pedestrian discomfort because of wind. Simulations of the existing site layout and the proposed development were conducted to quantitatively assess the wind microclimate and effects on pedestrian comfort levels.

Quantitative analysis was completed using computational fluid dynamics, which aimed to simulate conditions on the site. The aim of the simulation was to reproduce the macro-level wind regime around the buildings. 36 wind directions (every 10° around the compass) were analysed using representative strong winds applied to a full 3D model of the development within the local built environment.

Pedestrian Comfort and Distress criteria are then assessed at 1.5m above ground level. With exception of unusual circumstances, wind speeds at pedestrian level increase with height from the ground. Therefore, an assessment at 1.5m will be more onerous than one at 0.5m, for example. The pedestrian comfort criteria used is the Lawson Criteria. The Lawson Criteria provides comfort thresholds for certain pedestrian activities, ranging from pedestrian sitting, to business walking/cycling. These criteria should not be exceeded for more than 5% of the year. There is also a category called “unacceptable for pedestrian users”. The Lawson Criteria has also been used as the basis for the impact assessment, which in addition to addressing comfort, also addresses distress based on wind speeds.

The baseline assessment did not identify any areas which would have resulted in pedestrian discomfort or distress to able bodied people.

The initial assessment identified there would be areas of pedestrian discomfort and distress at Bank Place, in the proposed service yard (both in the northern section of the proposed development), to the south of the proposed development and at the north eastern corner of the proposed development.

To reduce discomfort and distress in these areas, mitigation measures were developed to change the relationship between the proposed development site and how wind moves around it.

In total, a seven mitigation measures were proposed and integrated into the design, there were:

- Porous gate to western courtyard onto Bank Place;
- A tower skirt to prevent wind washing down the face parcel 5;
- Planting (5m high evergreen species) in the plaza to calm wind conditions;
- A canopy above the basement carpark access to deflect wind away from the tunnel;
- Planting in the granary courtyard to calm winds circulating in the courtyard;
- Retention of a door between Bank Place and the granary courtyard; and,
- Placement of 9m high evergreen trees in Bank Place.

The result of the mitigation is pedestrian discomfort is minimised across the proposed development, however, three areas of pedestrian distress remain. In all three regions of distress, the maximum number of hours distress occurs at the worst point in the region is three hours per year, compared to a guidance value of two. This is a small increase beyond guidance, in three very small areas.

### 1.10.2 Sunlight, Daylight and Shadow Analysis

As the proposed development is larger than the existing context on site and within the surrounding area, a sunlight, daylight and overshadowing assessment has been completed to review the daylight and sunlight amenity that local residents are likely to have with the proposed development in place compared to existing conditions. This study allows the potential change in natural lighting condition to be quantified, where present.

All analysis and comments are made with reference to :

- the Building Research Establishment (BRE) design guide 209 'Site Layout Planning for Daylight and Sunlight', 2011; and,
- BS 8206:2008 – Lighting for Buildings – Part 2: Code of practice for daylighting.

The assessment has been completed in two main parts that compare the existing condition, with the proposed condition which introduces new built elements which could affect sunlight and daylight performance. Sunlight and daylight are assessed to inform on the following effects:

Impact on neighbouring buildings, where sunlight and daylight are assessed for buildings within the area of influence by the Proposed Development, or what we refer to as the Study Area.

Impact on neighbouring amenity areas, sunlight is assessed for exterior amenity, which is typically considered to include spaces such as gardens, parks or other types of recreation areas.

30 individual developments have been assessed in detail within the Study Area, and an additional set of access points are used within the Study Area to provide an overview of natural light performance around the Proposed Development. These areas were represented by a total of 1733 points have been assessed across the Study Area for sunlight and daylight assessment of buildings (708 of which represent windows in buildings), and three key amenity spaces have been assessed for sunlight. Sunlight and daylight conditions are assessed quantitatively through the modelling and simulation of both baseline and proposed conditions. This allows predicted results for receptors which are likely to be affected by new development to be compared to the numerical targets set out within BRE 209.

#### Sunlight

The majority of buildings assessed are found to retain similar levels of daylight to that which they currently enjoy both annually and during winter months with the Proposed Development in place, although there is likely to be some variation across facades.

#### Daylight

Out of the 30 detailed buildings assessed, 16 were found to have retained their access to daylight, while the 14 remaining buildings had a higher level of change.

#### Effects on Amenity

Overall shading to the amenity spaces identified for assessment are largely unchanged with the proposed development in place. All areas are found to receive as a minimum at least 2 hours or more of sunlight on 21 March for over 50% of their area, and overall are not expected to experience a

significant amount of change. This is considered to be in line with guidance recommendations, with all spaces retain good sunlight.

## 1.11 Landscape and Visual

The landscape and visual impact assessment describes the potential effects of the proposed Opera site on the character of the landscape or in this case 'townscape' and on views from within the city of Limerick and further afield from areas generally accessible by the public. The methodology used for the assessment follows best practice industry guidelines. It also refers to Limerick City and County Development Plans 2010-2016 (as extended), the Limerick 2030 Economic and Spatial Plan and others for existing descriptions of landscape /townscape character, designated landscapes, objectives and the location of scenic routes and viewpoints.

The study area consists of a 1.5km core study area from the boundary of the proposed development site within Limerick City and a 5km wider study area from the boundary of the proposed development covering areas of Limerick City; County Limerick and County Clare. The assessment was informed by a number of site surveys in 2017 and 2018 and is supported with 23 photomontages taken at representative viewpoints within the study area as well as figures indicating townscape and landscape designations.

Potential effects are separated into townscape and visual. Townscape effects are the result of physical changes to the fabric of the townscape resulting from new development. Visual effects relate closely to landscape effects but concern changes in views.

Effects at Construction - Construction effects will be temporary. Areas experiencing townscape and visual effects during the construction stage will vary considerably, depending on the active construction phase. Townscape and visual effects will be highest within the immediate vicinity of the site and within the principal visual zones with a radius of approximately 500m from the boundary of the Opera site. They will be most prominent along the riverbanks of the Abbey River and the western shores of the River Shannon in the city centre area. The visibility of construction works within the wider study will be limited to glimpsed views from within the urban or suburban quarters. All construction effects will be temporary.

Townscape Effects - The majority of townscape character effects will be experienced in the City Centre including the medieval part of King's Island. The character of local city quarters further afield will not change due to the potential visibility of the Opera site in the distance. The proposed Opera site will generally have a positive impact on the townscape character as it will become a high quality urban quarter and replace the existing degraded and neglected character of the existing site. Negative effects on the character can arise due to height of some of the proposed buildings and where sections of the proposed development can partially intrude above the historic rooflines in the inner city Georgian Quarter. While it will not change the overall character of the townscape in these areas, it will add a new feature to the existing townscape character. The proposed development will change some of the key characteristics of the city centre skyline when seen from the western river bank of the River Shannon as the development will introduce a prominent high rise building in the currently low rise character of northern part of the centre. The development will not conflict with the visual integrity of the Cathedral spires from the majority of viewpoints.

Visual Effects – The visual appearance of the Opera site is illustrated in photomontages from 23 viewpoints located within the study area. The majority of significant views will be experienced within the core study area of 1.5km where open or partial views of the development are possible, particularly in views from close proximity around the Opera site and from Thomond, Sarsfield and Shannon Bridge crossing the River Shannon as well as from the mainly western river front of the River Shannon. The main open and partial close distance views of the development will be available from the adjoining streets and city quarters (refer to Photomontages 1, 4, 7 – 11 and 17-22). Medium distance open views will be possible along the Shannon river front, particularly from the western side of the river along Clancy 's Strand and O'Callaghan's Strand and adjoining quarters (refer to Photomontages 12 -15) and from elevated views to the north such as the visitor platform at St John's Castle (refer to Photomontage 23). The development will become quickly partially or fully screened by intervening building structures and vegetation within the city centre and when moving away from the river fronts as indicated in Photomontages 2, 3, 5 and 6.

The highest visual effects tend to occur when in close proximity to the site, such as from Bank Place, Michael Street, Ellen Street, Patrick Street, Francis Street, Rutland Street and Georges' Quay, Bridge Street, Merchant's Quay and Charlotte's Quay. The proposed scheme will substantially alter the existing character of views in the area, particularly due to the introduction of a 14 storey tower and the enclosure of the city block along Michael Street and Ellen Street. It will result mainly in positive changes to the Opera site and its appearance from surrounding areas due to the high quality appearance and public access across the Opera site. The development will become a prominent focus in these close distance views but also a new anchor in the overall townscape. Potential negative visual effects can be experienced by the local community living in close proximity to the Opera site along Michael Street or adjacent perpendicular streets due to the close proximity of tall building frontages currently not in existence, particular when experienced from Michael Street and St. Michael's Court looking west.

The majority of medium distance views will include the high rise sections of the development only, which will be experienced from the western bank of the River Shannon along Clancy's Strand and O'Callaghan's Strand, Arthur's Quay, Lock Quay and visitor platform of St. John's Castle. The proposed development and in particular the proposed 14 storey tower will significantly alter the existing skyline in these panoramic views. It will introduce a new tall urban landmark in the skyline of Limerick City additional to the bell towers of the cathedrals. The change to the visual amenity in these areas is considered to be positive due to the bold but high quality appearance of the Opera site. Potential views from within the city centre and in particular from the Georgian Quarter are either fully screened or restricted to upper floor sections by intervening existing building structures. Visible parts of the development will introduce a new type of building structure and materials along the roofscape of often uniform and straight lined brick parapets of the historical Georgian buildings. However, the proposed development will not become a character changing element in these views.

Long distance views, outside the core study area of 1.5km, from within the remainder of the 5km study area are generally restricted by the overall flat or gently undulating nature of the land and by intervening existing building structures and vegetation. Views of the skyline of Limerick and the upper

sections of the high rise element of the development can be experienced from isolated locations where there is no or little intervening topography, vegetation or building structures.

Cumulative Effects – Cumulative effects result from additional changes to the existing townscape character or visual amenity as a result of the proposed development being visible together with other developments of similar type and scale, which are in the planning process but not built yet. Two consented projects, namely 'The Bishop's Quay' at the southern end of the Georgian Quarter and 'The International Rugby Experience' (Rugby Museum) located along O'Connell Street in the historic centre of Limerick may result in cumulative effects when seen together with the Opera site development.

The 15 storey Bishop's Quay development adds another high rise development in close proximity to the existing 59m high Riverpoint building, also located at The Bishop's Quay, and the existing Clayton Hotel with 57m slightly further south at Steamboat Quay. The proposed Opera development is located approximately 650m apart and will be seen as detached from these developments due to the long distance between them. The Opera site is also not located along the river front, which integrates it into the existing cityscape.

The 7 floor tower of the Rugby Museum stands approximately 530m apart from the Opera site and will partially screen the upper floors of Parcel 5 of the Opera site in views to the north. Cumulative changes resulting from both developments will concentrate in views north along O'Connell Street beginning approximately at The Crescent. The Rugby Museum will become visually more prominent than the proposed Opera site in views further north along O'Connell Street.

Cumulative effects can be significant when the Opera site is seen together with the consented developments as all projects will introduce new landmarks into the city centre skyline. However, the Opera site stands considerably apart from the consented developments and therefore does not directly relate to them in the majority of available views due to the screening effects of the existing cityscape.

Mitigation Measures - The principal mitigation for the proposed development is inherent in the design of its architecture, public realm and open space, which has evolved through an iterative process of assessment and consultation. The proximity of the development to historic townscapes and sensitive visual receptors has also influenced the design particularly in terms of mass, scale and use of building and surface materials. The public realm design is organised around a new central public plaza, the main square, creating a positive interface between the existing and proposed new buildings at the site. A sequence of interconnected spaces links Michael Street, Ellen Street, Rutland Street/Patrick Street and Bank Place. The new public open spaces allow for a 24h permeable city quarter accessible for everyone.

## 1.12 Traffic and Transport

The application site is located in Limerick City with good access to sustainable travel, including walking, cycling and public transport infrastructure (bus and rail). The Proposed Development has the potential to affect pedestrians, cyclists, public transport users and vehicular traffic during both the construction and operation phases.

The baseline conditions have been characterised by means of desktop research, policy review, GIS mapping, aerial photography, site visits and traffic surveys. These were then used to identify the potential impacts associated with the proposed development upon the surrounding transport network

The following is a summary of the methodology used in the assessment:

- The extent of the study area was defined by the impact of the development on walking, cycling, and public transport and traffic areas surrounding the development;
- A Traffic and Transport Impact matrix was developed in order to understand the sensitivity and description of impact and the magnitude of impacts of the development on the transport environment;
- In accordance with TII Traffic and Transport Assessment Guidelines (2014) six affected junctions were identified and modelled for a number of scenarios, base year, opening year + 5 years with and without development and opening year + 15 years with and without development;
- The traffic impacts of the development have been assessed during AM and PM peak periods;
- TII growth rates have been used to forecast future year traffic flows for the assessment;
- Development multi-modal trip rates and distributions were obtained from a number of sources including, Employment Densities 2nd Edition, Limerick Smarter Travel mode share targets and TRICS database;
- The development will be undertaken through phased construction with an operation year of 2022 and completion by 2024;
- The development provides a basement car park with 155 spaces; and,
- Limerick City and County Council provided evidence showing there is a surplus of publically available car parking surrounding the development which any additional car parking demand from the development can avail of.

The predicted impacts of the development on traffic and transport are assessed for both a construction and operational phase.

The percentage change in traffic flow on the affected links is between 0.6% to 1.17% on the R445 and Michael Street respectively. With HGV movements the increase in general traffic volumes is in the range of 1.14 % to 0.6% on the two affected route. The conclusion is that the demolition and construction stage of the development will have a temporary short term negligible effect on other road users.

A Construction Traffic Management Plan (CTMP) along with a Construction Methodology and Phasing Management Plan (CMPP) will be secured to further mitigate any impacts.

Once occupied, the Proposed Development will generate additional movements on the surrounding transport network.

Following the completion of the Proposed Development there will be a slight increase in average daily traffic flows on the roads near the site. However, all junctions continue to operate within capacity for all scenarios tested. This will lead a slight increase in driver delay in the area, but the effect is not significant. A Mobility Management Plan for the site will be secured to encourage less car travel and helps to mitigate driver delay and stress in the area.

The public realm enhancements will create a more attractive place to travel to, from and through. The Proposed Development has been designed to provide a safe and secure environment and appropriate footway widths and pedestrian crossings. The increased number of pedestrians will improve passive surveillance in the area, and the public realm enhancements will help improve the pedestrian environment. The effect on pedestrian and cyclist delay, amenity, fear and intimidation are permanent and beneficial.

There will be enhancements to public transport infrastructure (bus stops) and an increase in usage of public transport that will result in a permanent and beneficial impact.

In terms of car parking availability, the proposed development will have a moderate impact on the availability of publically accessible car parking in the vicinity of the site.

No additional mitigation is necessary over and above the management plans which form part of the embedded mitigation. This includes a Mobility Management Plan and Delivery and Servicing Plan.

No residual or cumulative impacts from the development have been identified.

In conclusion, it is considered that the development will not have a significant impact in traffic and transport terms with the mitigation measures proposed.

## **1.13 Waste Management**

There will be no significant storage or use of hazardous materials during the operational phase that could adversely impact subsoil, groundwater or surface water in the vicinity of the site.

During construction, excavation and removal from site of made ground and subsoil will have removed all sources of potential contaminated land. Any hazardous wastes and will be sent for recovery and recycling by licensed waste contractors in accordance with the relevant national and EU legislation.

## **1.14 Material Assets**

There will be some local diversion to power supplies, gas lines, telecommunications and sewage services to facilitate the development of the Opera site. However, it is expected that where outages occur, these will be facilitated out of hours to minimise effects on the surrounding community.

## 1.15 Biodiversity

Having regard for the potential impacts from the proposed development, and the nature of the proposed development site, the following ecology surveys were completed to inform the Biodiversity Chapter:

- Multidisciplinary daytime walkover surveys to identify and map the distribution of habitats and plant species including invasive species, and identify signs of and potential for protected fauna species, and fauna species of conservation interest including otter associated with the nearby Abbey River and River Shannon (10 and 31 May 2017, 6 June 2018, and 3 January 2019). The surveys also verified the results of desktop surveys, regarding the distribution of QI habitats of the Lower River Shannon SAC in the vicinity of the proposed development site (including the proposed outfall to the Abbey River).
- Daytime preliminary ground level assessments of buildings and trees to grade the suitability of trees and structures for roosting bats (10 and 31 May 2017);
- Bat emergence or re-entry surveys of buildings identified as having suitability for roosting bats during the preliminary ground level assessments (10, 11, and 31 May 2017; 1 June 2017; 8 May 2018; 6 June 2018);
- Bat activity surveys ('manned' by surveyors walking transects with handheld detectors: 10 and 31 May 2017; 8 May 2018);
- Bat activity surveys using automated detectors (8 May to 16 May 2018);
- Hibernation surveys of accessible basement structures (15 December 2017; 9 January 2018); and,
- Nesting bird surveys of buildings and other structures (10, 11 and 31 May 2017; 1 June 2017; and 8 May 2018).

Desk based studies and field surveys identified a range of designated habitats and species within the Zol of the proposed development site, these are discussed below. The lands in which the proposed development site are located have no formal designation.

### **Baseline Information**

#### Designated sites

##### Lower River Shannon SAC

The requirement for a proposed surface water sewer and new outfall to the Abbey River (Charlotte's Quay) means the proposed development site adjoins (and is downstream of) the Lower River Shannon Special Area of Conservation (SAC; site code: 002165). Bryophyte communities (i.e. mosses and/or lichens) associated with Qualifying Interest (QI) 'watercourses of plain to montane levels' habitat of the Lower River Shannon SAC were identified on the existing limestone wall of Charlotte Quay by the Abbey River, in the vicinity of the proposed surface water outfall. Given these bryophytes are a QI habitat of the SAC they were valued at International level, following the geographic frame of reference applied to the valuation of significant ecological features.

QI estuary habitat of the Lower River Shannon SAC was also identified in the Abbey River adjacent to the proposed outfall using desktop data, verified by field surveys.

Excluding the proposed surface water drain and outfall running northwards into the Abbey River, the Lower River Shannon SAC is located c. 45 m from the rest of the proposed development site at its nearest point. There was no potential breeding or resting sites of otter (which is a QI of the Lower River Shannon SAC), and no sheltered riparian feeding habitat often favoured by otter within the proposed development site or wider zone of influence. QI otter may occur occasionally in the nearby Shannon and/or Abbey Rivers within the potential zone of influence of piling effects.

QI Atlantic salmon of the Lower River Shannon SAC occur in the transitional waters of the River Shannon by the proposed development site on passage between upstream spawning and downstream estuarine/coastal waters. QI sea lamprey of the Lower River Shannon SAC is likely to spawn and feed in the estuarine habitats downstream of the proposed development site. QI river lamprey of the Lower River Shannon SAC (which spawns in freshwater upstream before migrating downstream) occurs in the downstream estuarine waters during its growth phase. Otter, Atlantic salmon, river lamprey, sea lamprey, and bottle-nosed dolphin are all QIs of the Lower River Shannon SAC and all occur downstream within the potential zone of influence of (unmitigated) pollution impacts.

#### River Shannon and River Fergus Estuaries SPA

The River Shannon and River Fergus Estuaries Special Protection Area (SPA; site code 4077) is located c. 725 m downstream of the proposed development site at its nearest point.

The nearest significant bird populations of the River Shannon and River Fergus SPA to the proposed development site are wintering and feeding flocks of several hundred black-headed gull (and smaller flocks of herring and common gull), on existing quay walls, pontoons, and railings on the eastern bank of the River Shannon, c. 120 m southwest of the proposed development site at their nearest point. These gull feeding/roosting locations are physically screened from the proposed development site by existing buildings. Due to the importance of these populations for the River Shannon and River Fergus SPA, they were valued at International scale.

Black-headed gull and potentially other designation features of the River Shannon and River Fergus Estuaries SPA such as cormorant, light-bellied Brent goose, golden plover, and/or lapwing could commute between downstream designated estuarine areas, and upstream, undesignated (inland) feeding/roosting areas including playing pitches, or other wetlands/green spaces. As such, whilst such birds may not stop to feed or roost within the proposed development site, they may fly through or over it (and this is of relevance to the assessment of potential bird collision risk from proposed structures). Due to the designation of such commuting populations within the River Shannon and River Fergus SPA, these populations were valued at International scale.

## Other sites

The Fergus Estuary and Inner Shannon, North Shore proposed Natural Heritage Area (pNHA; site code 002048) and Inner Shannon Estuary - South Shore pNHA (site code 000435) are also downstream of (but do not adjoin) the proposed development site.

## Habitats and flora

The proposed development site in urban Limerick City is dominated by built land devoid of any semi-natural vegetation. None of the buildings (including stone walls), spoil, recolonising bare ground, or street tree habitats were valued above Local Importance (Higher value).

No protected plant species, plant species of conservation concern, or invasive plant species scheduled to the relevant legislation were identified within the proposed development site.

## Fauna (bats)

A common pipistrelle roost, determined to be of Local Importance (Higher value) was identified at 9 Rutland Street within the proposed development site. The maximum of six common pipistrelle bats were observed exiting and re-entering an open window at this property during three of the emergence/re-entry surveys conducted in 2017 and 2018. This suggests it is a transitory male roost or non-breeding female roost (i.e. non-maternity roost). No other buildings containing roosting bats were identified.

A 'hotspot' of elevated bat activity valued at the scale of Local Importance (Higher) value, dominated by common pipistrelle bats was recorded in an unlit vegetated courtyard in the interior of the proposed development site, behind houses on Ellen Street. Three species of bat (common pipistrelle, soprano pipistrelle and Leisler's bat) were observed feeding and/or commuting through the proposed development site.

There were no lesser horseshoe bat (which is the only bat in Ireland listed on Annex II of the EU Habitats Directive) recorded foraging or roosting within the zone of influence of the proposed development site.

## Fauna (birds)

No specially protected bird species listed under Annex I of the Birds Directive were recorded breeding, foraging, or commuting in the proposed development site.

The urban habitats within the proposed development site do not offer feeding or roosting habitat to significant wintering birds of conservation concern in addition to the commuting populations potentially flying through and/or over the proposed development site described under designated sites above.

Collectively the nesting bird populations present were valued at Local-County scale. Herring gull was the only Red-listed bird species of High Conservation Concern nesting within the proposed development site (probable breeding evidence for a single pair of herring gull was recorded within the proposed development site in both 2017 and 2018). Four Amber-listed bird species of Medium

Conservation Concern were recorded nesting within the proposed development site (house sparrow, lesser black-backed gull, starling, and swift), in addition to two Green-listed species of Low Conservation Concern (jackdaw *Corvus monedula* and feral pigeon *Columba livia*).

#### Fauna (other species)

Distinct from fish populations which are the QIs of European sites, native sea trout and eel populations migrate past the proposed development site in transit between spawning and feeding areas, and these populations are valued at the County scale.

There were no significant populations of other protected species, or species of conservation concern recorded within the proposed development site or wider zone of influence.

### **Potential impacts**

#### Designated sites

Whilst outside the EIA process, for the avoidance of doubt it is noted that a Natura Impact Statement (NIS) was produced to determine if the proposed development would adversely affect any European sites. This NIS concluded that, following mitigation, there would be no adverse effects on the integrity of any European sites arising from the construction or operation of the proposed development, either alone or in combination with other plans or projects.

Before implementation of mitigation, potential impacts significant at international scale were identified from pollution (construction only) on both the Lower River Shannon SAC, and the River Shannon and River Fergus SPA. Similarly, potential pollution impacts at national scale were identified from pollution (construction only) on two nationally designated sites.

Before mitigation and applying the precautionary principle, there would be potential habitat loss impacts to QI bryophyte communities of the Lower River Shannon SAC ('watercourses of plain to montane levels' habitat) from the proposed outfall in Charlotte's Quay. These potential impacts would be significant at international scale.

There is potential for the proposed tower at Bank Place to pose a collision risk to birds in flight, resulting in potential impacts at international scale to the River Shannon and River Fergus SPA. No other significant impacts were predicted, having regard for the mitigation inherent in the proposed development.

#### Habitats and flora

During construction, potential loss of existing street trees would be significant at Local geographic scale. All other potential impacts would be non-significant. During operation, all potential impacts would be non-significant.

#### Fauna

During construction, before mitigation, potential pollution impacts to eel and sea trout in the River Shannon and Abbey River would be significant at Local-County geographic scale.

During construction, before mitigation, the following potential impacts would all be significant at Local geographic scale:

- Potential disturbance impacts to the roost of common pipistrelle bats;
- Potential habitat removal/disturbance to foraging bats, and,
- Potential disturbance and habitat removal impacts to nesting birds.

During operation (before mitigation), potential disturbance impacts to roosting and foraging bats, and nesting birds, and potential collision impacts to (non-designated) bird populations would be significant at Local geographic scale.

During operation, all other potential impacts would be non-significant

### **Inherent Mitigation**

Mitigation inherent in the design includes Sustainable Urban Drainage Systems (SUDS) in the operational drainage design, super-elevated' entrance/exits to prevent ingress of flood waters, and landscape planting plans which have been reviewed to ensure they include no invasive species.

### **Additional Mitigation**

A range of additional mitigation has been considered as part of the EIAR where potential significant impacts have been identified prior to mitigation measures.

Additional measures during construction include:

- Measures including a coring method to install the proposed Abbey River outfall (under supervision of and with input from a suitably experienced ecologist) to avoid impacts to QI bryophytes of the Lower River Shannon SAC;
- Site-specific pollution controls including the laying of the operation-phase surface water sewer in Michael Street at the start of construction (including hydrocarbon treatment, and silt traps), an alarmed and monitored surface water recirculation system to prevent contaminated water entering the Michael Street drain, and spill control and emergency response measures (including flood response actions in the event of coastal flooding during construction);
- Seasonal structural works to protect roosting bats in 9 Rutland Street, under license from (and assuming grant of same by) the Wildlife Licencing Unit of the National Parks & Wildlife Service;
- Seasonal structural works as required to protect nesting in other structures, if necessary under license from (and assuming grant of same by) the Wildlife Licencing Unit of the National Parks & Wildlife Service;
- Prioritised construction (i.e. before other site works) of the new surface water sewer in Michael Street (including SUDS) and the associated outfall to the Abbey River;
- Inclusion of artificial bird nesting provision for swift ('swift brick'), and artificial bat roosting provision for common pipistrelle bats ('bat 'bricks' and bat 'tiles'); and,
- Engagement of a suitably experienced ecologist to direct and advise the Contractor(s) on implementation of the specific measures proposed.

Additional mitigation measures during operation include:

- Use of flashing red or white lights on the proposed tower at Bank Place to mitigate bird collision impacts;
- Removal of uplighting from the façade of 4 and 5 Rutland Street where artificial bat roosting provision is proposed; and,
- Review of the detailed operational lighting design by a suitably qualified bat ecologist to ensure that the site-specific lighting mitigation measures in the Chapter are incorporated.

The Contractor will produce a Water Quality Monitoring Programme (WQMP) in advance of the construction programme, which will, in conjunction with the advice of the suitably experienced ecologist, inform the Contractor's adaptive management of the temporary construction-phase drainage works, having regard for any consents or planning conditions.

### **Residual Impacts**

Following implementation of mitigation measures, the geographic scale of significance of residual impacts will be at local level for roosting bats, feeding bats, nesting birds. All other residual impacts will be non-significant. Residual impacts to designated sites will be non-significant.

## **1.16 Archaeological and Cultural Heritage**

The proposed development area is located within the Zone of Archaeological Notification for the historic town of Limerick, which is a recorded monument (LI005-017). There are no recorded archaeological sub-constraints located within the site. The closest consists of the current location of a sheela-na-gig (LI005-017180), c. 30m to the east and a church and graveyard (LI005-078001-2) c. 40m to the west. The line of the medieval town defences (LI005-017010) for Irishtown is located c. 85–140m to the east of the proposed development area.

- Analysis of the historic cartographic resources has shown that the site was formerly located within an un-reclaimed estuarine environment to the south and west of the medieval settlement at Limerick. The river banks were gradually reclaimed and developed in the mid-late 18th century and significantly designed and reconstructed during the Georgian Period. By the 19th century the proposed development area was fully developed. Despite the development within the site, it still retains archaeological potential when considering its former estuarine nature and the proximity of the historic settlement of Limerick.

A review of the Excavations Bulletin (1970-2018) has shown that no previous archaeological investigations have been carried out within the proposed development area. A field inspection has been carried out as part of this assessment. This clearly illustrated the developed nature of the site but no previously unrecorded features of archaeological potential were noted.

No specific cultural heritage assets were identified during the course of this assessment.

Design proposals include for the construction of a basement level across the site save for those areas where existing buildings are being retained. The formation level of the basements will be at 1.3m aOD, resulting in the removal of up to 2.4m of material across the site.

Given the redevelopment of the site during the Georgian period it is possible that any potential archaeological remains may have been removed or disturbed at this time.

It remains possible that groundworks associated with the proposed development may have a direct and negative impact on any surviving archaeological remains. This may include features associated with riverine activities such as fish traps, which have the potential to survive beneath the reclamation deposits. This may also include structures shown on the mid-18th century mapping, which predate the Georgian redevelopment. The significance of the impacts may range from moderate to profound negative, dependant on the value and sensitivity of any potential archaeological material that may survive beneath the current ground level.

A targeted programme of archaeological test trenching will be carried out following the demolition of structures proposed for removal and prior to any invasive enabling works, including the insertion of the secant piled walled around the perimeter of the site. The programme of testing will allow for an assessment of the presence, location, extent, value and sensitivity of potential archaeological remains at the site. This work will be carried out by a qualified archaeologist, under licence from the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht (DoCHG).

Archaeological mitigation, such as monitoring or excavation, may be required dependant on the results of this investigation. Full provision will be made available for the resolution of any archaeological remains, both on site and during the post excavation process, should this be deemed the appropriate manner in which to proceed.

## 1.17 Architectural Heritage

The Opera site fronts four streets in a historic area of Limerick City and includes a large internal area. The existing buildings on the site are, for the most part, made up of historic structures although there are some 20th century buildings interspersed among the 18th and 19th century structures. The majority of the buildings are of architectural and historical importance although in some cases their condition is very poor. Many of the buildings have been unused for a prolonged period of time, particularly the upper floors.

There are two Protected Structures on the site, meaning that these buildings are listed for preservation in Limerick City's Development Plan. In addition, a stone door surround on Rutland Street is also a Protected Structure. Some of the other buildings are included on the National Inventory of Architectural Heritage.

The majority of the historic buildings remaining on the site are terraced brick structures from the Georgian period. They would have originally comprised living accommodation to the upper floors often with a shop of some kind to the ground floor entered off the street, and with a basement below. Basements extend under the footpath in front of the buildings and include vaulted spaces for storing coal. The larger historic buildings on the site include an 18th century stone Granary building, an early-19th century former Town Hall, and a stone building which was formerly a large wine and grocery store, and more recently Quinn's Bar.

The collection of existing buildings on the site are of architectural, historical and social significance, in terms of their individual architectural design, but also in how they all collectively contribute to the character of the streets on which they are located and to the larger surrounding area. Their social significance refers to their previous uses, sometimes public uses, and to their previous occupants.

As part of the process of researching and planning the future development of the Opera site, all of the existing buildings were surveyed and recorded in order to assess the extent of their original and historic fabric still remaining and to understand the significance of each individual structure. Once a full understanding of each building was gained, the information was shared with the design team who were made aware of the Architectural Heritage sensitivities and were able to design the scheme to include the retention and reuse of the historic buildings. Almost all buildings of architectural or historical merit have been incorporated in to the proposed scheme.

Where buildings have been deemed to not be of architectural or historical significance, new structures are proposed as replacements. These buildings are contemporary in design and are larger in scale and height than the historic buildings on the site. These new buildings will be highly visible due to their size and will be clearly identifiable as modern interventions among the historic buildings. Because the historic buildings all front on to the streets, they will remain clearly visible following the development of the new buildings.

The interior of the site will be improved by the introduction of a publicly accessible plaza with the historic buildings retained to the periphery, in some cases opening on to this new plaza. Landscaping works to Bank Place will also provide a more suitable setting for the Granary building and other historic buildings to this street.

While the visual impact of the new buildings on the site will be high, the physical impact of the proposed works on the historic buildings will be positive and long term. Conservation works will be carried out to the exteriors of all historic buildings (and in some cases also to the interiors) which will both restore and preserve their architectural character.

## 1.18 Interactions

As a requirement of the Environmental Impact Assessment Directive 2014 (Directive 2014/52/EU), and of best practice guidelines and advice notes, the inter-relationships between individual factors must be identified and assessed.

Article 3 of the Directive requires that the interactions between the following be assessed:

- Population and Human Health;
- Land, soils & geology and Groundwater;
- Water;
- Air Quality and Climate;
- Noise and Vibration;
- Microclimate;
- Landscape and Visual;
- Traffic and Transport;
- Waste Management;
- Material Assets;
- Biodiversity;
- Archaeology and Cultural Heritage; and,
- Architectural Heritage.

The EIAR has addressed each of the elements likely to have potential for environmental impact, during the construction and operational phases of the proposed development within their individual chapters.

### 1.18.1 Summary

In summary, no significant negative impacts are predicted from the interactions of the elements of the proposed development when viewed in light of their associated mitigation measures. The interactions are summarised in Table A.

Table A: Potential Interactions of Environmental Effects

Key Environmental Interactions Matrix	Population and Human Health	Land, Soils etc.	Water	Air Quality and Climate	Noise and vibration	Microclimate	Landscape and Visual	Traffic and Transport	Waste Management	Material Assets	Biodiversity	Archaeology and Cultural Heritage	Architectural Heritage
Population and Human Health													
Land, Soils etc.	✓		✓	✓	✓				✓	✓	✓		
Water	✓										✓		
Air Quality and Climate	✓												
Noise and Vibration	✓												✓
Microclimate	✓						✓						✓
Landscape and Visual											✓		
Traffic and Transport	✓												
Waste Management	✓												
Material Assets													
Biodiversity													
Archaeology and Cultural Heritage		✓											
Architectural Heritage							✓						

## 1.19 Mitigation and Monitoring

The summary of mitigation and monitoring has been provided in Table B.

Table B: Summary of Mitigation and Monitoring

EIAR Topic	Proposed Impact	Construction	Operation
Population and Human Health	Effects on pedestrians and cyclists	During construction, temporary signage and alternative route consideration (for pedestrians and cyclists) shall be provided pre construction. As the nature of the proposed development is a mixed use development with construction and operational phase jobs and major retail opportunities, no further mitigation measures are required.	
Lands, Soils, Geology and Groundwater	Requirements of Construction Methodology and Phasing Management Plan	<p>The Construction Methodology and Phasing Management Plan (CMPP) (which accompanies this application) establishes specific control measures to minimise the impact of construction works on the environment as part of the implementation of the mitigation measures and to ensure that consistent standards of environmental protection are established and maintained throughout the project works.</p> <p>During the early stages of construction, site clearance and excavation of made ground and subsoil to facilitate construction of basements, laying of foundations and realignment of drainage channels etc. will be undertaken.</p>	
	Management of Excavation	<p>Controlling working practices will avoid repetitive handling of excavated made ground and subsoils, minimise vehicle movements, limit the size of stockpiles and will reduce the compaction and erosion of material and generation of dust. The location of plant and materials and the implementation of a construction traffic management plan will minimise compaction and erosion of soil.</p> <p>If temporary storage of excavated, made ground and</p>	

EIAR Topic	Proposed Impact	Construction	Operation
		<p>subsoils is required it will be managed to prevent potential negative impact on the receiving environment and the stockpiled material will be covered and stored away from any surface water drains. It will be necessary to designate areas within the site where stockpiles will be established in order to facilitate the efficient transfer of material within the site. It will be necessary to position spoil and temporary stockpiles in locations which are at least 15 m distant from drainage systems.</p> <p>All excavated materials will be inspected for signs of possible contamination, such as staining or strong odours. Should any unusual staining or odour be noticed, this made ground / subsoil will be segregated and samples analysed for the presence of possible contaminants in order to determine an appropriate disposal outlet. Excavated made ground and subsoil will be disposed to licensed / permitted waste management facilities, as appropriate for the waste classification of the material.</p> <p>Excavation shall be restricted in times of high winds and heavy rainfall to minimise the potential for dust generation or uncontrolled sediment movement. Good construction practices will also be used during the construction phase, such as wheel washers and dust suppression on site roads (to be captured within the proposed sustainable urban drainage system (SUDS), and at site access points.</p>	
	<p>Importation of fill to site</p>	<p>The source of aggregate, fill material and topsoil imported to site will be carefully selected and vetted in order to ensure that it is of a reputable origin and that it is “clean” (i.e. will not contaminate the environment).</p>	

EIAR Topic	Proposed Impact	Construction	Operation
	Management of spills and leaks	<p data-bbox="723 256 1397 512">Due to the presence of a locally important aquifer beneath the site, shallow groundwater, adjacent surface water bodies, the presence of surface water drainage and nearby rivers which are designated as an SAC, mitigation measures at the construction site will be employed in order to prevent spillages to ground of fuels, and to prevent consequent soil or groundwater quality impacts such that:</p> <ul data-bbox="723 544 1397 1398" style="list-style-type: none"><li data-bbox="723 544 1397 639">• No oils/fuels will be stored on the proposed development site for the purpose of refuelling on the site;</li><li data-bbox="723 655 1397 815">• General maintenance and refuelling of plant, will be restricted to impermeable bunded areas with a minimum 110% storage capacity and away from surface waters or areas where any spillages could easily reach surface water;</li><li data-bbox="723 831 1397 927">• Leaking or empty oil drums shall be removed from site immediately and disposed of via an appropriately licensed waste disposal contractor;</li><li data-bbox="723 943 1397 1070">• All hazardous substances on-site shall be controlled within enclosed storage compounds that shall be fenced-off and locked when not in use to prevent theft and vandalism;</li><li data-bbox="723 1086 1397 1310">• Refuelling of plant and machinery shall take place at least 15 m away from drains or dewatering points using a mobile fuel bowser and restricted to designated areas on hard standing; only double-bunded fuel bowsers shall be used; vehicles shall not be left unattended during refuelling operations; road vehicles will not be refuelled at the site;</li><li data-bbox="723 1326 1397 1398">• Fixed plant shall be self-bunded; mobile plant shall be in good working order, kept clean, fitted with drip</li></ul>	

EIAR Topic	Proposed Impact	Construction	Operation
		<p>trays where appropriate and subject to regular inspection; water runoff from designated refuelling areas shall be channelled to an oil-water separator, or an alternative treatment system, prior to discharge;</p> <ul style="list-style-type: none"> <li>• Spill kits and oil absorbent material shall be carried with mobile plant and located at vulnerable locations around the site to reduce risk of spillages entering the sub-surface or groundwater environment; booms shall be held on-site for works near drains or dewatering points; and</li> <li>• Operatives will be trained in the proper handling of materials, the sensitive nature of the wider drainage system, and the consequences of accidental spillage.</li> </ul>	
	<p>Management of concrete on site</p>	<p>Measures for protection of soil and groundwater from wet concrete will include measures to prevent discharge of alkaline wastewaters or wash water to the surface water drainage system or to the underlying subsoil and groundwater, such that:</p> <ul style="list-style-type: none"> <li>• Ready mixed concrete will be brought to the proposed development site by truck;</li> <li>• Concrete pouring will take place within a designated area to prevent concrete runoff in soil and groundwater; and</li> <li>• Washout of concrete transporting vehicles shall take place at an appropriate facility; off-site or where on-site wash out will be captured for disposal off-site.</li> </ul>	
	<p>Water Quality Management</p>	<p>Mitigation measures in the water quality management plan shall minimise impacts and monitor effects upon the</p>	

<b>EIAR Topic</b>	<b>Proposed Impact</b>	<b>Construction</b>	<b>Operation</b>
-------------------	------------------------	---------------------	------------------

---

water environment during construction.

Mitigation measures within the water quality management plan will include:

- Procedures for investigating environmental incidents and incident notification procedures;
- Assessment of earthworks that are likely to give rise to sediment-laden run-off, the routes this is likely to take, and the methods to prevent silt entering the Shannon and Abbey Rivers;
- Procedures for dewatering the site during construction works, including licensing requirements, monitoring requirements, discharge points and maintenance requirements of water treatment plant;
- Establishment of contingency measures to cater for impacts to unknown services underlying the construction site (for example, old sewers, culverts);
- How mud and dust will be controlled and the frequency for road cleaning and dust suppression required at different times of the year;
- How shallow groundwater and the bedrock aquifer will be protected from potential contamination through the implementation of measures to prevent impact from spills and leaks; and
- Identify whether shallow groundwater monitoring wells on site will be maintained and protected during construction works; decommissioned; or removed completely as part of excavation works, to prevent them from acting as direct pathways for contamination to enter the groundwater body

EIAR Topic	Proposed Impact	Construction	Operation
		beneath the site.	
	Provision of training	<p>Induction training shall be provided to site construction personnel to inform them of their responsibilities and liabilities with reference to water quality and contamination issues, for example, workshops prior to commencement of site works, environmental toolbox talks during the works, and by use of notice boards in site offices to display important information.</p>	
Water	Requirements of Construction Methodology and Phasing Management Plan	<p>The Contractor will take all precautions to prevent the pollution or silting of watercourses from the construction of the proposed development.</p> <p>The Contractor will apply following mitigation:</p> <ul style="list-style-type: none"> <li>• Prior to excavation of the basement, the proposed foul and storm water sewers in Michael Street will be laid and commissioned to allow the existing combined sewer to be diverted. During the construction of the new sewers, surface water arising from the development will continue to discharge to the combined sewer. Surface water collected will be treated by sedimentation prior to discharge to the existing combined sewer. Total Suspended Solids (TSS) and colour will be monitored daily by a hand held multi parameter sonde.</li> <li>• Maintain and monitor the performance of the surface water drainage network throughout the construction of the proposed development noting that the proposed storm sewer will include a permanent hydrocarbon separator which will treat runoff from Michael Street.</li> <li>• Cover all temporary stockpiles generated during</li> </ul>	

EIA Topic	Proposed Impact	Construction	Operation
		<p>construction to minimise run-off.</p> <ul style="list-style-type: none"><li>• Locate spoil and temporary stockpiles in locations which are at least 15 m from drainage systems.</li><li>• Neither ground water or surface water runoff from the working areas will be permitted to discharge directly to the Abbey River or Shannon River. Run off generated within the site during construction will be filtered and treated to remove hydrocarbons and sediment. Total Suspended Solids (TSS), pH/EC and colour will be monitored daily by a hand held multi parameter sonde. In addition, the outlet from the sedimentation pond will incorporate a turbidity monitor with alarm at high level. In the event of surface water failing to meet the required standards, as set out in the discharge licence, water will be recirculated to the inlet of the sediment pond to provide further time for settlement. A penstock will be provided on the outlet from the sediment pond to control discharge from the site. In the event of surface water failing to meet the required standards, as set out in the discharge licence, water will be recirculated to the inlet of the sediment pond to provide further time for settlement. A penstock will be provided on the outlet from the sediment pond to control discharge from the site.</li><li>• Avoid direct or indirect discharges of untreated surface or ground water generated during the proposed development, to any surface water.</li><li>• Dewater all working areas at the end of each working day, if necessary, using pumping and transport of water off site in tankers if volumes prevent effective treatment prior to discharge.</li></ul>	

EIAR Topic	Proposed Impact	Construction	Operation
		<ul style="list-style-type: none"><li>• Where the Contractor utilises pumping to drain works areas, a backup pump and generator must be provided on site for use in the event of the primary pump failing.</li><li>• Use wheel washers and dust suppression on site roads (to be captured within the proposed SUDS system) and undertake daily plant maintenance checks and corrective actions where required.</li><li>• Establish contingency measures to cater for impacts to unknown services underlying the construction site (for example, old sewers or culverts).</li><li>• Identify whether shallow groundwater monitoring wells on site will be maintained and protected during construction works; decommissioned; or removed completely as part of excavation works, to prevent them from acting as direct pathways for contamination to enter the groundwater body beneath the site.</li><li>• Ready mixed concrete will be brought to the proposed development site by truck.</li><li>• The pouring of concrete shall take place within a designated area to prevent concrete runoff into the soil/ground water media.</li><li>• Proposed surface water drainage network outfall:<ul style="list-style-type: none"><li>– Outfall construction will avoid the pouring of concrete.</li><li>– The proposed pipe will be installed by coring through the quay wall.</li><li>– The Contractor's method statement for the works will be reviewed by a suitably qualified</li></ul></li></ul>	

EIAR Topic	Proposed Impact	Construction	Operation
------------	-----------------	--------------	-----------

---

ecologist.

- The works to provide the outfall will be supervised by the suitably qualified ecologist to advise and direct the Contractor on compliance with the method statement.
- Washout of concrete transporting vehicles shall take place at an appropriate facility, offsite or where onsite wash out will be captured, for disposal off-site.

All design and construction will be carried out in accordance with the Construction Industry Research and Information Association (CIRIA) C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors.

Daily monitoring of the excavation/earthworks, the water treatment and pumping system will be completed by a suitably qualified person during the demolition / basement excavation and construction phases. Preventative measures will be implemented to ensure no entrained sediment, or deleterious matter directly into any drains or watercourses.

If high levels of silt or other contamination is noted in the pumped water or the treatment systems, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied.

The primary flood risk to the site is associated with coastal flooding. The Contractor will provide a ramp to the development site as a mitigation measure to prevent any flood waters to enter the main structure or the

EIAR Topic	Proposed Impact	Construction	Operation
		<p>underground structure during the Construction Stage.</p> <p>As coastal flooding is somewhat predictable (usually 24-36 hours in advance) the Contractor shall take note of when coastal flooding warnings are issued for the Limerick City area. In the event that a flood warning is issued, all plant and construction materials must be moved and stored in parts of the site that are located within Flood Zone C or above the estimated 1 in 1000 year return period coastal flood event (CFRAM). Therefore, in the event of floodwaters inundating the site, no materials will be washed from the site into nearby watercourses.</p>	
	<p>Requirements for Spill Control Measures</p>	<p>No oils/ fuels will be stored on the proposed development site for the purpose of refuelling on the site.</p> <p>On-site plant will be refuelled by an external Contractor who will call to site as required. Road vehicles will not be refuelled at the site. Minor spills and leaks may occur from road vehicles and the onsite excavator. Any oils or fuels onsite will be removed by an experienced and authorised contractor.</p> <p>Fixed plant shall be self-bunded; mobile plant shall be in good working order, kept clean, fitted with drip trays where appropriate and subject to regular inspection.</p> <p>Spill kits and oil absorbent material shall be carried with mobile plant and located at vulnerable locations around the site to reduce the risk of spillages entering the sub-surface or groundwater environment; booms shall be held on site for works near drains or dewatering points.</p> <p>The Contractor will train all operatives in the proper handling of materials, the sensitive nature of the wider</p>	

<b>EIAR Topic</b>	<b>Proposed Impact</b>	<b>Construction</b>	<b>Operation</b>
-------------------	------------------------	---------------------	------------------

---

drainage system, and the consequences or accidental spillage.

The following steps provide the procedure to be followed by the Contractor(s) in the event of any significant spill or leak:

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers;
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident;
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill;
- If possible, cover or bund off any vulnerable areas where appropriate such as drains or watercourses;
- If possible, clean up as much as possible using the spill control materials;
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited;
- Notify the Contractor immediately giving information on the location, type and extent of the spill so that they can take appropriate action and further investigate the incident to ensure it has been contained adequately;
- Verify if necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring, where necessary proposing

EIAR Topic	Proposed Impact	Construction	Operation
		<p>additional the necessary; and,</p> <ul style="list-style-type: none"> <li>The Contractor will notify LCCC and (if LCCC deem it appropriate) Inland Fisheries Ireland.</li> </ul>	
	<p>Water Quality Monitoring Requirements</p>	<p>The Contractor will produce and commence a Water Quality Monitoring Programme (WQMP) at least one month in advance of the construction programme including any enabling works to establish a baseline dataset, and continue throughout construction. The regularity of, and specification for water quality monitoring in this section has been agreed following consultation with IFI during EIAR production.</p> <p>The baseline water quality dataset will include sampling at low tide, sampling at high tide, and (where possible should such events overlap with the pre-construction monitoring period) periods of elevated rainfall.</p> <p>The WQMP will sample surface water discharge upstream and downstream from the proposed outfall to the Abbey River, in similar habitat and flow conditions, to enable siltation and other contaminants from the proposed development to be detected and distinguished from 'background' levels (including natural and man-made activities).</p> <p>The WQMP will include relevant parameters from the European Communities (Quality of Salmonid Waters) Regulations, 1988 S.I. No. 293 as amended including Suspended Solids, pH, Dissolved Oxygen, Biochemical Oxygen Demand, hydrocarbons, Nitrites, Nitrates and heavy metals.</p> <p>Testing for pH, turbidity and/or Total Suspended Solids will be carried out daily in-situ using a calibrated multi-parameter sonde (to 0.1 NTU accuracy), and fortnightly</p>	

EIAR Topic	Proposed Impact	Construction	Operation
		<p>for all other parameters.</p> <p>The WQMP will inform the Contractor’s adaptive management of the temporary construction-phase drainage works, having regard for any consents or planning conditions.</p> <p>The Contractor will provide WQMP results to the Ecologist and LCCC at least fortnightly (but immediately after a known silt release or other pollution incident), along with a record of any corrective actions taken by the Contractor to improve or repair performance of silt fencing or other surface water protection measures.</p> <p>Highest standards of site management will be maintained and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A named person will be given the task of overseeing the pollution prevention measures.</p>	
	<p>Construction Phase Materials Handling and Storage</p>	<p>Materials will be stored within the site compound and outside of areas identified as being at risk of flooding.</p>	
	<p>Disposal of Materials</p>	<p>All material to be disposed of off-site will be disposed of to a disposal facility licensed in accordance with Irish Waste Management Legislation. Where material is to be stockpiled on site prior to disposal, the contractor will control all run-off to prevent contamination of surrounding watercourses.</p> <p>Contaminated soil will be assessed to determine its constituents and disposed of offsite in accordance with Irish Waste Management Legislation.</p>	

EIAR Topic	Proposed Impact	Construction	Operation
	Control of Concrete in relation to Water Quality	<p>Ready-mixed concrete will be brought to the Proposed Development site by truck. Measures for protection of watercourses from wet concrete shall be included in the CMPP. This will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil / groundwater or nearby surface watercourses.</p> <p>The pouring of concrete shall take place within a designated area to prevent concrete runoff into the soil / groundwater media. Washout of concrete transporting vehicles shall take place at an appropriate facility, offsite where possible, alternatively, where wash out takes place on-site, it shall be carried out in carefully managed on- site wash out areas.</p>	
	Foul sewer controls	<p>Foul sewage arising from temporary toilets and sanitary facilities on the Proposed Development site will initially be discharged to an on-site receptacle which will be emptied by tanker on a regular basis for disposal. This arrangement will be in place until the construction of on-site facilities connected to the existing Irish Water wastewater network.</p> <p>It is anticipated that due to the scale of the Proposed Development that a canteen will be provided on site during construction. Provisions will be made for a grease trap at the canteen drain outlet and this drain will connect to the on-site receptacle and later to the foul sewer. Drumming of waste cooking oil within the canteen will also be provided.</p>	
	Water supply during operation		The water system will be metered to determine water consumption and facilitate leakage detection.

EIAR Topic	Proposed Impact	Construction	Operation
	Flood Risk		<p>The proposed development is located within Flood Zone B and the associated water level in the area is 4.72 m OD Malin.</p> <p>The proposed finished floor level for new buildings within the development is 5.32 m OD Malin. This level includes a climate change and land movement allowance of 600mm and is above the 1 in 200 year return period coastal flood event level. In addition, all critical infrastructure within the buildings will be at a minimum level of 5.16 m OD Malin. All existing buildings to be retained are located within Flood Zone C.</p> <p>The design incorporates super-elevated entrance/exits for the development as a mitigation measure to prevent any flood waters to enter the main structure or the underground structure. In case of emergency there is vehicular access for Fire and Ambulance services to the building via Rutland Street, Patrick Street and Ellen Street westbound as these roads are outside of the areas identified as being at risk of flooding by the CFRAM project.</p> <p>The above measures incorporated into the proposed development design will minimise potential adverse effects due to flooding and drainage.</p>
	Storm water drainage		<p>The proposed storm water drainage system has been designed to ensure that there will be no increase in water levels or flow rates downstream of the proposed outfall. The system includes two attenuation tanks which will store run-off when the inflow rate exceeds 9.4the greenfield runoff rate. The system also includes a Class I Bypass Hydrocarbon Separator to remove hydrocarbons</p>

EIAR Topic	Proposed Impact	Construction	Operation
			<p>which may be suspended in runoff. To minimise sediment, build up within the storm water drainage network, trapped inlets will be used at all points of entry and key manholes will have sumps to collect material. A regular maintenance regime, including monitoring, will be put in place to remove any excess build-up of material. A Class I Bypass Hydrocarbon Separator has also been provided to treat surface water collected in the new gullies on Michael Street.</p> <p>LCCC, shall establish a maintenance company that will be responsible for the regular maintenance and monitoring of all infrastructure installed as part of the development. This includes the surface water drainage, gullies and petrol interceptor on Michael Street. Future third party Connection to the infrastructure in Michael Street will only be permitted if the same standard can be given with regards maintenance and monitoring. On behalf of LCCC, Limerick Twenty Thirty will be responsible for funding of the company and should units be sold (or resold) or leased (or subsequently lease), the sale shall incorporate a legal obligation on each unit owner to fund this management company on a pro rata basis.</p>
	<p>Foul sewage provision during operation</p>		<p>All foul water from the Proposed Development will discharge to the existing Irish Water combined sewer network.</p>
<p>Air Quality and Climate</p>	<p>Fugitive emissions of dust</p>	<p>Demolition, earthworks and construction activities have been defined as a medium risk, while trackout activities have been defined as a small risk of dust impacts. IAQM guidance specifies that the highest category of risk should be applied to all activities when assigning mitigation measures to reduce dust emission from each</p>	

EIAR Topic	Proposed Impact	Construction	Operation
		<p>of these four activities to low/negligible level. Procedures to assess deposition of dust shall be undertaken on site. Due to the proximity of human and ecological receptors, measurement data shall be obtained from at least three points on the site boundary. A sampling campaign, including baseline measurements (prior to construction), of sticky pads will consist of a suitable approach to collecting a catalogue of emitted dust particles. In addition to this the following section describes measures for the purpose of dust suppression that will be included in the CMPP which are considered standard practice.</p>	
	<p>Measures Specific to Demolition (medium risk):</p>	<p>Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);</p> <p>Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as water can be directed to where it is needed;</p> <p>Avoid explosive blasting, using appropriate manual or mechanical alternatives; and</p> <p>Bag and remove biological debris or damp down such material before demolition.</p>	
	<p>Measures Specific to Earthworks:</p>	<p>Ensure excavated soil is stored in appropriate areas and removed from site as soon as practicable</p> <p>Use Hessian, mulches or tackifiers where it is not possible to cover with topsoil, as soon as practicable; and</p> <p>Only remove the cover in small areas during work and</p>	

EIAR Topic	Proposed Impact	Construction	Operation
		not all at once.	
	Measures Specific to Construction:	<p>Avoid scabbling (roughening of concrete surfaces)</p> <p>Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;</p>	
	Measures Specific to Trackout:	<p>Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site;</p> <p>Avoid dry sweeping of large areas;</p> <p>Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport; and</p> <p>Implement a wheel washing system to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable.</p>	
	Carbon reduction mitigation	<p>Mitigation measures to reduce the impact which the proposed development may have on climate change will include the measures which are consistent with good practice regarding sustainable building design, safe bicycle storage and electric car charge points.</p>	
Noise and Vibration	Best Practical Means for noise reduction during construction.	<p>The contractor will follow Best Practicable Means (BPM) to reduce the noise and vibration impact on the local community, including:</p> <ul style="list-style-type: none"> <li>Fixed and semi-fixed ancillary plant such as generators, compressors etc. to be positioned so as to cause minimum noise disturbance. If necessary, acoustic barriers or enclosures to be provided for</li> </ul>	

EIAR Topic	Proposed Impact	Construction	Operation
		<p>specific items of fixed plant;</p> <ul style="list-style-type: none"><li>• Use of site boundary acoustic barriers/hoarding to screen neighbouring receptors;</li><li>• All plant used on site will comply with the EC Directive on Noise Emissions for Outdoor Equipment (2000/14/EC), where applicable;</li><li>• Operation of plant in accordance with the manufacturer's instructions;</li><li>• All major compressors to be 'sound reduced' models fitted with properly lined and sealed acoustic covers which are kept closed whenever the machines are in use, and all ancillary pneumatic percussive tools to be fitted with mufflers or silencers of the type recommended by the manufacturers;</li><li>• All plant used on site will be regularly maintained, paying particular attention to the integrity of silencers and acoustic enclosures;</li><li>• Machines in intermittent use to be shut down in the intervening periods between work or throttled down to a minimum;</li><li>• Drop heights of materials from lorries and other plant will be kept to a minimum;</li><li>• Adherence to the codes of practice for construction working and piling given in BS 5228 and the guidance given therein for minimising noise emissions from the site;</li><li>• Provision of rest periods during any prolonged noisy activities;</li></ul>	

EIAR Topic	Proposed Impact	Construction	Operation
		<ul style="list-style-type: none"> <li>• prohibition of the use of stereos and radios on site;</li> <li>• Compliance with normal construction working hours of 08:00-18:00 Monday to Friday, 08:00-13:00 on Saturdays, with no working on Sundays or bank holidays, however if out of hours' work is deemed necessary, it is subject to approval by LCCC; and</li> <li>• Keeping local residents informed and provision of a contact name and number for any queries or complaints.</li> </ul>	
	Use of site hoarding	<p>The site perimeter will have site hoarding which will provide some attenuation of noise to receptors on lower floors (first floor and below). Such hoarding will provide a conservative reduction of approximately 5dB.</p> <p>During particularly noise works, consideration shall be given to the implementation of mobile noise barriers. As with site hoarding, mobile noise barriers will only provide attenuation of noise at lower floor levels. With the use of such barriers, noise levels at lower floor levels of NSRs could be reduced by up to 10 dB. With the use of mobile noise barriers, noise levels during the majority of construction activities will be reduced to below the threshold values. Where the threshold values are exceeded, this shall not be by more than 6 dB (during the construction of access roads/car parking).</p>	
	Vibration	<p>Consideration will be given to the times of day and duration of piling works to reduce potential annoyance as far as possible. Prior notification of piling works, along with information on anticipated durations and the negligible likelihood of damage to property, will provide reassurance to nearby residents.</p>	

EIAR Topic	Proposed Impact	Construction	Operation
	Internal noise levels		<p>Options for mitigation include:</p> <ul style="list-style-type: none"> <li>• Double-glazing</li> <li>• Secondary glazing</li> <li>• Up-rated single-glazing</li> </ul>
Landscape and visual	Inherent design mitigation	<p>The principal mitigation for the proposed development is inherent in the design of its architecture, public realm and open space, which has evolved through an iterative process of assessment and consultation. There are no operational management measures required in respect of townscape and visual issues.</p>	
	Construction methods to reduce effects on visual amenity	<p>During the demolition and construction works of each, measures such as site hoardings and cleaning roads to remove any track out will be undertaken to reduce temporary effects on visual amenity. No additional mitigation is proposed further to that incorporated into the design.</p>	
	Landscaping proposals		<p>The Central Plaza: A contemporary main plaza space located in the centre of the development providing a structural element to the site layout. It will be a focus for daily activity and seasonal events.</p> <p>Bank Place: New tree planting proposed across this new public space. Trees will be cleared stemmed to 3m and lopped at 9m.</p> <p>The Granary: Provides a hidden space to be discovered. Its character is inherently influenced by the adjoining Granary building.</p>

EIA Topic	Proposed Impact	Construction	Operation
Traffic and Transport	The Construction Traffic Management Plan	<p data-bbox="725 517 943 541">The plan provides:</p> <ul data-bbox="725 572 1397 1391" style="list-style-type: none"> <li data-bbox="725 572 1267 596">• Location of site and materials compound;</li> <li data-bbox="725 624 1361 679">• Location of areas for construction site offices and staff facilities;</li> <li data-bbox="725 707 1211 730">• Details of site hoarding and security;</li> <li data-bbox="725 758 1397 877">• Construction traffic will be limited to certain routes and times of the day, with the aim of keeping disruption to pedestrians, cyclist, general traffic and public transport to a minimum;</li> <li data-bbox="725 904 1397 992">• During peak network hours (0800 – 0900 and 1700-1800) construction traffic movements will be discouraged;</li> <li data-bbox="725 1019 1397 1139">• The daily construction programme will be planned to minimise the number of disruptions to the local highway network by staggering HGV movements to avoid site queueing;</li> <li data-bbox="725 1166 1397 1286">• Measures to prevent spillage of spoil or materials on the public highway including the use of on-site wheel washing facilities and street cleaning measures;</li> <li data-bbox="725 1313 1397 1391">• Any traffic management plans that may be required for a road closure or pedestrian footpath closure, including appropriate signage advance public notice</li> </ul>	<p data-bbox="1413 264 2047 352">Surrounding Streetscape improvements: Public realm and street scape improvements to the surrounding streets anchor the site into its setting.</p> <p data-bbox="1413 392 2074 480">Roof Gardens: There are two private roof gardens included in the development providing amenity space to the adjoining buildings.</p>

EIAR Topic	Proposed Impact	Construction	Operation
		<p>procedures;</p> <ul style="list-style-type: none"> <li>• monitoring and mitigation measures to minimise noise, dust and vibration impacts on any identified sensitive receptors;</li> </ul>	
	<p>Further mitigation plans proposed during operation</p>		<ol style="list-style-type: none"> <li>1. Mobility Management Plan (MMP)                     <p>An MMP is a long-term management strategy for supporting sustainable and active travel for the development. The benefits of an MMP include</p> <ul style="list-style-type: none"> <li>– Reduction in car usage and less congestion experienced on the roads surrounding the development. This in turn improves the road safety characteristics;</li> <li>– Environmental improvements through reduced congestion, emissions, pollution and noise;</li> <li>– Increase opportunities for active healthy travel such as walking and cycling;</li> <li>– Reduced demand for parking through the promotion of active travel and car sharing;</li> </ul> </li> <li>2. Delivery Service Plan (DSP)                     <p>A DSP is a strategy for managing and reducing the number of deliveries and service trips to a development, particularly during peak and sensitive network periods. The benefits include:</p> <ul style="list-style-type: none"> <li>– Reduced costs associated with the consolidation and reduction in deliveries;</li> <li>– Improvements to road safety and risks of</li> </ul> </li> </ol>

EIAR Topic	Proposed Impact	Construction	Operation
			<p>accidents associated with reduction in delivery goods movements;</p> <ul style="list-style-type: none"> <li>- Environmental improvements due to reduced congestion, emissions, pollution and noise;</li> </ul>
			<p>3. Pedestrian Crossing Facilities</p> <p>The proposed development incorporates several improved and new crossing opportunities on roads surrounding the development that will improve pedestrian facilities and enhance road safety for those vulnerable road users.</p>
			<p>4. Cycling Facilities</p> <p>The development provides secure, sheltered and accessible cycle parking facilities for both staff and visitors that will encourage cycling as a mode of choice when accessing the development. In addition to this a new Limerick Bike docking facility will be incorporated into the public realm scheme on Bank Place that will further enhance the sustainable choices for all users.</p>
			<p>5. Public Transport</p> <p>A new bus stop facility will be provided at Bank Place that will provide improved public transport connections to the development and this area of the city.</p>
			<p>6. Review of signal timing at the two signalised junctions in the study area to improve conditions for all users.</p>

EIAR Topic	Proposed Impact	Construction	Operation
Waste		<p>In developing the C&amp;D WMP, the contractor shall also take into account the requirements of Limerick 2030 Strategic Developments and Environmental Policy requirements, which includes minimising the quantity of waste and, in particular, eliminating waste disposed to landfill.</p> <p>Construction will comply with the objectives of the SRWMP, including incorporating a system for the management of wastes in accordance with the waste management hierarchy that prioritises waste prevention and minimisation, followed by waste reuse and recycling. Disposal of waste shall only be considered as a last resort. The contractor will incorporate the reuse and recycling target of 70% for construction and demolition waste (excluding soil and stones) contained within the SRWMP.</p> <p>Prior to the transfer of a waste off-site under a particular EWC Code for the first time, the contractor shall advise LCCC or its representatives of the proposed classification and shall only transfer the waste following agreement from LCCC or its representatives.</p> <p>The contractor shall ensure that waste materials generated during the works are clearly identified as either hazardous or non-hazardous wastes, with reference to guidance from the Environmental Protection Agency where required and shall establish waste storage areas for the different types of waste that may arise. For each waste stream identified by the contractor, and for each additional waste stream that may arise during the course of the works, the contractor shall identify the following:</p>	

EIAR Topic	Proposed Impact	Construction	Operation
		<ul style="list-style-type: none"> <li>• The appropriate EWC Code;</li> <li>• A suitable waste collection contractor in possession of a valid waste collection permit for the collection of the particular waste within Limerick city;</li> <li>• The waste recovery or disposal site, including the transfer station where the waste may be transferred to upon leaving the site in possession of a valid Waste Facility Permit or Waste Licence, as appropriate; and</li> <li>• The recovery or disposal method for the waste.</li> </ul> <p>Only waste contractors in possession of a valid Waste Collection Permit shall collect wastes from the site. The contractor responsible for the waste shall ensure that the waste collection contractor:</p> <ul style="list-style-type: none"> <li>• Is permitted to collect the particular waste;</li> <li>• Is permitted to collect waste within Limerick City;</li> <li>• Uses a waste collection vehicle identified on the waste collection permit; and</li> <li>• Transfers the waste to a waste facility identified on the waste collection permit.</li> </ul> <p>Prior to the commencement of the project, the contractor shall determine the quantity of waste expected to arise from its works, and LCCC or its representatives shall be advised accordingly.</p>	
	<p>Asbestos Removal</p>	<p>Following risk assessment, a number of demolition options for the safe cleaning and removal of ACMs prior to demolition of the buildings were identified.</p> <p>A specialist asbestos removal contractor, whose staff are</p>	

EIAR Topic	Proposed Impact	Construction	Operation
		<p>trained in asbestos removal as required under the Safety Health and Welfare at Work (Exposure to Asbestos) regulations 2006 (S.I. No. 386 of 2006), will remove ACMs as far as reasonably practicable, prior to demolition or refurbishment works commencing. ACM waste to be removed from site for disposal will be in sealed bags/containers and labelled appropriately.</p>	
	<p>Excavated material management</p>	<p>The contractor shall develop a Soil Management Plan (SMP) set out within the C&amp;D WMP. The SMP shall outline proposals for the management and reuse of excavated materials from the site, where permitted in accordance with the relevant legislation; and, provided that the reuse meets engineering requirements, for material used within the works.</p>	
		<p>Where the contractor proposes to maximise the reuse of excavated soil in order to minimise the generation of waste, it shall set out how it proposes to manage and document this reuse to the satisfaction of LCCC or its representatives. This shall include the following:</p> <ul style="list-style-type: none"> <li>• Identification and recording of the location from where the material was excavated;</li> <li>• Delineation of areas where excavated soil is intended for disposal as waste, and where it is intended for reuse (where permitted);</li> <li>• Delineation of areas of contaminated and uncontaminated soil (if present);</li> <li>• Sampling of excavated soil (the number and location of soil samples);</li> <li>• Details of the proposed laboratory to carry out the testing;</li> </ul>	

EIAR Topic	Proposed Impact	Construction	Operation
		<ul style="list-style-type: none"> <li>• The suite of parameters for which the soil is to be tested; and</li> <li>• The criteria for assessing whether the soil is contaminated or uncontaminated.</li> </ul> <p>The contractor shall establish the controls necessary to manage the generation, handling and storage of waste at the site.</p> <p>These controls may rely on other plans within the CMPP, for example: the protection of stockpiles of contaminated soil against rainwater ingress and leachate runoff; the bunding of hazardous waste storage areas containing liquids (e.g. oils, paints); and the management of waste collection vehicles both within the site and when leaving the site (dust and noise).</p> <p>The SMP shall indicate waste soil classifications to enable LCCC or appointed contractor to identify appropriate disposal/transfer routes for proposed excavated material, based on the nature of the material i.e. made ground or natural soil.</p> <p>Service clearance, foundation excavation and pile arisings will/may be generated during the works. These shall be segregated, stockpiled on site and sampled. Soil waste classification shall be completed on these materials in order to identify an appropriate waste receiving facility.</p> <p>Prior to the transfer of material from the site for export or to a specific waste permitted/licensed site, the appropriate waste classification data shall be submitted to the permit/licence holder to confirm the suitability of</p>	

<b>EIAR Topic</b>	<b>Proposed Impact</b>	<b>Construction</b>	<b>Operation</b>
-------------------	------------------------	---------------------	------------------

---

the material in writing for transfer to their facility.

In order to control off-site soil movements and undertake appropriate waste disposal/recovery, a comprehensive docketing system shall be detailed in the site construction waste management plan and implemented on site. A daily record (including preparing and reconciling waste transfer notes) of soil excavation at the site shall be maintained by the appointed contractor.

Documentation to be maintained in relation to soil wastes includes the following:

- The names of the agent(s) and the transporter(s) of the wastes;
- The name(s) of the person(s) responsible for the ultimate recovery or disposal of the wastes;
- The ultimate destination(s) of the wastes;
- Written confirmation of the acceptance and recovery or disposal of any hazardous waste consignments;
- The tonnages and EWC (European Waste Catalogue) Code for the waste soil materials;
- Details of each individual consignment dispatched from site:
  - Description of waste (grid cell number, stockpile number or type and origin of soil)
  - Date and time of dispatch from site
  - Name of haulage company
  - Details of Contractor and Haulier docket numbers

EIAR Topic	Proposed Impact	Construction	Operation
		<ul style="list-style-type: none"> <li>- Vehicle registration number and driver name</li> <li>- Volume/weight of waste removed</li> <li>- Name of waste receiving facility</li> <li>- Date and time of arrival at waste receiving facility</li> <li>- Details of any rejected consignments</li> <li>• The Waste Transfer Forms for hazardous soil wastes transferred from the site (stamped at receiving facility);</li> <li>• The Trans-Frontier Shipment of Waste forms for hazardous soil wastes transferred abroad; and</li> <li>• The results of any analysis conducted on excavated soil.</li> </ul> <p>Waste transfer notes will be issued in triplicate. On dispatch, the note shall be signed by the issuing operative and one copy retained at the site office. The remaining two copies shall accompany the load and signed or stamped by the receiving facility. One of these signed copies shall be returned to the site office for reconciliation. It is noted that a suitably licensed hauler shall be appointed to transfer waste soil from site.</p>	
	Operational waste management		<p>Waste generated during the operational phase of the proposed redevelopment will be primarily limited to activities in office and commercial buildings, apartments and hotels.</p> <p>Mitigation measures proposed to manage impacts arising from waste generated during operation of the proposed redevelopment are set out below:</p>

EIAR Topic	Proposed Impact	Construction	Operation
Material Assets	Services continuity during construction	All services are maintained unless this is agreed in advance with the relevant service provider and LCCC.	<ul style="list-style-type: none"> <li>• On-site segregation of all waste materials into appropriate categories including:                             <ul style="list-style-type: none"> <li>– organic waste;</li> <li>– cardboard and paper;</li> <li>– plastic;</li> <li>– glass;</li> <li>– metals; and</li> <li>– mixed non-recyclables.</li> </ul> </li> <li>• All waste materials will be stored in bins or other suitable receptacles in a designated, easily accessible areas of the proposed redevelopment;</li> <li>• Where possible, a high percentage of waste leaving the proposed redevelopment will be recycled, with the exception of those waste streams where appropriate recycling facilities are currently not available;</li> <li>• Any waste classed as hazardous will be stored in a designated area and will be removed off site by a licensed hazardous waste contractor;</li> <li>• All waste leaving the proposed redevelopment will be transported by suitable permitted contractors and taken to suitably licensed or permitted facilities; and</li> <li>• Waste records and copies of relevant documentation will be maintained.</li> </ul>

EIAR Topic	Proposed Impact	Construction	Operation
Biodiversity	Requirement for Method Statements	<p>There may be some power outages required when making new connections. These will be facilitated in out of hours' times to minimise impact on existing buildings and infrastructure.</p> <p>All works in the vicinity of services apparatus will be carried out in ongoing consultation with the relevant utility company and/or LCCC and will be in compliance with any requirements or guidelines they may have.</p> <p>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.</p>	
	Other Pollution Control Measures	<p>The Contractor shall produce site-specific Method Statements for review and agreement with the Ecologist and Inland Fisheries Ireland, to demonstrate adherence to specific, tried-and-tested pollution control measures.</p> <p>The Contractor shall take all necessary precautions to prevent the pollution or silting of watercourses from the construction of the proposed development. The Contractor will take the following mitigation:</p> <ul style="list-style-type: none"> <li>• Prior to excavation of the basement, the proposed foul and storm water sewers in Michael Street will be laid and commissioned to allow the existing combined sewer to be diverted. During the construction of the new sewers, surface water arising from the development will continue to discharge to the combined sewer. Surface water collected will be treated by sedimentation prior to discharge to the existing combined sewer. Total Suspended Solids (TSS) and colour will be monitored daily by a hand held multi parameter sonde.</li> </ul>	

EIAR Topic	Proposed Impact	Construction	Operation
		<ul style="list-style-type: none"><li>• Neither ground water nor surface water runoff from the working areas will be permitted to discharge directly to the Abbey River or Shannon River. Run off generated within the site during construction will be filtered and treated to remove hydrocarbons and sediment. Total Suspended Solids (TSS), pH/EC and colour will be monitored daily by a hand held multi parameter sonde. In addition, the outlet from the sedimentation pond will incorporate a turbidity monitor with alarm at high level. In the event of surface water failing to meet the required standards, as set out in the discharge licence, water will be recirculated to the inlet of the sediment pond to provide further time for settlement. A penstock will be provided on the outlet from the sediment pond to control discharge from the site.</li><li>• No pouring of concrete will occur during the construction of the outfall, albeit localized grouting would be required (see Section 16.5.1.2).</li><li>• Maintain and monitor the performance of the surface water drainage network throughout the construction of the proposed development, noting that the proposed storm sewer will include a permanent hydrocarbon separator which will treat runoff from Michael Street.</li><li>• In the event of surface water failing to meet the required standards, as set out in the discharge licence, water will be recirculated to the inlet of the sediment pond to provide further time for settlement. A penstock will be provided on the outlet from the sediment pond to control discharge from the site.</li><li>• Where the Contractor utilises pumping to drain works areas, a back-up pump and generator shall</li></ul>	

EIAR Topic	Proposed Impact	Construction	Operation
		<p>be provided on site for use in the event of the primary pump failing.</p> <ul style="list-style-type: none"><li>• Cover all temporary stockpiles generated during construction to minimise run-off;</li><li>• Locate spoil and temporary stockpiles in locations which are at least 15 m from drainage systems, the Abbey River and the River Shannon'</li><li>• Avoid direct or indirect discharges of untreated surface or ground water generated during the proposed development, to any surface water;</li><li>• Dewater all working areas at the end of each working day, if necessary using pumping and transport of water off-site in tankers if volumes prevent effective attenuation and treatment prior to discharge; and,</li><li>• Use wheel washers and dust suppression on site roads (to be captured within the proposed SUDS system) and undertake daily plant maintenance checks and corrective actions where required.</li><li>• Establish contingency measures to cater for potential impacts to unknown services underlying the construction site (for example, old sewers, culverts)</li><li>• Identify whether shallow groundwater monitoring wells on site will be maintained and protected during construction works; decommissioned; or removed completely as part of excavation works, to prevent them from acting as direct pathways for contamination to enter the groundwater body</li></ul>	

EIAR Topic	Proposed Impact	Construction	Operation
		<p>beneath the site</p> <ul style="list-style-type: none"><li>• Excavation:<ul style="list-style-type: none"><li>– All excavated materials will be inspected for signs of possible contamination, such as staining or strong odours;</li><li>– Should any unusual staining or odour be noticed, this made ground / subsoil will be segregated and samples analysed for the presence of possible contaminants in order to determine an appropriate disposal outlet; and,</li><li>– Excavated made ground and subsoil will be disposed to licensed / permitted waste management facilities, as appropriate for the waste classification of the material.</li></ul></li><li>• Importation of fill:<ul style="list-style-type: none"><li>– The Contractor will vet the source of aggregate, fill material and topsoil imported to site in order to ensure that it is of a reputable origin and that it is “clean” (i.e. it will not contaminate the environment).</li><li>– The Contractor and/or LCCC will implement procurement procedures to ensure that aggregate, fill material and topsoil are acquired from reputable sources with suitable environmental management systems as well as regulatory and legal compliance.</li></ul></li><li>• Disposal of materials<ul style="list-style-type: none"><li>– All material to be disposed of off-site to a facility licensed having regard for Irish Waste management legislation. Where material is to</li></ul></li></ul>	

EIAR Topic	Proposed Impact	Construction	Operation
		<p>be stockpiled on site prior to disposal, the Contractor will control all run-off to prevent contamination of surrounding watercourses.</p>	
		<ul style="list-style-type: none"> <li>– Contaminated soil will be assessed to determine its constituents and disposed of offsite having regard for Irish waste management legislation; and,</li> <li>– The Contractor will dispose of all alkaline wastewaters and contaminated storm water off-site having regard for Irish waste management legislation.</li> </ul>	
		<ul style="list-style-type: none"> <li>• Control of concrete: <ul style="list-style-type: none"> <li>– Ready-mixed concrete will be brought to the proposed development site by truck.</li> <li>– The pouring of concrete shall take place within a designated area to prevent concrete runoff into the drainage network, watercourses, or soil / groundwater media.</li> <li>– During construction no pouring of concrete will occur during the construction of the outfall. Works to locally grout and otherwise repair Charlotte Quay, following installation of the proposed outfall will be supervised by the Ecologist or other suitably experienced ecologist who will advise and direct the Contractor such that contaminated surface water does not enter the Abbey River.</li> <li>– Washout of concrete transporting vehicles shall take place at an appropriate facility, offsite or where onsite wash out will be captured, for disposal off-site.</li> </ul> </li> </ul>	

EIAR Topic	Proposed Impact	Construction	Operation
	Minimising pollution risks associated with flooding	<p>The Contractor will provide a ramp to the development site as a mitigation measure to prevent any flood waters to enter the main structure or the underground structure during the Construction Stage.</p> <p>As coastal flooding is somewhat predictable the Contractor shall take note of when coastal flooding warnings are issued for the Limerick City area (usually c. 24-36 hours in advance). In the event that a flood warning is issued, all plant and construction materials must be moved and stored within areas only at risk from the 1 in 0.1% AEP coastal flood event (i.e. areas within 'Flood Zone C' as defined by OPW and DoEHLG (2009), which includes parts of Patrick Street, Ellen Street and Rutland Street). In this way, in the event of floodwaters inundating the site, no materials will be washed from the site into nearby watercourses.</p>	
	Spill Control Measures	<p>No oils/fuels will be stored on the proposed development site for the purpose of refuelling on the site.</p> <p>On-site plant will be refuelled by an external Contractor who will call to site as required. Road vehicles will not be refuelled at the site. Minor spills and leaks may occur from road vehicles. Any oils or fuels onsite will be removed by an experienced and authorised contractor.</p> <p>Fixed plant shall be self-bunded; mobile plant shall be in good working order, kept clean, fitted with drip trays where appropriate and subject to regular inspection. Drip trays will be covered, and the Contractor will empty their contents regularly as required, and dispose of off-site having regard for relevant waste legislation.</p> <p>Spill kits and oil absorbent material shall be carried with mobile plant and located at vulnerable locations around</p>	

EIAR Topic	Proposed Impact	Construction	Operation
		<p>the site to reduce risk of spillages entering the sub-surface or groundwater environment; booms shall be held on-site for works near drains or dewatering points</p> <p>The Contractor will train all operatives in the proper handling of materials, the sensitive nature of the River Shannon, Abbey River (and the drainage system which is hydrologically connected to these Rivers), and the consequences of accidental spillages.</p> <p>The following steps provide the procedure to be followed by the Contractor(s) in the event of any significant spill or leak.</p> <ul style="list-style-type: none"> <li>• Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers;</li> <li>• If applicable, eliminate any sources of ignition in the immediate vicinity of the incident;</li> <li>• Contain the bulk of the spill immediately using a spill kit before placing the contaminated absorbent material and the contaminated soil in a stockpile outside the 1% Annual Exceedance Probability (AEP) floodplain (and at least 10 m from, and downslope of any drainage system or The Abbey River or River Shannon),</li> <li>• Place all contaminated material on and cover with plastic to prevent leachate generation, until such time as it can be removed off-site by an appropriately licensed waste management company;</li> <li>• If possible, cover or bund off any vulnerable areas where appropriate such as drains;</li> </ul>	

EIAR Topic	Proposed Impact	Construction	Operation
		<ul style="list-style-type: none"> <li>• Notify a fully licensed waste Contractor immediately giving information on the location, type and extent of the spill so that they can take appropriate action to further investigate the incident to ensure it has been contained adequately, and so that the fully licensed waste Contractor can, subject to the appropriate permits, dispose of the contamination off-site having regard for relevant legislation; and,</li> <li>• Notify LCCC and (if LCCC deem it appropriate) Inland Fisheries Ireland (IFI).</li> </ul>	
	<p>Emergency Response and Environmental Training</p>	<p>The Contractor will produce an Emergency Response Plan (ERP) based on the Contractor’s own Risk Assessment, which will be reviewed by the Employer’s Representative Team, Including the Ecologist. The ERP will include:</p> <ul style="list-style-type: none"> <li>• The Contractor’s proposed training of relevant staff, including cover staff, in the implementation of the ERP and the use of spill kits;</li> <li>• Details of procedures to be undertaken by the Contractor in the event of the release of any sediment into a watercourse, or any spillage of chemicals, fuel or other hazardous wastes, non-compliance incidents with any permit or licence, or other such risks that could lead to a pollution incident, including flood risks;</li> <li>• Confirmation of the number and specification of spill kits which shall be carried by the Contractor;</li> <li>• Information on clean-up procedures as specified above under ‘Spill Control Measures’.</li> </ul>	
	<p>Minimising habitat loss</p>	<p>A Mobile Elevated Working Platform (MEWP), parked on</p>	

EIAR Topic	Proposed Impact	Construction	Operation
	in protected sites	<p>Charlotte’s Quay, will allow Contractors to access the limestone wall from the Abbey River side of the existing quay wall, whilst avoiding instream works. The Contractors will use a coring method (i.e. drilling from north to south), which will avoid any material from entering the Abbey River. This will avoid any disturbance to QI bryophyte communities located c.1 m below the proposed outfall location. There will be no pouring of concrete for the installation of the proposed outfall, albeit Contractors will be permitted to locally grout the finished outfall.</p> <p>The Ecologist will review and input to the method statement produced by the Contractor to ensure the method statement contains the specific measures identified in the previous paragraph.</p> <p>The Ecologist or other similarly experienced ecologist will then supervise the works to Charlotte Quay and direct or advise the Contractor as appropriate, to ensure the method statement and mitigation are implemented, and bryophyte communities and water quality of the Lower River Shannon SAC are protected.</p>	
	Minimising effects of construction on specific species.	<p><b>Bats (Roosting)</b></p> <p>The mitigation will be compiled into a derogation licence application and submitted to the Wildlife Licencing Unit (WLU) of the NPWS. The licence application will take account of any comments by relevant parties including the NPWS received in the course of An Bord Pleanála determination, and any relevant planning conditions. The mitigation in the derogation licence application will have regard for relevant guidance including the NPWS Bat Mitigation Guidelines for Ireland (Kelleher &amp; Marnell, 2006). All measures in the derogation licence application will be subject to change having regard for the</p>	

EIAR Topic	Proposed Impact	Construction	Operation
------------	-----------------	--------------	-----------

---

requirements of the NPWS including any licence conditions.

Prior to construction, the Ecologist will notify the Contractor, who in turn shall make all site personnel aware of, the structure to the rear of 9 Rutland Street known to contain roosting bats. The Ecologist will also notify the Contractor of the strict legal protection applicable to bats and their roosts, and input to the construction programme including phasing of structural works, having regard for relevant licence conditions.

A notice will be erected at 9 Rutland Street to identify it as a legally protected bat roost to ensure no works take place unless clear instruction is given from the Ecologist that it is safe and legally compliant to do so.

Contractors will receive training by the Ecologist to advise them what to do in the event that bats (whether live or dead) are discovered in structures during works (i.e. stop works when it is safe to do so and contact the Ecologist).

Subject to any licence conditions, any works to 9 Rutland Street will be carried out outside the summer months (i.e. from 1<sup>st</sup> September to 1<sup>st</sup> May only). This has been determined to be appropriate for a summer roost, which is not a proven maternity site, having regard for NPWS guidance (Kelleher & Marnell, 2006). This timeline may change subject to the requirements of the NPWS and conditions of any derogation licence issued by them. The Contractor(s) will be informed of any such changes to timelines.

Even when carried out during the recommended season, works to 9 Rutland Street will be completed with the

EIAR Topic	Proposed Impact	Construction	Operation
------------	-----------------	--------------	-----------

expectation that bats may be found, and having regard for any licence conditions. Caution will be exercised during the removal of any roofing material from 9 Rutland Street as bats may be underneath even in winter. Where required, the Contractor will remove tiles of 9 Rutland Street by hand. If bats are found, all works will cease, until the Ecologist has been contacted, and the Ecologist has in turn contacted the NPWS WLU.

As shown in Figure 16.3 (and Drawing OPRA-ACM-Z3B-ZZ-DR-AR-13001), a total of 1 no. 'bat brick' to the specification of "Habibat Bat Box - Custom Brick Facing<sup>3</sup>" or equivalent and 1 no. 'bat tile' to the specification of Habibat Bat Access slate<sup>4</sup> or equivalent have been included in the design of 4 and 5 Rutland Street respectively, which is located close to the existing roost site in 9 Rutland Street.

The bat brick and tile have been incorporated into 4 and 5 Rutland Street in a location where there is no obstruction to bat flight. Uplighting will be excluded from the façade of these structures.

Prior to commencement of construction, the Ecologist will be consulted regarding the phasing of demolition of the roost at 9 Rutland Street. Where the Ecologist deems it necessary, or as per any licence requirements, provision may be made for a temporary roosting structure in the vicinity of 9 Rutland Street (e.g. bat box to appropriate specification), to ensure continuity of roosting provision until the (permanent) bat brick and tile are installed.

<sup>3</sup> Available from: <http://www.nhbs.com/title/183578/habibat-bat-box-custom-brick-facing> . Accessed December 2018.

<sup>4</sup> Available from <http://www.nhbs.com/title/192461/habibat-bat-access-slate>. Accessed December 2018.

EIAR Topic	Proposed Impact	Construction	Operation
------------	-----------------	--------------	-----------

As annotated on Figure 16.3 (and Drawing OPRA-ACM-Z3B-ZZ-DR-AR-13001), Breathable Roofing Membranes (BRMs) will not be installed into the roof of 4 or 5 Rutland Street. Only bituminous roofing felt that does not contain polypropylene filaments, or similar to be agreed with a bat ecologist, will be used. For example, bitumen felt type 1F, which is reinforced hessian.

Water tanks sited within roof spaces will be permanently covered to prevent future accidental drowning of bats.

**Bats (Foraging)**

No planting is proposed in addition to that in the landscape planting plan which includes, in Bank Place, native Alder trees and some flowering plants (e.g. *Salvia nemorosa*) would provide nectar for bees and insects. These in turn, would provide food for birds and bats.

**Nesting Birds (including Swifts)**

Structural works to building exteriors will not be carried out between March and August inclusive, unless otherwise agreed with the Ecologist. Where the construction programme does not allow this seasonal restriction to be observed, buildings will be surveyed by a suitably experienced ecologist for the presence of nesting birds prior to commencement of demolition works.

In the case of roof-nesting gulls, a Mobile Elevated Working Platform may be required to visually inspect roofs, if adequate views are not available from ground level or adjacent buildings. Nesting bird surveys will follow the species-specific guidance in the British Trust for Ornithology's Field Guide to Monitoring Nests (Ferguson et al, 2011).

EIAR Topic	Proposed Impact	Construction	Operation
		<p>Where nests are found within structures to which works are proposed, or within the potential ZoI of indirect disturbance as determined by a suitably experienced ecologist, the suitably experienced ecologist will advise the Contractor(s) if a licence is required from the NPWS to permit disturbance and/or removal of any nests, or if works must be delayed until nesting has been shown to have finished, following survey by a suitably experienced ecologist.</p> <p>Structural works to buildings found not to contain nests, shall be completed within three days of bird surveys, or repeat nesting surveys will be required.</p> <p><b>Nesting Swifts (Additional Measures)</b>                      As shown in Figure 16.3 (and Drawing OPRA-ACM-Z3B-ZZ-DR-AR-13001), one swift brick with starling barrier to the specification of 16S Schwegler Swift Box (with Starling Barrier)<sup>5</sup> or equivalent has been incorporated into the design of the façade of No. 5 Rutland Street.</p> <p>Grids will be installed on any ventilation holes on the building exterior, and this must be implemented from September to April inclusive during the non-breeding season to avoid unwanted occupation by birds of other sites in buildings during the breeding season.</p>	
	Role of the Ecologist	<p>The Employer’s Representative (ER) Team shall engage a suitably experienced ecologist (the Ecologist). The Ecologist will be a full member of a relevant professional institute such as the Chartered Institute of Ecology and Environmental Management (CIEEM), have relevant experience in the management of ecological constraints during construction, and hold or have held a protected</p>	

<sup>5</sup> Available from <http://www.nhbs.com/title/177997/16s-schwegler-swift-box-with-starling-barrier> Accessed 31st May 2017.

EIAR Topic	Proposed Impact	Construction	Operation
		<p>species licence (s) in the Republic of Ireland.</p> <p>The Ecologist shall be appointed sufficiently in advance of construction to arrange for any mitigation requirements (including licensing) to be incorporated into the Contractor’s site-specific Method Statements and programme.</p> <p>The Contractor will accommodate the Ecologist, whose role will be to:</p> <ul style="list-style-type: none"> <li>• Communicate relevant findings to LCCC, and other stakeholders as relevant;</li> <li>• Advise the Contractor on phasing of relevant works (including structural works in relation to nesting birds and roosting bats);</li> <li>• Review Contractor Method Statements for compliance with the mitigation in this EIAR, and any licenses to avoid damage or disturbance to designate sites or protected species; and,</li> <li>• Attend site meetings and input to Contractor toolbox talks prior to commencement of construction.</li> </ul>	
	<p>Bird strike mitigation</p>		<p>In the absence of evidence to the contrary, in the light of best available scientific knowledge, <i>flashing green lights [emphasis added]</i> shall be installed on the proposed tower at Bank Place, and be maintained in good working order throughout building operation.</p> <p>Prior to procurement of the proposed (flashing, green) lighting system, an ecologist with relevant credentials in the technical field of bird collision mitigation will review this measure, in the light of peer-reviewed scientific evidence published since the production of this NIS. In the event where new scientific evidence on lighting</p>

EIAR Topic	Proposed Impact	Construction	Operation
Archaeological and Cultural Heritage	Identifying archaeology under buildings once demolished.	<p>A targeted programme of archaeological test trenching will be carried out following the demolition of structures proposed for removal and prior to any invasive enabling works, including the insertion of the secant piled walled around the perimeter of the site. The programme of testing will allow for an assessment of the presence, location, extent, value and sensitivity of potential archaeological remains at the site. This work will be carried out by a qualified archaeologist, under licence from the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht.</p> <p>Archaeological mitigation, such as monitoring or excavation, may be required dependant on the results of this investigation. Full provision will be made available for the resolution of any archaeological remains, both on site and during the post excavation process, should this be deemed the appropriate manner in which to proceed.</p>	<p>mitigation for bird collision conflicts with this measure, the ecologist will advise the relevant planning authority as appropriate and advise on any changes in light colour or other parameters required to minimise the potential for strike risk.</p> <p>Uplighting has not been included on the façade of 4 and 5 Rutland Street.</p> <p>The lighting specification proposed at Bank Place on the northern boundary of the proposed development site where it borders the Abbey River has been amended to have a maximum Kelvin value of 3000, low-pressure sodium lights in preference to high pressure sodium lights or mercury lamps, and luminaires mounted on the horizontal with an upward light ratio of 0%.</p>
	Bat mitigation		

EIAR Topic	Proposed Impact	Construction	Operation
Architectural Heritage	Mitigation for Parcel 3B – 4 and 5 Rutland Street	<p>The shopfront and limestone door case to No. 5 to be retained and restored to best conservation practice. The modern shopfront to No. 4 will be replaced. Removal of the existing shopfront to be monitored to ascertain whether earlier joinery is retained behind.</p> <p>Limestone window sills to the front elevation of No. 4 to be retained. Rear return to No. 5 to be retained. Balconies to be glazed to rear elevation of No. 5 to minimise visual impacts.</p> <p>Aluminium and uPVC windows to be replaced with multiple pane timber sash windows.</p> <p>All surviving historic internal fittings to No. 5 Rutland Street to be retained, including in particular the staircase (to be repaired), architraves, dado rails and ceiling plasterwork.</p> <p>The proposed new doorways off the landings of the staircase in to No. 4 are proposed in order to allow for the retention of the original floor plan of No. 5 to each floor level.</p>	
	Building specific mitigation for Parcel 3A/4 – 8 and 9 Rutland Street, Town Hall (Protected Structure)	<p>The buildings will be interconnected at ground and third floor levels only where existing levels allow, in order to retain the original floor levels of all three buildings.</p> <p>The main rooms of the town hall will be restored with later partitions removed and the floor plan retained. The existing open well staircase and vaulted cellars to the basement of the town hall will be also be retained.</p> <p>The staircases to Nos. 8 and 9 will be retained as will existing floor levels which will maintain the relationship to the windows of the front elevation.</p>	

EIAR Topic	Proposed Impact	Construction	Operation
	Building specific mitigation for Parcel 2B (9 Ellen Street)	<p>Best conservation practice will be followed for the repair of stonework, roofs and other external fabric.</p> <p>Timber sash windows to the Ellen Street elevation will help to restore the historic character of the building and will have a positive impact on the streetscape.</p> <p>The large internal spaces will be retained with little subdivision or partition which will retain the character of the building internally. Surviving features such as columns, colonnade, existing panelled doors and flagged basement area etc. will be retained.</p>	
	Building specific mitigation for Parcel 6 (The Granary – Protected Structure)	<p>Proposed works will avoid any physical impact on the vaulted ceiling over the ground floor, carriage arch to Bank Place, or main street elevations.</p> <p>The proposed new external staircase to the courtyard shall be designed to minimise loss of existing fabric to the west elevation and to require minimal intervention to the walls of the Granary for construction.</p> <p>Best conservation practice shall be followed for any works carried out to the historic building, including to its structure, roof and external stonework.</p> <p>Landscaping materials for the proposed works to the courtyard of the Granary shall be sensitive to the character of the historic building.</p>	
	General mitigation associated with historic buildings on the Opera site	<p>An accredited Conservation Architect will be appointed to oversee all works on the site and should be present from the commencement of the project. No works, including opening up, stripping out or demolition works shall be carried out to the existing buildings on the site without</p>	

<b>EIAR Topic</b>	<b>Proposed Impact</b>	<b>Construction</b>	<b>Operation</b>
-------------------	------------------------	---------------------	------------------

---

the appointment of a Conservation Architect.

All existing records and documentation of the existing buildings shall be updated by the findings of opening up and stripping out works. There may be some instances where the scope of recording work will be widened to include detailed record drawings and some material and finishes analysis. Only once these inspections and records have been completed shall the contractor continue with any demolition work as allowed in the planning permission.

Prior to commencement of works, a method statement will be provided by the Conservation Architect for the recording and dismantling of the doorcase at 6 Rutland Street to include details for safe storage and reinstatement in location indicated on the planning drawings.

Other items and features of Architectural Heritage value to be removed from site will be recorded in detail prior to dismantling. This to include the area to the rear of the Town Hall and the gateway adjacent to the Granary Building.

Prior to the commencement of works, a detailed methodology will be prepared by the Conservation Architect and Structural Engineer appointed to the project for the existing buildings on the site, during and after demolition works, from damage caused by vibration, construction traffic, water ingress and other factors which may accelerate their deterioration in condition.

With the exception of No. 6 Patrick Street, all existing Georgian buildings will be retained to the Opera Site.

EIAR Topic	Proposed Impact	Construction	Operation
		<p>Areas of physical impact on the existing buildings in the form of demolition are concentrated in a small number of areas, principally to the rear elevations where additions and alterations to the original buildings have accumulated over the years.</p> <p>The principal elevations of the historic buildings will be repaired using best conservation practice. The external stone work and brick work of the historic buildings will be repaired and repointed as necessary, using a suitable mortar mix as per Conservation Architect's instruction.</p> <p>The historic roofscapes of all existing buildings are to be retained, including brick parapets, pitched roofs and brick/stone chimney stacks. All proposed new building elements are designed to the rear of these buildings and will not necessitate alterations to the historic roofs.</p> <p>There are a small number of surviving historic timber sashes to the buildings. These sashes will be repaired where possible and the surviving glazing bars used to provide suitable profiles for replacement sash windows for the front elevations of the Georgian terraced buildings.</p> <p>The existing historic buildings to the site (with the exception of the Granary building) are in poor, or extremely poor, repair with regard to their structure and/or historic fabric. All buildings have been carefully inspected, and those found to retain significant historic internal fabric have been recorded and will be repaired in a sensitive manner, with internal fittings and fabric reused where condition allows.</p> <p>Existing floor levels to all historic buildings are to be retained, allowing for a meaningful relationship internally</p>	

EIAR Topic	Proposed Impact	Construction	Operation
------------	-----------------	--------------	-----------

---

between the floor plans, individual rooms and the historic fenestration pattern.

All historic buildings will retain small retail uses to the ground floor, having active shopfronts, and will retain independent access from the street to the upper floors, regardless of whether the buildings have been integrated with new buildings to the rear. Where historic shopfronts, or elements of shopfronts, survive, these will be retained and repaired.

Existing laneways and carriage arches from the streets to the interior of the site will be maintained and remain open to provide access to the buildings and public plaza within the site. Historic fabric found to these laneways, such as cobblestones or setts, wheel guards, decorative grills or other street furniture should be preserved and reused in situ.

All new buildings are designed in a contemporary manner and will allow the existing historic buildings to be easily read within the new streetscapes. Proposed alterations to the rears of historic buildings will have a light touch, minimising damage to the historic fabric of the rear elevations, and with maximum glazing to allow views of the original rear elevations.

The proposed materials for the new buildings reference the existing historic building fabric on the site without attempting to reproduce any architectural details of the historic buildings, allowing the Georgian buildings to retain their own character and significance. The variety of materials used in the construction of the historic buildings which includes ashlar limestone, rubble stone and brick is reflected in the contemporary materials

EIAR Topic	Proposed Impact	Construction	Operation
		<p>proposed as finished to the new structures.</p> <p>Detailed fabric analysis and recording of the historic fabric of the individual buildings should be carried out prior to the commencement of work in order to establish the nature and location of significant surviving fabric and architectural features. These records shall include drawings (elevations, plans and sections) at appropriate scales and in addition to recording historic fabric should detail condition issues such as deflections in brickwork, cracking to masonry (internal and external), fissures in ceilings and faults to flooring. These records shall be supplemented by photographs illustrating the issues. This detailed analysis of the condition of the buildings will supplement the existing structural condition reports and assist in determining the extent of historic fabric which can be retained and in pricing remedial works.</p>	
Microclimate	Wind Mitigation		<ul style="list-style-type: none"> <li>• The proposed wind mitigation includes:</li> <li>• Porous Gate to Western Courtyard</li> <li>• Tower skirt</li> <li>• Southern Courtyard planting</li> <li>• Canopy above carpark entrance/exit</li> <li>• Planting in the eastern courtyard</li> <li>• Retention of a door to the eastern courtyard</li> <li>• Trees in Bank Place</li> </ul>



