July 2020

Environmental Impact Assessment Report (EIAR) Volume 2

Abbey Quarter – Urban Park and Street

Kilkenny County Council

County Hall, Kilkenny

MALONE O'REGAN ENVIRONMENTAL

QUALITY ISO 9001:2008 NSAI Certified

MALONE O'REGAN

Form ES - 04

MALONE O'REGAN ENVIRONMENTAL

Ground Floor – Unit 3
Bracken Business Park
Bracken Road, Sandyford
Dublin 18, D18 V32Y
Tel: +353- 1- 567 76 55
Email: enviro@mores.ie
Web: www.mores.ie

Title: Environmental Impact Assessment Report (EIAR) Volume 2, Abbey Quarter – Urban Park and Street, Kilkenny County Council, County Hall, Kilkenny

Job Number: E1518

Prepared By: David Dwyer **Signed:** _____

Checked By: Janette McDonald **Signed:** _____

Approved By: Kevin O'Regan **Signed:** _____

Revision Record

Issue No.	Date	Description	Remark	Prepared	Checked	Approved
01	29/07/20	EIAR	Final	DD	JMcD	KOR

Environmental Impact Assessment Report (EIAR) Volume 2

Abbey Quarter – Urban Park and Street

Kilkenny County Council

County Hall, Kilkenny

Contents

FIGURES

TABLES

APPENDICES (See Volume 3)

1 INTRODUCTION

Malone O'Regan Environmental (MOR) has been commissioned by Kilkenny County Council (KCC) to prepare an Environmental Impact Assessment Report (EIAR) in support of an application to An Bord Pleanála (ABP) for the proposed Urban Park and Street (proposed development) to be located within the Abbey Quarter that was formerly the Smithwick's Brewery Lands (St Francis Abbey Brewery). This application is being made under Sections 175 and 177AE of the Planning and Development Act 2000 (as amended).

The proposed development will cover an area of approximately 1.44ha within the Abbey Quarter (the Site) and consists of two main components; an Urban Park and an Urban Street.

The Urban Park will consist of a variety of grassed areas, trees, paved surfaces, water features and meeting points. The Park will provide a new amenity area for Kilkenny City. The Park has been specifically designed to express known important historic national monuments. In addition, the Park will provide space to accommodate seasonal markets and other events.

The Urban Street will be a pedestrian and cyclist dominated space that will facilitate access to adjoining developments of the Abbey Quarter. The Street will provide multiple pedestrian linkages to the City, making the Park easily accessible. It should be noted that only limited access to other vehicular through traffic will be available, namely service, delivery and maintenance vehicles serving the Park, and directly adjoining buildings. Access to the street for vehicles will be controlled by use of traffic barriers and a permitting system.

A more detailed description of the proposed development is presented in Chapter 3.

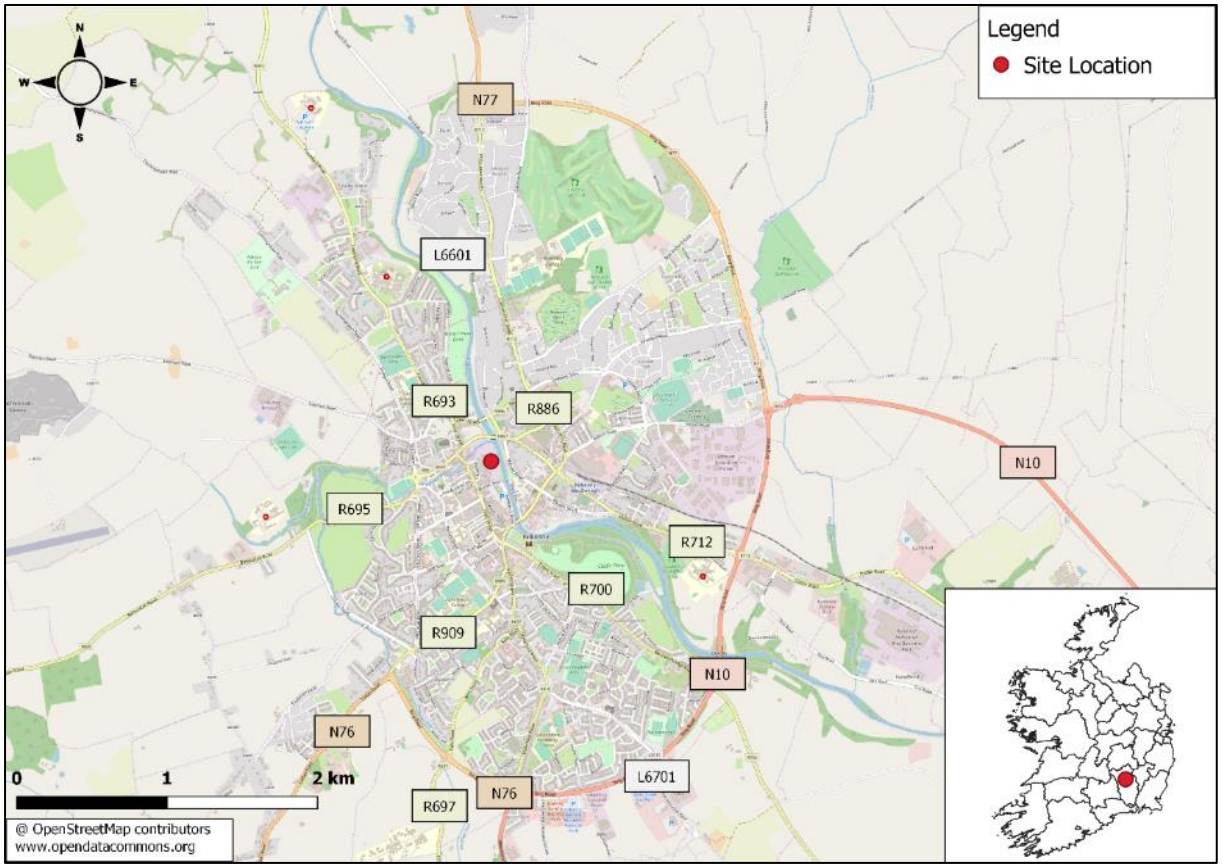
1.1 The Applicant

Kilkenny County Council (KCC) is the applicant for the proposed development.

1.2 Site Context and Recent History

The Site is located in the heart of Kilkenny City within the City's Abbey Quarter as shown in Figure 1-1.

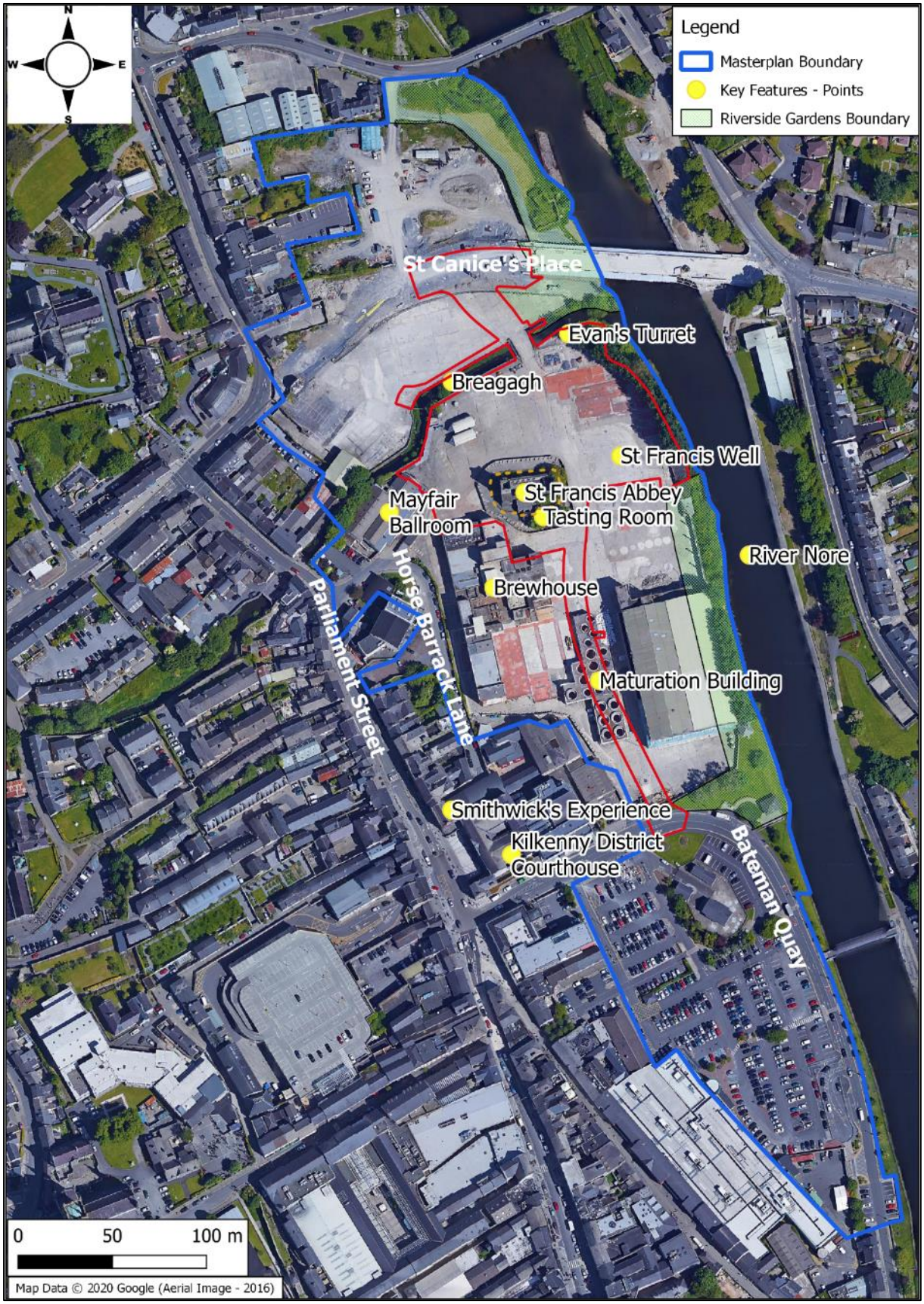
Figure 1-1: Site Location



The Site itself is located on the western bank of the River Nore, stretching from St Canice's Place in the north to Bateman Quay in the south and is centred around St. Francis Abbey.

The Site boundary in the context of some of the key existing features is presented in Figure 1-2.

Figure 1-2: Site Context



1.2.1 Recent History

The rich history of the Site is described in detail in Chapter 12. Following DIAGEO's decision to terminate brewing activities at the St Francis Abbey Brewery (Smithwick's Facility), Kilkenny Local Authorities (former Borough and County Council) agreed to purchase the Site in May 2012. A purchase contract was agreed which ensured Diageo would complete the following items prior to handover;

- Demolish all non-Historical/Protected buildings to slab level; and
- Surrender all existing licences at the Site.

The former brewery was an IPPC licenced site, regulated by the EPA under licence P0448-01. Following the implementation of a Closure, Restoration and Aftercare Management Plan (CRAMP) by DIAGEO, the IPPC licence was formally surrendered by the EPA on the 29th May 2015. In surrendering the licence, the EPA stated that they were "*satisfied the condition of the installation is not causing or likely to cause environmental pollution and the site of the activity is in a satisfactory state*" (EPA, 2015). Following the successful completion of the required works by Diageo, KCC took formal ownership of the Site in November 2016.

1.2.2 Master Plan

To identify options for the redevelopment of the St Francis Abbey Brewery Site, KCC commissioned an urban design process for the St Francis Abbey Brewery Site. This process commenced with a public meeting and colloquium in 2012, an urban design review in 2013, a Brewery Vision workshop in 2015, followed by various public consultations. During this time, a Masterplan outlining the Abbey Quarter was drafted (KCC, 2015).

It is the intention of KCC to develop the area, now known as the Abbey Quarter, for mixed land use with a combination of creative, knowledge intensive business services, retail, residential, commercial, educational, hotel and civic land uses in a proportion set out in the urban design code for the area (Loci and Kilkenny Co Co, 2018). The Abbey Quarter Masterplan area is currently an area of undeveloped and underdeveloped land comprising circa (c.) 8.25 ha just off the centre of Kilkenny City, which includes the former brewery lands (4.64 ha) (KCC, 2015). The proposed development will form an integral part of the Abbey Quarter Masterplan.

1.2.3 Adjoining Land Uses

To the north of the Site lies St Canice's Place which will connect to the proposed Urban Street. The River Breagagh runs from west to east along the northern part of the Urban Park section of the Site to its confluence of the River Nore. The River Nore is located less than 10m to the east and north east of the Site at its closest point. The Riverside Gardens, which are currently under construction, links with the Site along the eastern boundary. To the west of the Site lies the Mayfair ballroom and Brewhouse buildings which, are currently undergoing extensive renovations. An existing access gate to the Site is located between these buildings leading onto Horse Barrick Lane and Parliament Street. The Smithwick's Experience buildings, owned by Diageo, and Kilkenny District Courthouse are also located along the western boundary. To the south of the Site lies Bateman Quay which will also connect into the proposed Urban Street.

KCC, OPW and the NMS are in the process of preparing a conservation plan for St Francis Abbey in accordance with the objectives of Kilkenny City & Environs Development Plan. Any future works to the Abbey will be proposed and undertaken by the OPW as part of this conservation plan.

The context of the surrounding land use is shown in Figure 1-2.

1.3 Existing Site Services

This section of the report presents a review of the existing services within and surrounding the Site. For further details of existing services at the Site please refer to engineering drawing P800 and the Services Design & Methodology report that has also been submitted with this application.

1.3.1 ESB / Power

The existing electrical infrastructure consists of an ESB substation (MVSB-001) within the Mayfair Building, however this substation will not provide sufficient capacity for the proposed development.

1.3.2 Gas Supply

The Site is currently no longer served by natural gas supply. However, there is a75 mbar pipework in-situ which connects to the main gas network connection point on Horse Barrack Lane, this infrastructure will be removed and upgraded as part of the proposed development.

1.3.3 Broadband / Telecommunications

The E-Nets metropolitan area network (MAN) will serve the Site from the north and south. E-Net MANs are a combination of state-owned fibre and wireless assets which serve urban and sub-urban areas. Ducting is also provided within the St. Francis' Bridge Scheme development to facilitate further connection(s) to the MAN from the eastern side of this bridge.

1.3.4 Water Supply

There are existing watermains located to the west and south of the Site. As part of the provision of the St Francis Bridge Scheme, to the north of the Site, a new 200mm diameter watermain was installed close to the northern entrance of the Site.

1.3.5 Foul Water Drainage

There is an existing large combined sewer that runs from north to south, crossing the north western corner of the Site, before exiting and running adjacent the western aspect of the Site. This sewer line serves a large section of Kilkenny City, including the County Hospital and large residential areas.

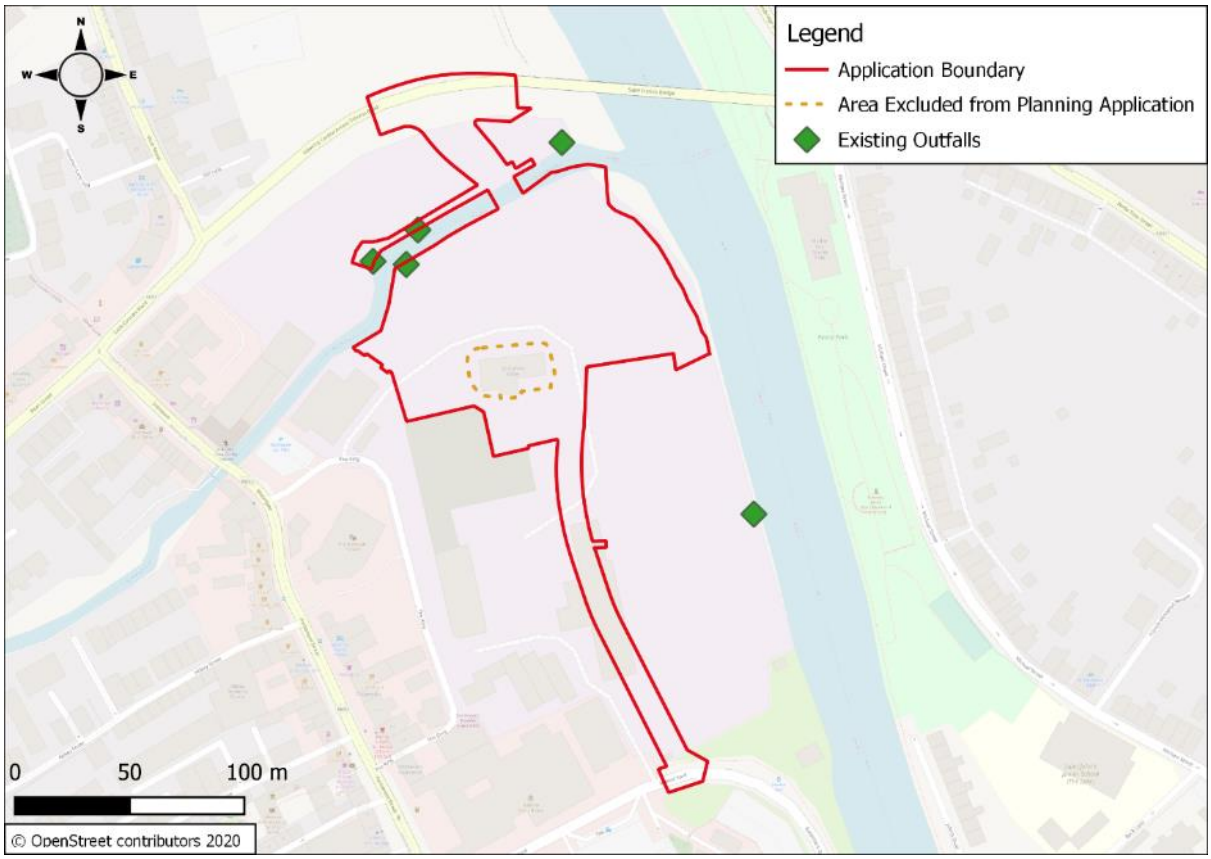
Wastewater from the former brewery development discharged to the existing combined sewer at a manhole close to the Market Yard pumping station. The existing sewer discharges wastewater from the Site to the combined sewer is a 225 mm diameter pipe laid at a gradient of c. 1:100. This sewer has a full-bore capacity of approximately 45l/s. This sewer links to the Kilkenny City and Environs Wastewater Treatment Plant (WWTP) at Purcellsinch.

1.3.6 Surface Water Drainage

There are three separate surface water drainage networks within the Site, with three separate outfalls. Two of these networks are located to the south of the River Breagagh, while one network is situated to the north of the Breagagh. Run-off from the northern and western areas of the Site is collected by gullies and aco drains with concrete sewers conveying run-off to the River Breagagh (northern & southern bank) through flap valves.

Run-off from the south eastern part of the Site is collected by gullies and conveyed to a large chamber upstream of the outfall to the River Nore. Downstream of this chamber, twin 225 mm diameter concrete sewers convey surface water run-off to the River Nore. The locations of the existing outfalls are presented in Figure 1-3 below.

Figure 1-3: Existing Outfalls to River Nore and River Breagagh



The majority of the existing Site is a concrete slab and therefore drains to the existing outfalls via existing interceptors which were installed as part of the former brewery operations. There is no storm water flow attenuation associate with the existing drainage network on the Site.

1.4 Existing Structures

The majority of the existing Site is hardstanding, largely comprised of concrete slab. There are three existing structures (non-historic) at the Site, which were not demolished as part of the purchase contract agreement. Two of these structures are known as the "*Tasting Room*" and the "*Maturation Building*". The Tasting Room is a single storey stone structure located adjacent to the southern aspect of St Francis Abbey and is currently used as a meeting room.

The Maturation building is a single storey concrete building which previously housed a total of 22No. maturation vessels which formed part of the brewery process at the Site. In accordance with the provisions of Part VIII of the Planning and Development Regulations (as amended), the demolition of the Maturation Building has received approval (Reference No: P11/19). It is likely that this building will be demolished in advance to works commencing as part of this proposed development. Therefore, the demolition works associated with the removal of the maturation building do not form part of the planning permission sought for the proposed development. However, the potential for these demolition works to be completed in tandem with the proposed development cannot be ruled out.

The third existing structure is a small structure in the southern portion of the Site which will be demolished as part of the proposed development. This structure was a former pumphouse and consists of a single block wall.

1.5 Environmental Impact Assessment Report

This EIAR has been prepared in accordance with the requirements of the following legislation:

- Planning and Development Act, 2000 (as amended);
- Part II of the first Schedule of the European Communities (Environmental Impact Assessment (EIA)) (Amendment) Regulations, 1999 (S.I. No. 93 of 1999);
- The Local Government Planning and Development Regulations 2001 – 2018 (S.I. No. 600 of 2001, and subsequent amending legislation); and,
- European Union (EU) (Planning and Development) (Environmental Impact Assessment) Regulations, 2018.

The following existing and draft guidance were also considered in preparing this EIAR:

- EPA Advice notes on current practice in the preparation of Environmental Impact Statements (EPA, 2003);
- EPA Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002);
- European Commission Interpretation of definitions of project categories of Annex I and II of the EIA Directive (European Commission, 2015);
- European Commission Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017) (European Commission, 2001a);
- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft) (EPA, 2017);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2017) (Department of Housing, Planning and Local Government , 2018); and,
- EPA Guidance on Soil & Stone By-Products in the context of Article 27 of the European Communities (Waste Directive) Regulations 2011 (Environmental protection Agency (EPA), 2011).

1.5.1 EIA Amendment Directive (2014/52/EU)

On 14th April 2014, the EIA Directive (2014/52/EU) (the EIA Amendment Directive) was adopted by the Council of the European Union (EU) and amended Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. Article 2 of the EIA Amendment Directive required all Member States to bring the Directive into force by 16th May 2017.

The EIA Amendment Directive clarified aspects of the preceding Directive 2011/92/EU to bring it into line with intervening European Court of Justice (ECJ) judgments and introduced additional provisions and procedural options. Therefore, compliance with the EIA Amendment Directive (2014/52/EU) will automatically ensure compliance with Directive 2011/92/EU. In Ireland, the EU (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. 296 of 2018), came into effect on the 1st September 2018[1] and gave effect to Directive 2011/92/EU as amended by the EIA Amendment Directive.

An EIAR document is produced as the key component of the environmental impact assessment (EIA) process. It provides a description of:

a) The baseline environment;
b) Identification of the potential effects (if any - both positive and negative) that are predicted to be incurred as a result of the proposed development; and,

[1] Regulation 21, 67(d) and 69(e) came into effect on the 1st January 2019

c) A description of any control and mitigation measures required to avoid, reduce or eliminate such potential effects.

1.5.2 EIAR Screening

The proposed development was subject to EIA Screening in accordance with the scope of activities listed in Part 1 of Schedule 5 of the Section 172 of the Planning and Development Act 2000, as amended. The proposed Urban Park and Street does not fall within any of the classes of development listed in Part 1, or paragraphs 1 to 9 and 11-12 of Part 2 of Schedule 5. Therefore, mandatory EIA, as classified under *Annex I*, is not required.

However, it was determined that the proposed development has the potential to result in likely or significant effects on the environment based on the findings of this EIAR screening assessment and as such an EIAR under Schedule 7 of the consolidated Planning and Development Regulations 2001- 2018 was considered necessary to be completed to support of the planning application.

1.5.3 Structure of the EIAR

Table 1-1 provides a description of the EIAR structure.

Table 1-1: Structure and Description of the EIAR

Title	Description
Volume 1: Non-Technical Summary (NTS)	
NTS	The NTS contains an overview of the proposed development and the principle findings of the Environmental Impact Assessment (EIA) in non-technical language.
Volume 2: Main EIAR Report	
Chapter 1- 4	Chapters 1-4 provide an introduction to the proposed development, describes the proposed development, the need for the proposed development and the alternatives considered.
Chapters 5-14	Chapters 5-15 comprise of the assessment of predicted environmental impacts, together with an evaluation of their significance and a description of any mitigation measures proposed to minimise impacts. It also takes into account the interactions between the various environmental topics. Chapters 5-14 generally follows the structure set out below: • A brief introduction to the chapter; • An outline of the methodology employed; • A description of the receiving existing environment relevant to the environmental topic under consideration; • A description of the characteristics and predicted impacts of the proposed development on the receiving environment; • A description of the reductive or mitigation measures and / or the factors that will reduce or eliminate any significant environmental impacts identified; • A description of the residual impact of the proposed development. Residual impacts are the remaining impacts that will occur after the proposed mitigation measures have been taken into consideration; • A description of the interactions with other environmental attributes; • Details of any monitoring required during Site preparation and operations; • Details of any rehabilitation or restoration works required; and, • Difficulties encountered in undertaking the assessment.

Title	Description
Chapter 15	Interactions of the Foregoing
Chapter 16	Chapter 16 outlines the overall Schedule of Commitments agreed by the applicant in the event that the planning application is authorised.
Volume 3: Appendices	
Appendix	Relevant topic specific technical documentation supporting the EIAR are contained within the Appendix and presented as a separate Volume of the EIAR (Volume 3)

1.6 Methodology

1.6.1 Assessment of the Effects – Evaluation Criteria

The assessment of effects has been undertaken in accordance with best practice, legislation and guidance notes. The evaluation of significance considers the magnitude of the change and the sensitivity of the resource or receptor. Unless otherwise stated, this approach has been adopted throughout the EIAR.

The criteria for determining the significance of impacts and the effects are set out in Figure 1-4 as abstracted from the EPAs draft document on the Information to be contained in an EIAR (EPA, 2017). Definitions of impact, as outlined by the EPA are included below, unless otherwise stated within a specific EIAR topic; these definitions will apply within this EIAR.

Figure 1-4: Description of Impacts (EPA, 2017)

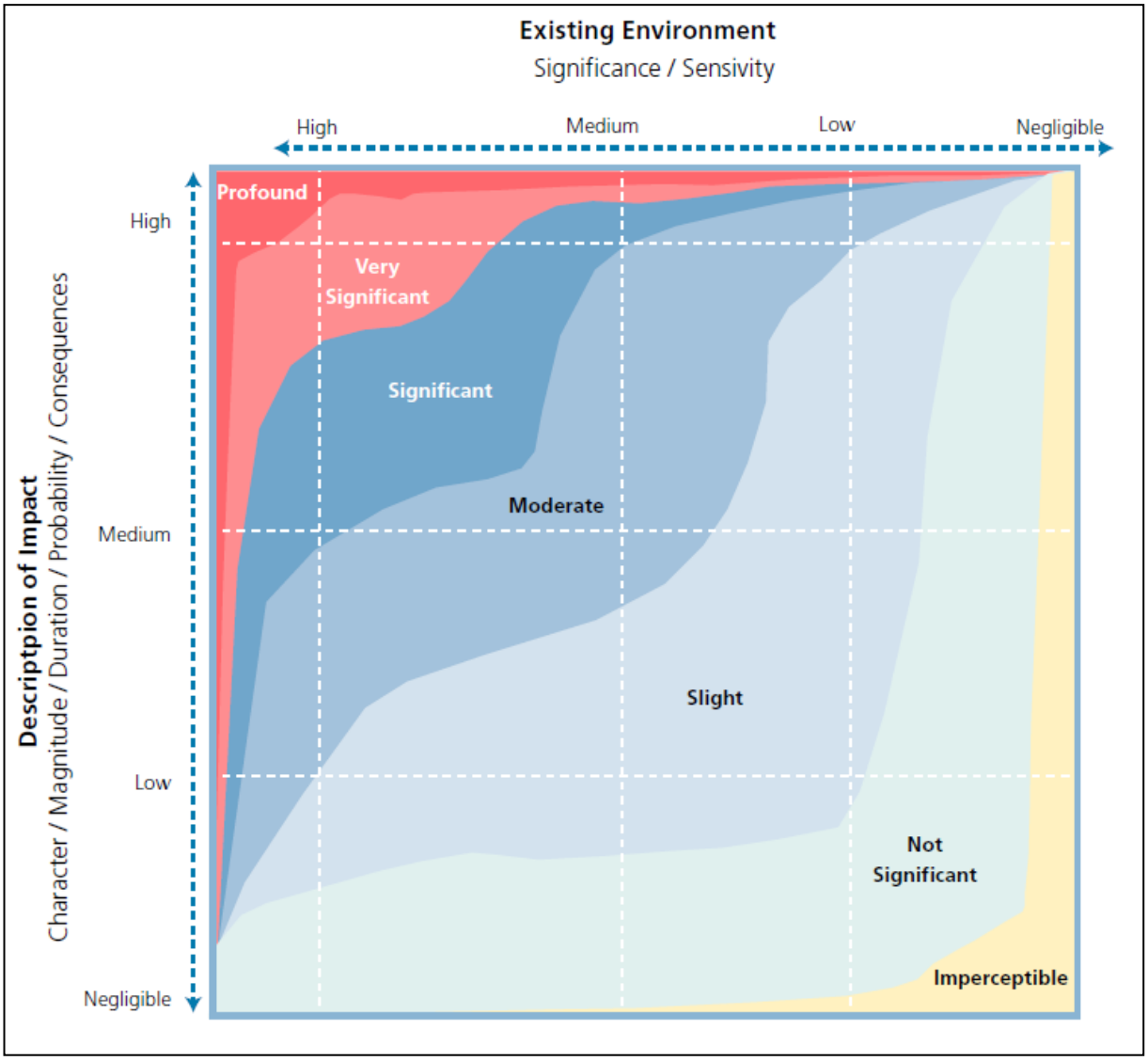


Table 1-2 defines the quality of effects from positive to negative on the environment.

Table 1-2: Quality of Effect

Quality of Effect	Description
Positive	A change which improves the quality of the environment.
Neutral	A change which does not affect the quality of the environment
Negative / adverse	A change which reduces the quality of the environment.

Table 1-3 outlines the definitions of significance of effects which ranges from imperceptible to profound effects.

Table 1-3: Definitions of Significance of Effect

Classification	Criteria
Imperceptible	An effect capable of measurement but without noticeable consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without noticeable consequences

Classification	Criteria
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends.
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics

Table 1-4 describes the terminology used to discuss the magnitude of effects.

Table 1-4: Describing Magnitude of Effect

Magnitude	Description
Extent	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
Duration	Describe the period of time over which the effect will occur. (See further detail below)
Frequency	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)

Table 1-5 shows how likely an impact is to occur.

Table 1-5: Describing Probability of Effect

Magnitude	Description
Likely	The effects that can reasonably be expected to occur as a result of the planned project if all mitigation measures are properly implemented.
Indeterminable	When the full consequences of a change in the environment cannot be described.
'Worst case'	The effects arising from a project in the case where mitigation measures substantially fail

Table 1-6 discusses the duration of effects. Momentary effects lasting from seconds to minutes will often be less concerning than long term and permanent effects, depending on their severity.

Table 1-6: Describing Duration of Effects

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

Table 1-7 defines the types of effects that can potentially occur.

Table 1-7: Describing Types of Effects

Magnitude	Description
Cumulative	The addition of many small effects to create one larger, more significant, effect.
Do Nothing	The environment as it would be in the future should no project of any kind be carried out.
Indeterminable	When the full consequences of a change in the environment cannot be described.
Irreversible	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
Residual	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
Synergistic	Where the resultant effects are of greater significance than the sum of its constituents.
Indirect	Effects that arise off-site or are caused by other parties that are not under the control of the developer (such as a quarry)
Secondary	Effects that arise as a consequence of a project (a new waste water treatment plant will reduce the yield of mussels in a nearby estuary)

1.6.2 Assessment of Cumulative Impacts

The EIA Directive and implementing legislation requires that the EIAR considers 'cumulative impacts.' Section 6.12 of the EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft 2017) states:

> *'The Directive requires that the EIAR describes the cumulation of effects[2]. Cumulative effects may arise from:*
>
> *- The interaction between the various impacts within a single project;*
>
> *- The interaction between all of the different existing and/or approved projects in the same area as the proposed project.'*

Cumulative impacts refer to impacts that result from incremental changes caused by other past, present and approved developments, and as far as is practicable from reasonably foreseeable development(s), together with the project. The proposed development is for a public park and urban street that will provide a recreational amenity for Kilkenny City and will facilitate future development of the Abbey Quarter as provided for in the Kilkenny City Development Plan 2-014-2020 and related documents, including the Abbey Quarter Urban Design Framework Masterplan (2015) and the Abbey Quarter Urban Design Code (2018).

The wider Masterplan lands will accommodate a new mixed-use quarter, with associated residential and employment populations, through the development of brownfield lands comprising 8.25 hectares (20.4 acres). The Masterplan provides a final Masterplan Design which includes an indicative block layout to guide future development. The Abbey Quarter Urban Design Code (2018) provides guidance on land use mix, quality of built form and nature and use of public spaces. The Code states that building density and quantum will be determined at planning application stage subject to consistency with the overarching Masterplan and Design Code objectives and guidance.

Development permitted to date on the Masterplan lands include Riverside Gardens (linear park currently under construction) and the redevelopment/reuse of the former Mayfair Ballroom (proposed end use as City Library), the former Smithwick's Brewery Brewhouse (c. 6,390m^2 to provide for a range of uses including education, research & development and/or office commercial development), and the demolition of the former Maturation Building

[2] Annex IV, point 5(e) of the Directive, and Schedule 6(2)(e)(i)(V) to the 2018 Regulations.

permitted under a Part 8 (KCC Ref. P11/19). These permitted schemes have been taken into consideration for the purposes of determining cumulative impacts. The demolition of the former Maturation Building will be undertaken in accordance with the extant Part 8 consent. These permitted works will likely be undertaken in advance of the development that is subject of this application. The maturation building is included in this assessment as part of the receiving environment. In order to take a precautionary approach, in the event that the demolition of the maturation building is delated, the impact of the permitted demolition works are assessed as part of the cumulative impact assessment.

Future development of the Abbey Quarter lands will be subject to separate planning application(s) and detailed assessment by the Planning Authority of likely impacts on the environment, and consistency with the relevant statutory land use plans in effect at the time of the determination of those applications, including the Masterplan. The Masterplan has been subject to Strategic Environmental Assessment (SEA) to predict and evaluate the likely environmental effects of implementing the Plan. Furthermore, wide ranging mitigation measures have been identified in the Masterplan to avoid, reduce and/or minimise potential effects on the environment. The proposed development has been designed to be consistent with the Masterplan and incorporate where appropriate all relevant mitigation measures. Accordingly, the proposed development is responsive to potential cumulative, future development of the wider area.

1.6.3 Assessment of the Risk of Accidents and Unplanned Events

In accordance with EPA guidance (EPA, 2017) the risk of accidents and unplanned events which may be either caused by or have impact on the proposed development have been assessed. A risk-based approach has been employed and is detailed in the following chapters:

- Biodiversity;
- Land and Soils;
- Water;
- Air and Climate; and,
- Noise and Vibration.

1.7 Consultation and Scoping

This section sets out the consultation undertaken as part of the EIA process and the related scope of the assessment undertaken.

1.7.1 Formal Scoping Request

A request for formal scoping in relation to the proposed development was made to the relevant planning authority, An Bord Pleanála (ABP) under Section 173 of the Planning and Development Act 2000 (as amended). This application was made on the 19th of December 2019. ABP subsequently replied to this scoping request on the 01st of May 2020. The scoping opinion received gave guidance with regard to the scope of this EIAR under the following headings:

1) The Proposed Development;
2) The Existing Environment;
3) The Likely Significant Effects of the Proposed Development;
4) Measures to Mitigate Adverse Impacts;
5) Consideration of Alternatives;
6) Non-Technical Summary;
7) Population, and Human Health;
8) Biodiversity;
9) Land, Soils, Water, Air and Climate;
10) Material Assets, Cultural Heritage and Landscape; and,

11) Interactions between the above factors

A copy of the ABP scoping opinion is included in Appendix 1.1. These comments were taken into account in the preparation of this EIAR.

1.7.2 Non-Statutory Consultation

In accordance with best practice guidelines (EPA, 2017) (Department of Housing, Planning and Local Government , 2018), this EIAR included non-statutory consultation. Table 1-8 below lists the consultees to which a consultation request was sent, whether a response was received, and the topics raised by the consultee, where relevant.

A copy of the EIAR Consultation document, issued on the 4th of March 2020, is presented in Appendix 1.2. Copies of the submissions received from the Consultees are presented in Appendix 1.3.

A consultation request was sent to the following bodies but no reply has been received to date:

- An Taisce;
- Bird Watch Ireland;
- Bord Gáis Energy;
- Department of Agriculture, Food and the Marine (DAFM);
- Department of Business, Enterprise and Innovation (DBEI);
- Department of Communications, Climate Action and Environment (DCCAE);
- Department of Housing, Planning and Local Government (DHPLG);
- Department of Rural and Community Development (DRCD);
- Department of Transport, Tourism and Sport (DTTS);
- Environmental Protection Agency (EPA);
- Fáilte Ireland;
- Health and Safety Authority;
- Inland Fisheries Ireland (IFI);
- Irish Wildlife Trust;
- Sustainable Energy Authority of Ireland (SEAI);
- The Arts Council; and,
- The Heritage Council.

1.7.3 Masterplan Consultations

Due to the restrictions in place as a result of the Covid-19 crisis, it was not feasible to hold a public consultation event during the preparation of this EIAR. However extensive consultations took place over a number of years with statutory bodies, service providers and the public in relation to the overall Abbey Quarter Masterplan.

The concept of including an urban park within the masterplan came about as a direct result of these public consultations. A “Summary of public consultation undertaken in the preparation of the Abbey Quarter Masterplan 2012-2018” is included as Appendix 1.4.

Consultation with regard to the high-level objectives of the Masterplan took place in conjunction with consultation on the Kilkenny City and Environs Development Plan. These objectives included the provision of the Urban Park and Street.

Table 1-8: Consultation and Consultee Responses

Consultee	Date of Response	Method of Response	Topics Raised	Response
Department of Culture, Heritage and the Gaeltacht (DCHG)	July 2020	Letter	Vehicular access and its appropriate management was identified as a priority, to ensure the amenity and long-term conservation of St Francis Abbey and other heritage features is protected.	Vehicular through traffic will be limited to early mornings/late evenings and available for, namely goods and services, delivery vehicles serving future buildings. This will be controlled by the use of traffic bollards and a permitting system and will operate as a one-way system (i.e. south to north).
Development Applications Unit – National Parks and Wildlife Service (NPWS)	N/A	Informal consultation with local NPWS ranger.	1. It was requested that access from the proposed park to the existing riparian habitat along the River Nore be minimised. 2. Protection of riparian habitat. 3. Restoration of an area of riparian habitat close to the confluence of the Rivers Breagagh and Nore would be favourable. 4. Light spill to the riparian and aquatic habitat was to be kept to a minimum.	1. It was decided that the most effective way to do this would be to include “defensive” planting close to the proposed fence along the eastern site boundary. 2. No removal of riparian habitat was to be proposed. 3. Tree planting in this previously disturbed area which is now scrub is proposed. 4. Lighting design was revised to minimise light spill to both the River Nore and River Breagagh.
Electricity Supply Board (ESB)	05/03/2020	Email	Submission forwarded to Kilkenny office for their attention. No further reply received. Separate technical services design consultation was also undertaken with the local area engineer to confirm requirements	The required number and size of ducts has been included in the design.
Gas Networks Ireland	08/03/2020	Email	Gas safety and maps of the local gas network supplied. Separate technical services design consultation was also undertaken with the local area engineer to confirm requirements.	Cognisance is taken of the 4bar gas line to the north of the Site, the 4bar line to the West of the Site and the 75mbar line to the south of the Site. It is proposed to provide conduits for an extension of the gas network within the Street as part of the development. The required number and size of ducts has been included in the design.

Consultee	Date of Response	Method of Response	Topics Raised	Response
Geological Survey of Ireland (GSI)	16/03/2020	Email	1. All GSI data, including maps should be referenced as such. 2. Some online sources of information were provided 3. No County Geological Sites (CGSs) located in close proximity to the Site. 4. Geohazards and particularly flooding be taken into consideration. 5. The EIAR should also consider the potential for resource sterilisation as part of the planning process. 6. Copy of reports detailing any Site investigations carried out for inclusion in the GSI's national database of Site investigation boreholes.	1. All data sources, including map data, has been referenced throughout the EIAr and related documents. 2. Noted 3. Several of these data sources have been reviewed as part of the EIA and referenced in the EIAR. 4. No particular geohazards have been identified. A stage 1 flood risk screening has been conducted and is presented in Chapter 8. 5. There are no now minerals beneath the Site, resource sterilisation has therefore been screened out.
Health Service Executive	29/03/2020	Letter by email from EHS department	1. The project will support the Healthy Ireland Strategy and other national plans and policies; 2. Some specific landscaping design recommendations were made; 3. A request to assess positive and not just negative effects of the project in relation to population and human health was made; 4. With regard to the EIAR some recommendations were made in relation to structure and content, in particular in relation to emissions, socio-economic changes and opportunities for health gain; 5. It was requested that we do not assess wider socio-economic or population trends on a regional or national basis; 6. It was requested that we take into account the SEA completed for the Masterplan and avoid duplication; 7. Consideration of the Kilkenny Climate Adaption Plan is requested; 8. An assessment of the impact of artificial lighting is requested; 9. A CEMP was requested; 10. Some sources of information were also provided.	1. Noted and mentioned in Chapter 5. 2. Noted and taken into account during the design process. 3. Noted and positive impacts have been addressed in Chapter 5 among others. 4. Noted and these comments have been taken into account in Chapter 5 and throughout the EIAR. 5. Noted and only relevant, local socio-economic and health-based statistics included in Chapter 5. 6. Noted and taken into account throughout the EIAR. 7. The Kilkenny Climate Adaption Plan has been taken into account in Chapters 5 and 9 of this EIAR. 8. See Chapters 5 and 11 of the EIAR for an assessment of the impact of artificial lighting from a health and visual perspectives respectively. 9. A pCEMP will be submitted alongside this planning application. 10. Sources of information provided were used in compiling the baseline data for Chapter 5 of this EIAR.

Consultee	Date of Response	Method of Response	Topics Raised	Response
Irish Water (IW)	N/A	Informal consultation with local IW engineer.	Technical services design consultation was also undertaken with the local area engineer to confirm requirements.	The required number and size of ducts has been included in the design.
National Monuments Service (NMS)	No response to consultation document but letter received in July..	Letter and Informal consultation with NMS & OPW	Context Accessibility Vibration Abbey conservation plan	Generally supportive of the project as it will make a long hidden national monument publicly accessible in a more appropriate context. Vibration impact assessment and monitoring will be required. The area within the ownership of the OPW i.e. St, Francis Abbey, should not be included within the development plans as it will be subject to an OPW / NMS conservation plan. Any works to the Abbey will be undertaken by the OPW and NMS.
Office of Public Works (OPW)	No response to consultation document directly.	Informal consultation with OPW & NMS	Context Accessibility Vibration Abbey conservation plan	Generally supportive of the project as it will make a long hidden national monument publicly accessible in a more appropriate context. Vibration impact assessment and monitoring will be required. The area within the ownership of the OPW i.e. St, Francis Abbey, should not be included within the development plans as it will be subject to a conservation plan to be prepared by OPW, the NMS and KCC. Any works to the Abbey will be undertaken by the OPW and NMS.

Consultee	Date of Response	Method of Response	Topics Raised	Response
Transport Infrastructure Ireland (TII)	10/03/2020	Letter	1. Requested to identify national infrastructure that might be affected by the project and methods proposed for any works that may be in proximity to these. 2. The requirement for Traffic and Transport Assessment (TTA) should be assessed in accordance with reference to section 2.2 of the 2014 TTA guidance. 3. Further consultation was requested with regard to screening for RSA. 4. Assessment in line with TII standards and guidance. 5. The provision for travel planning / mobility management planning	1. The local roads infrastructure is identified in Chapter 14. There is no proposal to traverse or work in proximity to any national roads or other national transport infrastructure. 2. The proposed development will be sub-threshold for the requirement to undertake a TTA as the Street will be pedestrianised with the only vehicle traffic being deliveries and maintenance serving the Abbey Quarter. 3. An Area Based Transport Assessment (ABTA) including traffic modelling for the City is being prepared by KCC in line with TII guidelines. This plan will take the proposed development into account.

1.7.4 Scope of the Environmental Impact Assessment Report

In accordance with the formal scoping opinion obtained from ABP the following attributes of the receiving environment and their interactions are described within this EIAR in the following chapters:

5. Population and Human Health;
6. Biodiversity;
7. Land and soils;
8. Water (Hydrogeology & Hydrology);
9. Air and Climate;
10. Noise and Vibration;
11. Landscape and Visual;
12. Archaeology and Cultural Heritage;
13. Material Assets - Waste and Use of Natural Resources;
14. Material Assets – Traffic and Transport.

1.8 Project Team

The in-house Malone O'Regan project team included the following competent professionals:

Table 1-9: MOR In-House Project Team

Name	Role	Relevant Qualifications
Kevin O'Regan	Project Director	BAgrSci, MSc, 20+ years' experience.
Janette McDonald	EIAR Coordinator	BSc (Hon) Env. Sci., MSc, member IEMA, 8+ years of experience.
Pat Rohan	Principal Engineer	BE, MIEI, 20+ years' experience.
Dyfrig Hubble	Principal Ecologist	BSc, MSc, CIEEM Full Member, 12+ years' experience.
Kenneth Goodwin	Principal Acoustician	BSc, PgD & DI Acoustics, Full Member IOA, IEMA Practitioner, 14+ years' experience.
Klara Kovacic	Principal Environmental Consultant (Air & Climate)	MEng, MSc, DiB, Chartered Environmentalist, 18+ years' experience.
Simon Firth	Senior Hydrogeologist	BSc, MSc, Professional Member IGI, Member IAH, 12+ years' experience.
Thomas Vainio - Mattila	Principal Geologist	BSc, MSc, listed on the IGI 'Register of Competent Persons' in regard to Section 2.3 of the EPA 'Code of Practice', 20+ years' experience.
David Dwyer	Environmental Consultant	BSc, MSc, 7+ years experience.
Ursula Daily	Geologist	BSc, MSc, 5+ years experience.

The project team, in addition to the in-house engineering and environmental expertise of Malone O'Regan included the following external experts:

Table 1-10: MOR External Experts

Person	Company	Role	Relevant Qualifications
David Kirkwood	Mitchell and Associates	Landscape architect and LVIA	BSc(Hon), Dip Env Mng, CMLI Landscape Institute, MILI Irish Landscape Institute (past president). 20+ years experience.
Veronika Kunclova	Mitchell and Associates	Landscape architect	BSc, MSc, 5+ years experience.
Declan Brassil	Declan Brassil and Company	Planning Consultant	BA (NUI Maynooth), Masters of Regional and Urban Planning (UCD), Chartered Town Planner, Member Irish Planning Institute, 20+ years experience.
Richard Clutterbuck	Archaeological Management Solutions	Archaeological impact assessment	BA (Hons), MLitt, PhD, MIAI. 20+ years experience.
Rob Goodbody	Historic Building Consultants	Built heritage impact assessment	BA(mod); PgD; MA; Masters in Urban and Building Conservation; PgD in Applied Building Repair and Conservation; Member of Irish Planning Institute. 20+ years experience.
Sean Cahalane	3rd Eye	Architectural visualization and photomontages	MA, BA (Hons), Cert Construction Tech. 15+ years experience
Pascal Sweeney	Sweeney Consulting	Specialist aquatic ecologist	BSc, MSc, 20+ years experience.
John Morgan	Independent Tree Surveys	Arboricultural assessment	Qualified Arborist, BSc (Hons), Tech Cert (Arbor A), M.Arbor. A. 10+ years experience.

2 PLANNING CONTEXT & NEED FOR THE DEVELOPMENT

2.1 Introduction

This Chapter sets out the need for the proposed development through analysis of the most recent development plans, planning guidelines, policy frameworks and reports issued by the county, state and semi-state bodies.

2.2 Kilkenny Abbey Quarter Masterplan

The proposed development forms part of the Abbey Quarter Urban Design Framework Masterplan (the Masterplan) area, the extent of this area is presented in Figure 1-2 above. The Abbey Quarter is an area of land that is currently undeveloped and underdeveloped land adjoining Kilkenny City Centre. The Masterplan was initially prepared and public consultation on the plan took place in 2013. Following this consultation, the Masterplan was further refined in 2015 and was accompanied by a Strategic Environmental Assessment (SEA). The key high-level principles of the Masterplan were accepted by KCC in 2016 through Variation No.1. of the Kilkenny City and Environs Development Plan (KCEDP) in 2016 and further amended by way of Variation No. 5. The provision of "*an urban park & Street in the vicinity of St. Francis Abbey (National Monument) incorporating the City Walls, Evans Turret and St. Francis' Well*" was included as one of these key objectives.

The Urban Design Code for the Masterplan, which was also one of the objectives, was later prepared in 2018 to provide "*greater clarity for all stakeholders on the nature of planning and development outcomes in the Quarter*".

The Masterplan, related SEA and Urban Design Code have been reviewed and their objectives taken into account as part of the design and Environmental Impact Assessment processes. The Masterplan includes the following elements which have yet to commence:

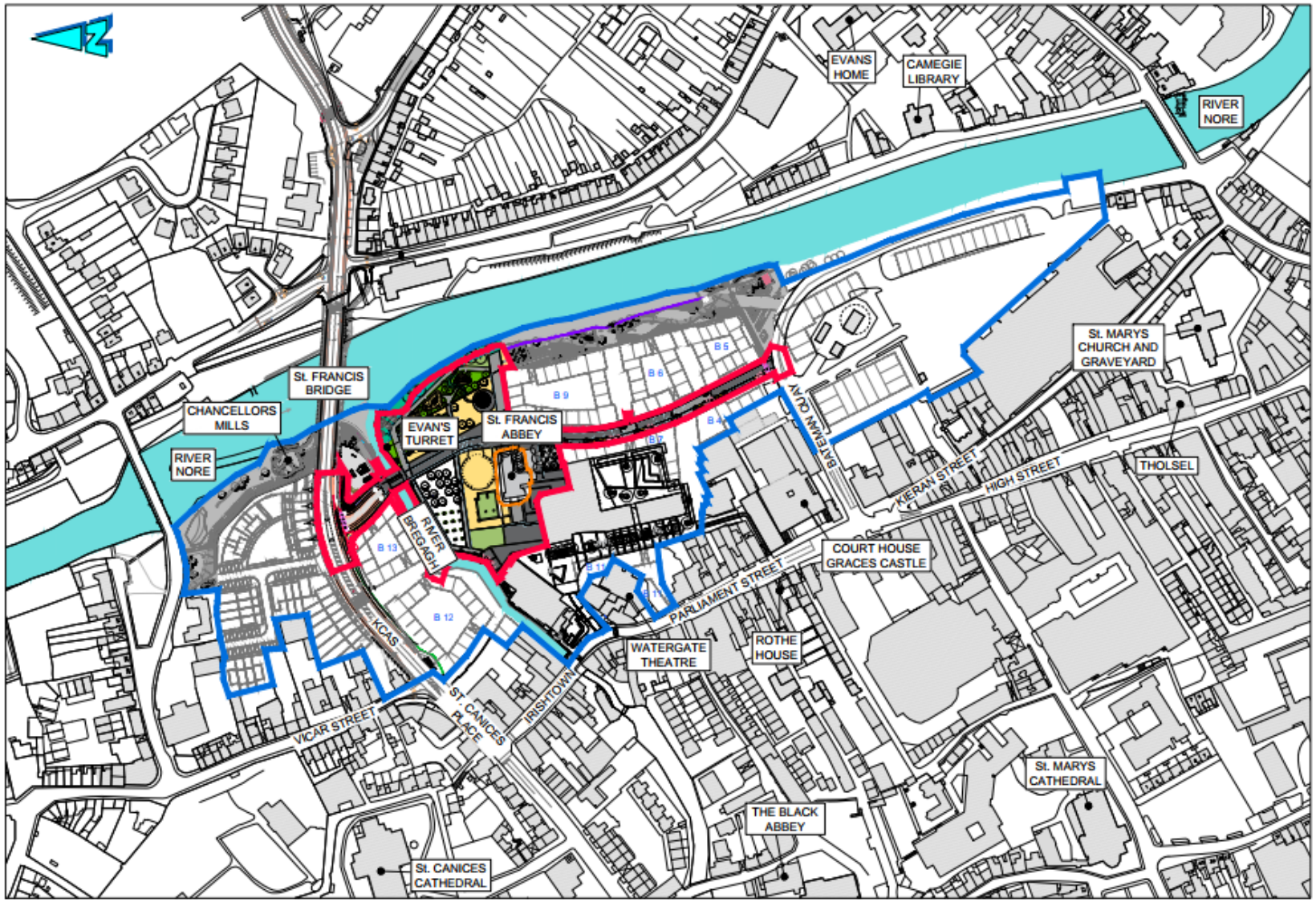
- Seven new blocks on the former brewery site and seven other new blocks just outside of the former brewery site with the aim of creating a new urban quarter to complement the existing City Centre;
- Conservation of historic buildings on the Site including St. Francis Abbey and Evans Turret;
- The proposed park forms a key element of this Masterplan with the proposed street providing access to the brewery site as well as a link to the City Centre; and
- Mixed use residential, commercial, retail, education and civic spaces.

Projects associated with the Abbey Creative Quarter Masterplan Development (and stated objectives of the Kilkenny City and Environs Development Plan 2014 - 2020) already approved include the following:

- The Riverside Garden Project – approved under Part 8 of the Planning and Development Regulations, 2001, as amended, in February 2016;
- The redevelopment of the Mayfair Ballroom into the City Library – Part 8 Development approved in July 2019;
- The redevelopment of the former Smithwick's Brewery Brewhouse building into primarily office space – Part 8 Development approved in December 2017; and
- The Abbey Quarter Maturation Building demolition – Part 8 Development approved in June 2019.

A plan drawing showing the proposed layout of the Masterplan is presented in Figure 2-1 overleaf.

Figure 2-1: Abbey Quarter Masterplan - Final Plan 2015



2.3 Planning Context

This section presents the planning context of the proposed development in terms of national, regional and local planning contexts.

2.3.1 National Planning Context

There are two national plans which address the period for which planning is being sought, the National Spatial Strategy (NSS) and Project Ireland 2040 the National Planning Framework.

2.3.1.1 National Spatial Strategy (NSS)

The NSS is a statutory planning document designed to achieve a better balance of social, economic, physical development and population growth between regions, up until 2020. Sustainable development is at the core of the NSS. Its focus is based on people, places and building communities.

The Southeast Region comprises of Waterford, Wexford, Carlow, South Tipperary and Kilkenny and as set out in the NSS the contribution to balanced regional development requires the enhancement of Hubs of which Kilkenny is one.

With regard to Kilkenny City, in a DELG in a document entitled "What the NSS means for Kilkenny" the specific impact of the NSS on Kilkenny is summarised as follows:

- *"Kilkenny is to be a hub with a strong relationship with the existing gateway of Waterford, with both helping to build up critical mass and attractiveness of regions for enterprise."*
- *"The NSS will build on Kilkenny's success as a City with a good quality of life, through further support for tourism based on built heritage."*
- *"This can lead further development based on heritage and scenic attractiveness of other towns and rural parts of the county."*
- *"Further scope for strong enterprise development, taking account of improved accessibility to and from Dublin."*

2.3.1.2 Project Ireland 2040 National Planning Framework

Project Ireland 2040 was launched by the Government in February 2018 (Government of Ireland, 2018). Project Ireland 2040 incorporates two policy documents i.e. the National Planning Framework and the National Development Plan to 2027.

The plan states the importance of urban green spaces to Ireland's development.

> *"Green belts and green spaces in our cities, towns and villages play an integral role as part of the fabric of our settlements, either through their use for community recreation and amenity purposes, supporting biodiversity or as a natural delineation of the settlement itself, forming the interface between urban and rural areas.*
>
> *Green spaces and parks have a role in determining the quality of life in and sustainability of, our settlements. Green belts adjoining our urban areas also fulfil a strategic purpose, as a potential asset for future, planned development as an urban extension, particularly at a city scale."*

It specifically sets out the following objectives to support urban renewal, the provision of amenity and green spaces and alternatives cars in the urban environment. These are specific goals of this project supported by the following national policy objectives.

National Policy Objective 6

> *"Regenerate and rejuvenate cities, towns and villages of all types and scale as environmental assets, that can accommodate changing roles and functions, increased*

residential population and employment activity and enhanced levels of amenity and design quality, in order to sustainably influence and support their surrounding area."

National Policy Objective 12

"The Government will establish a National Regeneration and Development Agency to work with local authorities, other public bodies and capital spending departments and agencies to co-ordinate and secure the best use of public lands, investment required within the capital envelopes provided in the National Development Plan and to drive the renewal of strategic areas not being utilised to their full potential. The Government will consider how best to make State lands available to such a body to kick-start its development role and to legislate for enhanced compulsory purchase powers to ensure that the necessary transformation of the places most in need of regeneration can take place more swiftly and effectively."

National Policy Objective 18a

"Support the proportionate growth of and appropriately designed development in rural towns that will contribute to their regeneration and renewal, including interventions in the public realm, the provision of amenities, the acquisition of sites and the provision of services."

National Policy Objective 27

"Ensure the integration of safe and convenient alternatives to the car into the design of our communities, by prioritising walking and cycling accessibility to both existing and proposed developments, and integrating physical activity facilities for all ages."

National Policy Objective 62

"Identify and strengthen the value of greenbelts and green spaces at a regional and city scale, to enable enhanced connectivity to wider strategic networks, prevent coalescence of settlements and to allow for the long-term strategic expansion of urban areas."

National Policy Objective 66

"A more effective strategic and centrally managed approach will be taken to realise the development potential of the overall portfolio of state owned and/or influenced lands in the five main cities other major urban areas and in rural towns and villages as a priority, particularly through the establishment of a National Regeneration and Development Agency."

2.3.1.3 National Development Plan 2018-2027

The National Development Plan (NDP) 2018-2027 established the Urban Regeneration and Development Fund (URDF) and the National Regeneration and Development Agency (NRDA). The fund of €2 billion was set up to support the co-development of growth enablers in large urban centres such as Kilkenny. The Kilkenny Abbey Quarter has so far been awarded significant support from this fund to aid in the development of the Abbey Quarter Masterplan. This proposed development will form an integral aspect of the next phase of making the Abbey Quarter Masterplan a reality and it is hoped that these future plans will be part funded by the URDF.

2.3.2 Regional Context

The Regional Spatial & Economic Strategy for the Southern Region identifies high level requirements and policies necessary to ensure continued development in the region in the form of Regional Policy Objectives (RPOs) (RSES, 2020).

RPO 12 have been developed specifically for Kilkenny and includes the following:

A. *"To strengthen the role of Kilkenny City as a self-sustaining regional economic driver with significant zone of influence and Key Town on Dublin – Carlow-Kilkenny Waterford M9 Road/Rail Axis, links to the Eastern Corridor. The RSES seeks to leverage its strategic location and accessibility to the Port of Waterford & Rosslare Europort, Waterford Airport and to build upon its inherent strengths including the finance, technology and creative sectors, skills, innovation and enterprise, tourism, and retail services";*
B. *"To strengthen 'steady state' investment in existing rail infrastructure and seek investment for improved infrastructure and services to ensure its continued renewal and maintenance to high level in order to provide quality levels of safety, service, accessibility and connectivity including improved frequency and journey times";*
C. *"To support development of freight rail services and facilities including rail freight links to the ports";*
D. *"To strengthen the Education, Research and Innovation Capacity Kilkenny with ongoing development of St. Kieran's College and development of the Multi-Campus TUSE";*
E. *"To support urban generation through investment in the Abbey Quarter & other initiatives to improve the Public Realm and regenerate underused land in the City and to support implementation of mitigation from Abbey Quarter Masterplan SEA and AA processes";*
F. *"To seek investment in sustainable transport measures through a Local Transport Plan including development of Town Bus Services in support of the Compact '10-minute city' concept";*
G. *"To support the delivery of the infrastructural requirements identified for Kilkenny City including the delivery of the northern extension of the ring road from the N77 Castlecomer Road to the R693 Freshford Rd as part of the western by-pass for the City from the Castlecomer Road to the Waterford Road identified as an objective and assessed under the Kilkenny City & Environs Development Plan, subject to required feasibility, planning and environmental assessment processes";*
H. *"Support for the City as a 'Hero site' within the Failte Ireland's branding of Ireland's Ancient East. The 'Medieval Mile' package which brings together Public Realm improvements linking Kilkenny Castle to St Canice's Cathedral and other significant attractions in between, such as the Medieval Mile Museum, the new Butler Gallery, the Smithwick's Experience and Rothe House";* and,
I. *"Support for the Quality of life offer in Kilkenny City which is renowned as evidenced in its population growth which has exceeds the national average over the period 2006 – 2016*".

2.3.3 Local Context

Variation No. 1 of the Kilkenny City and Environs Development Plan (KCEDP) 2014-2020 incorporates a total of nine high level objectives for the Abbey Quarter Masterplan area including the following relevant objectives:

3I: "*To provide for an urban park in the vicinity of St. Francis Abbey (National Monument) incorporating the City Walls, Evans Turret and St. Francis' Well taking into account the recommendations of the archaeological strategy developed in the preparation of the Abbey Creative Quarter Masterplan (as indicated on Fig 3.4) and subject to compliance with the Habitats and Birds Directives and the provisions of the Abbey Creative Quarter Masterplan*."

3P: "*To provide for an urban street of pedestrian and cyclist priority between the Central Access Scheme and Bateman Quay crossing the River Breagagh at the existing bridge*

crossing. To provide for traffic management measures on the street such as to inhibit the flow of through traffic and heavy goods vehicles."

The proposed development aims to specifically address these objectives in the provision of an Urban Park and pedestrian and cyclist priority street in the Abbey Quarter.

Variation No.5 of the KCEDP changed the name of the masterplan area from "Abbey Creative Quarter" to the "Abbey Quarter", amending the objectives accordingly. It also included for the provision of temporary car parking within the area as follows:

3Q: *"To provide for temporary carparking (meanwhile uses) as outlined in the Urban Design Code (completed on foot of Objective 3k) and the Parking Options Report (completed on foot of objective 3N) within the Master plan area."*

2.4 Need for the Proposed Development

The acquisition by KCC of the former Brewery site presented a unique opportunity to create a space for businesses and amenity at the centre of one of Europe's most dynamic cities. The vision of the masterplan is to develop the Abbey Quarter as a seamless complement to the medieval City and an inclusive place for an inter-generational community to work, live and play.

It is the intention of KCC to develop the Abbey Quarter for mixed land use with a combination of creative, knowledge intensive business services, retail, residential, commercial, educational, hotel and civic land uses in a proportion set out in the urban design code for the area (Loci and Kilkenny Co Co, 2018). It is envisaged that the proposed development in combination with the overall masterplan will open the north eastern quarter of the City to the public and tourists alike. The proposed development will target the attraction of new business and residents to the north eastern quarter of the City, benefitting a co-ordinated and cohesive future development of the City as a whole.

The primary need for the proposed development will be to provide a new amenity area that will transform a City Centre brownfield site, which has been in private ownership and cut off from the public for many years, into a social and sustainable public amenity with the following aims:

- An amenity area to play and exercise. The provision of a fitness area within the proposed development providing a free and accessible tool for physical activity to the local population.
- An amenity area to meet and gather;
- An amenity area to relax, sit and observe, or lay on the grass lawn;
- An area to learn about the rich history of this part of the City;
- An amenity area where people can come in contact with nature; and,
- An amenity area where, small outdoor events can be organized such as markets, art exhibitions.

Furthermore, the need for the proposed development will be to provide access and an anchor to the future development of the overall Abbey Quarter Masterplan. The Urban Street will provide access and the necessary infrastructure to the future buildings to be developed in the Abbey Quarter. With this anchor, it will kick start the development of a new City quarter into the future while at the same time acknowledging and enhancing the architectural and archaeological heritage of the site's long history. The proposed new Urban Street will bring vibrancy and public life to this portion of the City Centre, connecting to the City fabric on both the southern and the northern ends. The proposed development will also meet the demand to provide more access for pedestrians and cyclists in a safe environment within the City Centre, and along the banks of the River Nore, thereby potentially allowing for increased transport via walking/cycling within the City as a whole.

3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

3.1 Introduction

As described in Chapter 1, the proposed development covers an area of c.1.44ha of the Kilkenny Abbey Quarter Masterplan Area and consists of two main components:

- The Urban Park; and,
- The Urban Street – a pedestrian and cyclist dominated street.

3.2 Description of the Proposed Development

This section sets out a description of the proposed development. Further detail on the finishes and design concepts are provided in the following documents which have been included with this planning application:

- Architectural and Engineering design drawings;
- Materials Booklet;
- Landscape Design Statement; and,
- Engineering Services Design and Methodology Report.

A landscape design statement has been prepared by Mitchell+Associates and is included with this application. It contains further details on the design objectives and concepts related to this proposed development.

3.2.1 The Urban Park

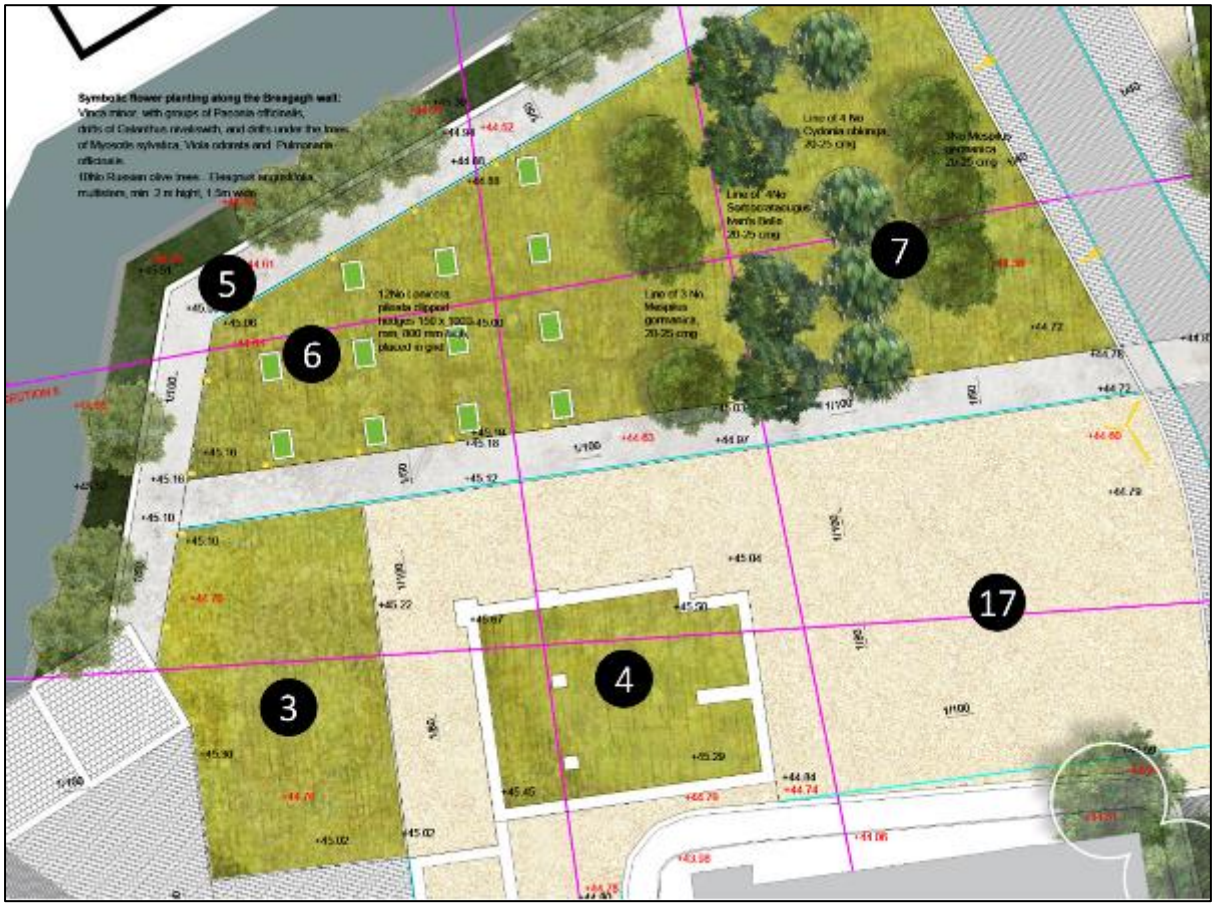
The individual elements of the Park are presented in Figures 3-1, Figure 3-2 and Figure 3-3 as well as described below.

Figure 3-1: Individual Built Elements of the Urban Park
(extract from Mitchell+Associates Landscape Design Statement)

1) The Abbey Plaza (c. 812m^2) will be the main arrival area to the remains of the historic St Francis Abbey Choir and Bell tower from the City.
2) The Brewhouse Plaza (c. 625m^2) is proposed to be adjacent to the former St Francis Abbey Brewery Tasting Room which has the potential to be adapted for reuse in the future. It will be populated with seating, information signage, grove of trees and paving related to the historic use of the Site as a brewery.
3) A c. 294m^2 lawn for picnicking, exercising or relaxation which represents the area of the transept.
4) Elevated c.248m^2 lawn with a lit limestone seating edge. This area refers to the transept of the St Francis Abbey. The area will also serve as a stage for events.
5) The c.73m long walkway along the River Breagagh allows for views back to St Francis Abbey and to the Bell Tower, and links to the Riverside Gardens. A south-facing seating edge will be provided all along the walk.
6) This c. 383m^2 area will provide another recreational lawn with planted hedges as a reference to the historic use as the St Francis Abbey cemetery.

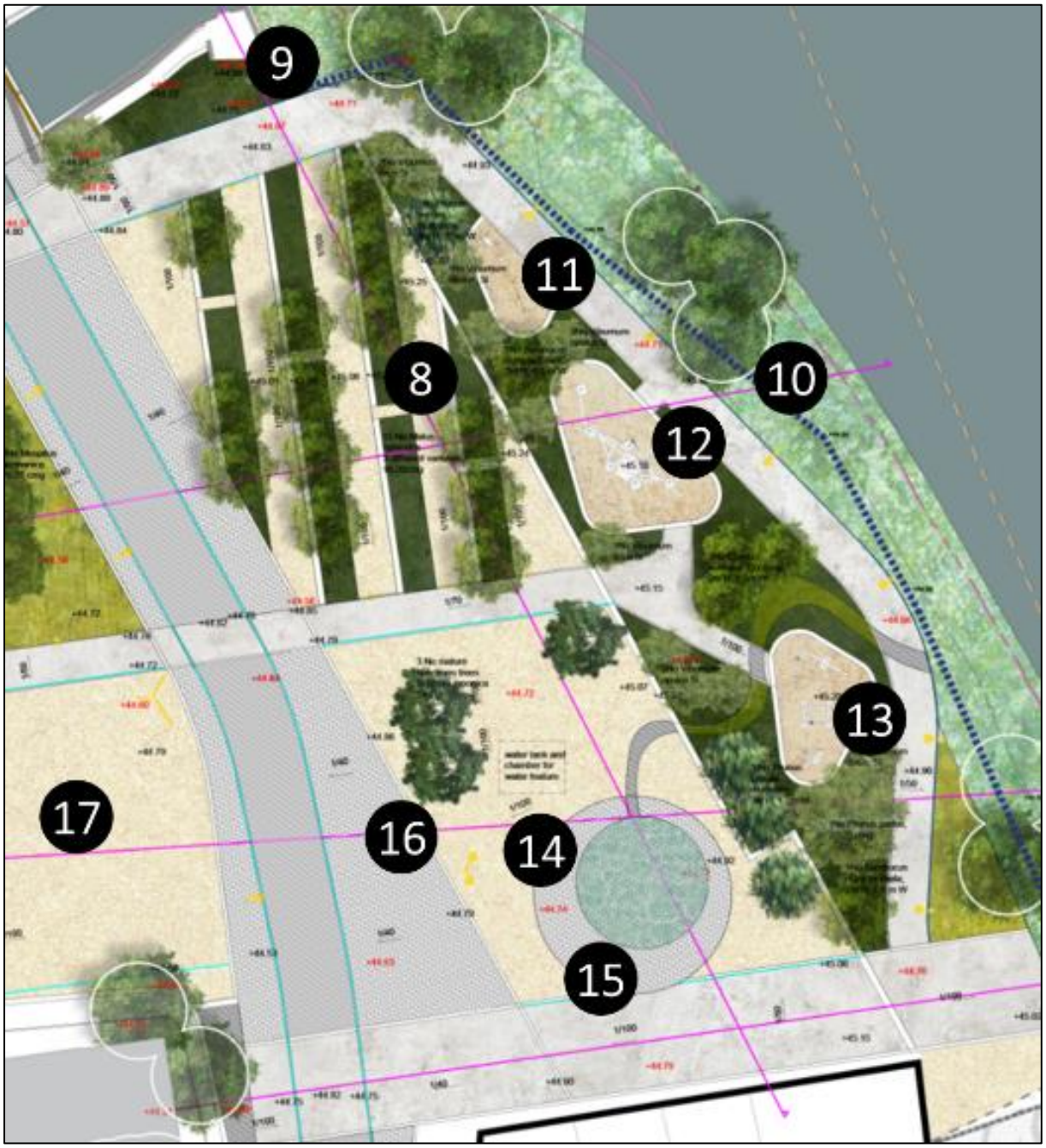
7) The orchard of forgotten fruits (c. 647m^2) will provide a shady space to enjoy the park lawns and serve as a point of interest to explore heritage fruit species.

Figure 3-2: North Western Portion of the Park
(extract from Mitchell+Associates Landscape Design Statement)



8) The ornamental crab apple orchard (c.727m^2) will provide shaded seating. The timber seats and backrests will run along the planted beds under the tree branches. Lower level, medicinal and symbolic plants under the trees will provide another point of interest and sensory experience, as they are often aromatic.
9) A larger space will be left open in front of Evans Turret to give visitors the space to view this historic structure. Evans Turret itself will be set in a background of perennial planting.
10) The c.105m long path along the river will connect to the Riverside Gardens park both on the north and the south end and will provide views both to the River Nore and to St Francis Abbey.
11) Fitness equipment zone (c.36.4m^2).
12) Older children playground (c.111.6m^2).
13) Younger children playground. (c.70.7m^2)
14) A c.78m^2 water mirror within a 700m^2 plaza, will act as a reference to the historic St Francis well.

Figure 3-3: Eastern Portion of the Park
(extracted from Mitchell+Associates Landscape Design Statement)



15) The Abbey axis will be the main connection of the Park to the Riverside Gardens park on the south and the visual axis to the Eastern Choir window of St Francis Abbey.
16) Main north-south axis of the park - the c.320m long pedestrian and cyclist priority Street element will reconnect the whole Site to the urban fabric of the City.
17) Main event space / multifunctional plaza (c.658.7m^2).

3.2.2 The Urban Street

The Street will be a shared space which will accommodate pedestrians (including wheelchair users, prams/buggies etc.), cyclists and service vehicles. The vehicle access carriageway will be only demarcated by a change in the Street surface finish and drainage channels. The Street will operate as a one-way system, for limited service vehicles, from Bateman Quay in the South to Wolf Tone Street in the North. Specific road markings for pedestrians, cyclists and other vehicles will only be present from the bridge over the Breagagh to the junction with Wolf Tone Street in the north and at the junction with Bateman Quay in the south. Pedestrians and cyclists will therefore have freedom of movement across the entire Street and into the Urban Park. Road marking at the junction with St. Canice's Place will be revised as part of this project to provide a safe transition to the existing road networks.

The urban street is 320m long and has an overall pavement width of 11.1m consisting of a 5.5m wide shared space and 2m to 3m wide dedicated pedestrian pavement with tree planting and street furniture to each side. The junctions along with proposed directions of traffic movements are presented in Figure 3-4 and Figure 3-5. For further details on traffic movements please refer to Chapter 14 and drawing P811 which has been submitted with this planning application.

Figure 3-4: Breagagh Bridge and Proposed Junction with St Canice's Place

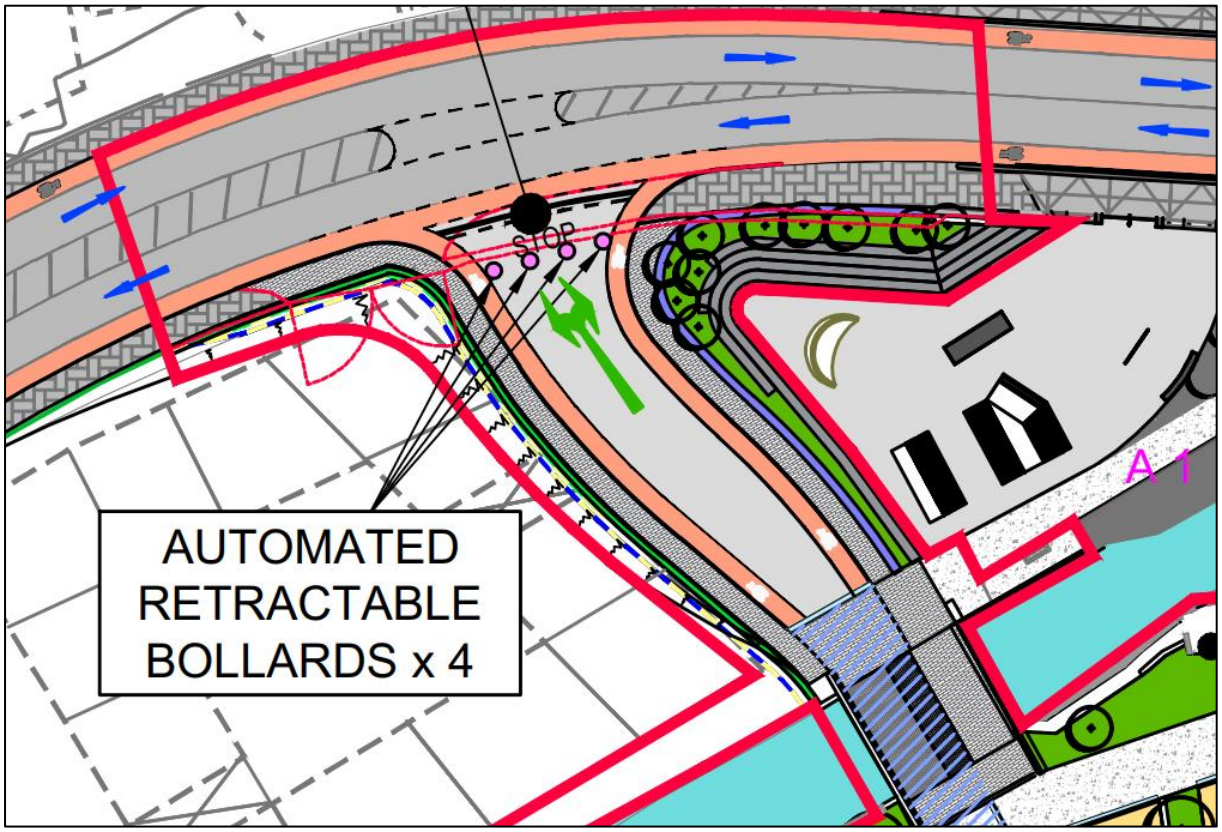
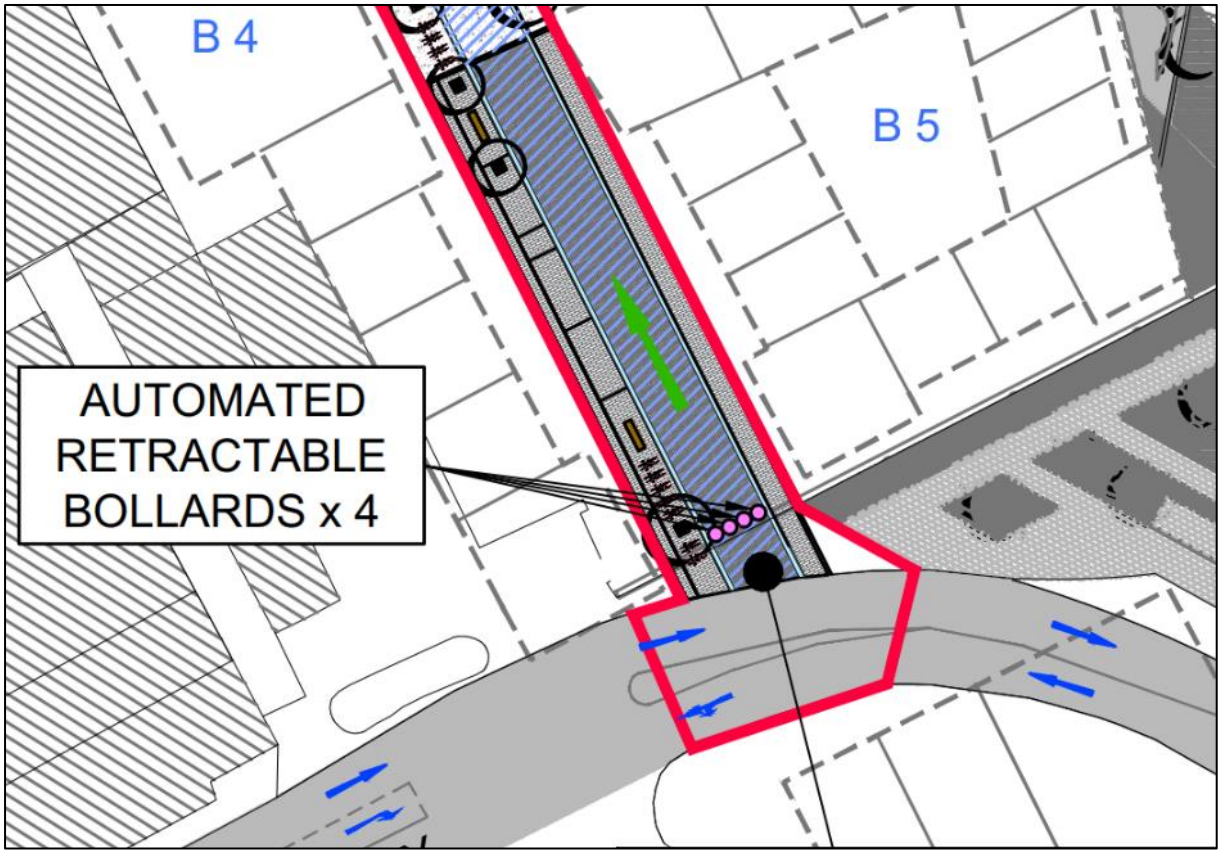


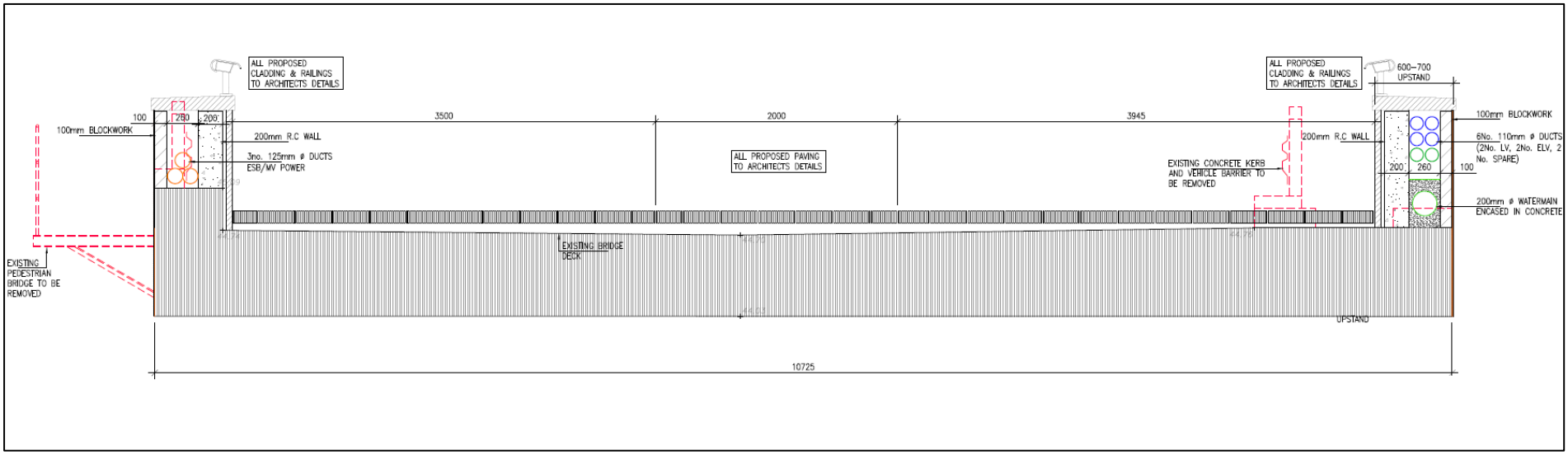
Figure 3-5: Proposed Junction with Bateman Quay



3.2.2.1 Bridge over the River Breagagh

It is proposed to retain the existing bridge over the River Breagagh. This bridge is located c.40m upstream of the confluence with the River Nore as shown in Figure 3-1 and Figure 3-4. Existing metal railings, barriers and overhanging pedestrian walkway are to be removed. These will be replaced with reinforced concrete (RC) barriers clad in local limestone to match the finishes continued from the new St. Francis Bridge along the proposed new northern junction to the bridge. Services for the Site will be encased within these barriers as shown in Figure 3-6: Typical Proposed Section Through River Breagagh Bridge.

Figure 3-6: Typical Proposed Section Through River Breagagh Bridge



3.2.3 Services

The proposed development itself will only require electricity for lighting and water supply for maintenance and the proposed water feature. However, to facilitate the installation of services for the development of the overall Masterplan in a coordinated manner, mains services and connection points have been included as part of the proposed development. The Street will incorporate all utility services required for the development of potential future building plots adjoining the Street. These services, required for the Masterplan, include foul water drainage, surface water drainage, electricity, broadband, gas and public lighting. However, these services for the wider Masterplan will not be commissioned as part of this development.

The services outlined in this section are in line with the specifications deemed necessary for the development of the Masterplan by the various service providers. The use of all these services will be subject to separate assessments as part of future planning applications as the different developments within the masterplan proceed.

3.2.3.1 ESB / Power

Preliminary power requirements for the proposed development will be limited solely to external, high-efficiency lighting and to power the water feature.

ESB Networks have proposed that they will provide additional capacity from McDonagh Substation as part of an upgrade to the area to facilitate the proposed development and future Masterplan developments.

3.2.3.2 Lighting

A variety of lighting options will be utilised within the proposed development. Cognisance was taken of the need to minimise light spill to the River Breagagh and River Nore to cater for wildlife in the area.

Along the Street element, LED light fittings will be mounted on 6m high poles. Along the River Nore walkway, softer LED light fittings mounted on 6m high poles will be utilised which will minimise light spill and glare to cater for wildlife. Along the River Breagagh walkway and on the bridge crossing the River Breagagh, 1.2m high lighting will be utilised to offer targeted lighting and minimise light spill. The St Francis' Abbey courtyard area will be lit by a pole-mounted floodlight which will be used as a feature light. The pole height will be 6m and the light fittings will be angled to avoid light spill to surrounding areas.

Further details are provided in the Lighting Design Statement included in Appendix 6.2

3.2.3.3 Gas Supply

Although the proposed development itself will not require a gas supply, the design includes a 4bar 125mm diameter HDPE network throughout the Site. Each Masterplan building will require a connection point that will be easily accessible by Gas Networks Ireland (GNI) for metering purposes. Contact with GNI has confirmed that there is sufficient capacity in the network to enable future Masterplan structures to connect into this proposed addition to the network.

3.2.3.4 Broadband /Telecommunications

The proposed supply will originate from two (2 No.) separate points located north and south of the Masterplan area thus ensuring the resilience of the network and continuity of supply. Fibre optic cabling will be supplied to each unit via dedicated ELV ducting as per the proposed services engineering drawing P813 submitted with this planning application.

3.2.3.5 Water Supply

Although the proposed development itself will only require a limited water supply for maintenance and the water feature, a mains water supply is provided through the centre of the Site beneath the proposed Street. Connection to the public water supply will be required to facilitate future Masterplan developments. The preliminary layout of the proposed watermain within the Site has been designed and agreed with Irish Water based on the proposed connection to this St Francis Bridge watermain.

The proposed new 200mm HDPE water main will connect to the public water supply in the north of the Site and will run underneath the Street before reconnecting to the public water supply at Bateman Quay. The water feature will recirculate and treat the water so will only require filling during commissioning and topping up periodically when water is lost to evapotranspiration.

3.2.3.6 Foul Water Drainage

No wastewater will be generated from the proposed development itself. However, the Street element of the proposed development will include a new mains foul drainage sewer to cater for wastewater discharge from potential future developments on neighbouring sites.

The new foul sewer will flow from north to south and connect to the existing foul sewer that is located slightly south of St Francis Abbey. The dry weather foul water load generated for the new foul drainage sewer has been estimated as 2l/s, taking into account the Masterplan and consultation with Irish Water. The peak flow has been estimated as 12l/s.

The foul water network will consist of watertight manholes and pipes. The sewer pipes will consist of uPVC. Sealed spurs from the foul network are included for future Masterplan structures.

3.2.3.7 Surface Water Drainage

It is proposed to replace the existing drainage pipework and interceptors with a new drainage network which will connect to existing outfalls to the Rivers Breagagh and Nore as described in section 1.3.

The proposed drainage infrastructure for the Site will consist of three (3 No.) drainage networks:

- Network 1 – North of the River Breagagh
- Network 2 – South of River Breagagh
- Network 3 – Proposed Street

Figure 3-7 presents the proposed drainage networks.

Figure 3-7: Proposed Drainage Network Areas

Network 1 – North of the River Breagagh

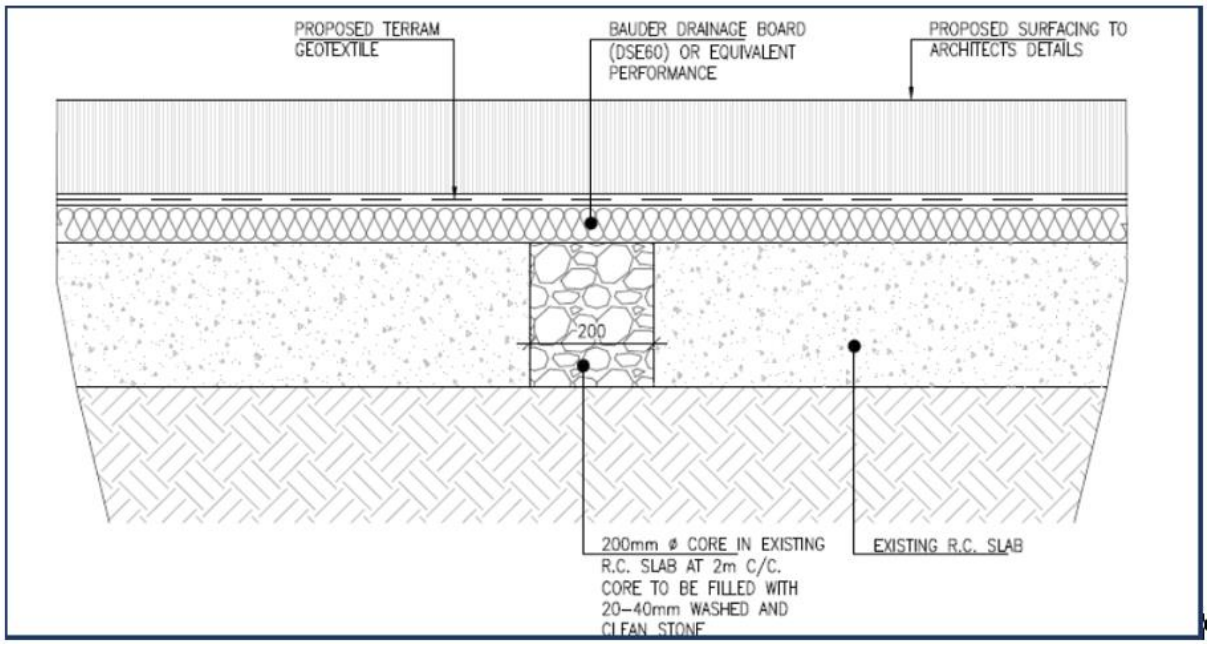
Drainage Network 1 will be located to the north of the River Breagagh. This will be replaced by a new proposed storm drain which will cater for run-off from the access road, cycle track, footpath and future Masterplan developments. Surface runoff will be collected in road gullies and discharged to a proposed network of watertight manholes and drainage lines. The proposed storm drains will connect to existing storm drainage outfall to the north west of the Site and will pass through an oil / silt separator before discharging to the existing outfall to the River Breagagh. The proposed separator will be a Class 1 type separator which will reduce oils to a concentration of 5mg/l and can store 150L of oily contaminants. This proposed separator will have a capacity to store 1,000L of silt.

Network 2 – South of the River Breagagh

Drainage Network 2 will cater for drainage from the area of soft and hard landscaping south of the River Breagagh and future Masterplan structures.

The surface water from soft landscaped areas will drain by infiltration through the installation of cores in the existing concrete hardstanding, which will promote drainage to the underlying soils. An indicative infiltration detail design is illustrated in Figure 3-8.

Figure 3-8: Indicative Infiltration Detail



A drainage board will form part of the landscaping build-up over the concrete hardstanding. The purpose of the drainage board will be to retain 10-12 litres of water per m^2 to support the growth of grass and planted areas and minimise the requirement for watering.

A proposed storm drainage line will cater for run-off from the hard-landscaped areas. Sections of the existing storm sewer in poor condition will be replaced. To minimise impact when replacing the pipes, the new sections of pipe will be laid in the same alignment as the original lines, where possible. Any drains left in place will be decommissioned by blocking each end and any gullies with grout to prevent water ingress. This area will be drained by surface channels (ACO drains). A silt bucket will form part of the ACO drain which will reduce silt discharge to the drainage pipelines. The surface water will discharge to a network of watertight manholes and sealed pipework.

The surface water from the hard-landscaped areas in Network 2 will flow through a new oil / silt separator before discharging through the existing outfall to the River Breagagh in the north

western corner of the zone. It is proposed to install a Class 1 type separator which can achieve a concentration of 5mg/l of oil and can store 300L of oil. This separator will have a capacity to store 2,000L of silt.

Network 3 – Proposed Street

Network 3 serves the proposed Street element of the Site. Surface water from the Street will be collected by surface channels (ACO drains). Silt buckets will form part of the ACO drains. The silt buckets will reduce silt discharge to the storm drainage network. Surface water runoff from future Masterplan structures will also discharge to this proposed storm drainage network. Sealed spurs from the storm drainage lines are included for these future connections. The surface water will discharge to a network of proposed watertight manholes and pipework.

Surface water from this area will flow to the centre of the Street. The surface water will flow through a new oil / silt separator before discharging through the existing outfall on the western bank the River Nore which will be retained as part of the development. The proposed separator will be a Class 1 type separator which can achieve a concentration of 5mg/l of oil and can store 600L of oil. This separator will have a capacity to store 4,000L of silt.

Design Flows

The maximum design flows for the stormwater networks are presented in Table 3-1.

Table 3-1: Surface Water Discharge Summary

Network	Discharge Location	Design Flow (l/s)
Storm Network 1	Northern bank of River Breagagh	88.9
Storm Network 2	Southern bank of River Breagagh	137.1
Storm Network 3	Western bank of River Nore	180.8

Attenuation

As described in section 1.4, the majority of the existing Site is hardstanding. The proposed development will incorporate a number of landscaped / grassed areas. The inclusion of planted and grass areas, a drainage board in drainage network 2 and infiltration holes in soft landscaped areas will result in a reduction of surface water discharge compared with the existing, fully hardstanding surface. The design will therefore provide a natural attenuation. Therefore, while it is not proposed to attenuate run-off from the Site mechanically, there will be an overall reduction of surface water run-off from the proposed development compared to the current situation.

3.3 Construction Procedures

This section sets out the basic timeline, sequencing and methodology for completion of the proposed development.

3.3.1 Construction Programme

It is estimated that construction of the proposed Urban Park and Street will take place over a c.14-month timeline. Subject to the allocation of funding, it is hoped that construction can commence in 2022.

The construction duration will take account of the planting season for the soft landscaping design to the Park. The first six months of the construction program will involve the completion of all Site clearance works, excavation works, installation of drainage and services for the entire project. The remaining six to eight months of the programme will include for the soft and hard landscaping finishes to be installed. These works include the installation of feature

limestone garden seats, cycle stands, amenity seating, light fittings, feature trees, water features and finally the surface finishes and soft landscaping. The approximate timeline is shown in Table 3-2.

Table 3-2: Proposed Construction Schedule

	Before Construction	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14
Pre-construction ecological surveys	✓														
Site set-up		✓													
Tree removal / protection		✓													
Slab removal			✓	✓											
Drainage and services installation					✓	✓	✓	✓	✓						
Slab reinstatement									✓	✓					
Street construction									✓	✓	✓	✓			
Hard landscaping									✓	✓	✓	✓			
Soft landscaping & street furniture											✓	✓	✓	✓	
Hard landscaping of the Street														✓	✓
Finishing														✓	✓

3.3.2 Construction Management

Details of the predicted impacts and mitigation measures associated with the construction of the proposed development are included within the relevant chapters. Chapter 16 (Schedule of Environmental Commitments) summarises the mitigation and monitoring requirements outlined within this EIAR.

In general, disturbance arising from construction works that may result from various activities including preparatory works, diversion of services, noise and vibration from the plant, excavation and fill operations, stockpiling and handling, construction traffic and the duration and timing of the construction phase. Further detail is included in the specific impact assessment chapters as follows:

- Measures related the protection of health of the local population during the construction phase will be addressed in Chapter 5;
- Measures to mitigate construction impacts on biodiversity are addressed in Chapter 6;
- Measures to reduce construction impacts to air during the construction phase, such as dusts will be addressed in Chapter 9;
- Measures for the minimisation of construction nose impacts are presented in Chapter 10.
- Measures for the protection of both below ground archaeology and above ground protected structure during the construction phase are presented in Chapter 12;
- Construction waste management measures have been included in Chapter 13; and,
- Measures for the control of traffic during the construction phase are presented in Chapter 14.

During the construction phase, the methods of working will comply with all relevant legislation and best practice in reducing the environmental impacts of the works. Construction phase impacts will be short-term and localised. These impacts will be reduced as far as practicable through compliance with the mitigation measures stated in this EIAR and current construction industry guidelines as outlined in relevant chapters of this EIAR.

As part of the pre-construction preparation, a comprehensive Construction Environmental Management Plan (CEMP) will be developed. To ensure the CEMP is relevant to the project and the current environment at the time of construction it will be prepared by the appointed Contractor in advance of the commencement of construction works. To ensure that all potential construction phase environmental impacts will be addressed in accordance with current legislative requirements and best practice guidelines, MOR prepared a preliminary Construction Environmental Management Plan (pCEMP). The CEMP completed by the appointed contractor should take cognisance of the pCEMP. The pCEMP will be submitted alongside this planning application.

The CEMP will also detail the procedures for monitoring the effectiveness of the environmental protection measures. The CEMP will as a minimum include the following:

- Incorporate all Environmental Commitments / Mitigation Measures in the construction contract documents which will include mitigation measures identified in Chapters 5 to 16 of this EIAR and any conditions of any permission as may be granted and any further requirements of Statutory Bodies;
- Provide a method of documenting compliance with these Environmental Commitments / Mitigation Measures;
- List all relevant environmental legislative requirements;
- State methods by which construction work will be managed to avoid, reduce or remedy potential adverse impacts on the environment;

- Identify the frequency and attendance requirements for toolbox talks on environmental matters;
- Outline the points of contact in relation to complaints or incidents; and,
- Outline the procedures in relation to emergency response.

The CEMP will be required to take account of best practice guidance such as:

- *CIRIA C741 Environmental Good Practice on Site* (4th edition) (CIRIA, 2015); and,
- *CIRIA C532 Control of Water Pollution from Construction Sites* (CIRIA, 2001).

3.3.2.1 Construction Access

It is proposed that the access\egress to the Site will be via the proposed junction with St. Francis' Bridge at the northern end of the Site and Johns Street (Bateman Quay) at the southern end of the Site.

3.3.2.2 Hours of Work

Construction works will be agreed with the Planning Authority prior to the commencement of these works and will be specified in the CEMP. Hours will generally be limited to 7am to 7pm Monday to Friday and 9am to 4pm on Saturday. Construction works outside these hours will be limited to works necessary for health and safety reasons or to protect the environment.

3.3.2.3 Temporary Facilities

The construction phase will necessitate the provision of a temporary Contractor's Compound along with welfare facilities. A temporary connection to water supply and foul sewer will be provided to accommodate these welfare facilities.

Temporary car parking for contractors' vehicles will be provided within the temporary Contractor's Compound. Temporary signage will also be erected at the entrances to the Site.

3.3.2.4 Security

The Site will be secured by fencing to prevent unauthorised access, with security measures implemented to prevent risks and control access to the Site. All vehicles / HGVs entering the Site will pass the on-site security hut, where details of the vehicle will be recorded.

3.3.2.5 Construction Employment

It is expected that 60-70 jobs will be created during the construction of the Urban Park and Street.

4 ALTERNATIVES CONSIDERED

4.1 Introduction

This chapter focuses on describing the alternatives considered for the proposed development. The decision process that has resulted in the selection of the Site, its layout and processes is described below.

It should be noted that ABP completed an Environmental Impact Assessment Scoping Report (ABP, 2020), in which they outlined, when exploring alternatives considered, "*it is not a requirement to requirement to revisit issues considered in the formulation of policy that has been the subject of SEA*". Therefore, to align with the requirements outlined by ABP in relation to this Chapter, for further information on Alternatives Considered the reader should refer to the SEA for more details.

4.2 Alternative Uses

During initial iterations of the Abbey Quarter Masterplan Development and subsequent SEA Four (4 No.) alternative land use strategies were assessed as follows (CAAS and Kilkenny Co Co, 2015b):

Alternative 1: "*Redevelop the Brewery Site, and reuse of existing buildings on Site (Mayfair, Brewhouse, & Maturation building) providing for a new City Quarter with linear park*."

Alternative 2: "*Redevelop the Brewery Site, without retaining the existing buildings, and provide for a new City Quarter with linear park."*

Alternative 3: "*Intensive redevelopment of the Brewery Site to maximise the development footprint incorporating mixed uses (e.g. retail, office, leisure and other commercial activity along with third level uses) providing for a new City Quarter."*

Alternative 4: "*Low intensity intervention with the majority of the Brewery Site devoted to a public park*."

Alternative three (No.3) proposed to develop the entire brewery Site and retain the existing buildings for redevelopment. Alternative No.4, provided for a park and only redevelop the existing buildings. The potential significant environmental effects of all four alternative land uses were assessed as part of the SEA. They were also ranked against relevant Strategic Environmental Objectives (SEOs).

This assessment found that the development of the entire brewery Site as a park would reduce the "efficiency of land utilisation" and would not provide pressure relief for redevelopment of greenfield land on the outskirts of the City. However, it would provide for the retention, preservation and potentially enhancement of designated archaeological and architectural heritage. It would also "contribute toward sustainable mobility" and "enhancement of ecological connectivity along the banks of the Nore".

On further review and following public consultation it was decided to combine alternatives No. 3 and No. 4, provide for new mixed-use development while still providing an urban park within the City thereby realising the advantages of both.

Consideration was given to separating the Urban Park and Street element of the project, however, it was decided that given the prompt position of the Site in Kilkenny City Centre that the access, services and public amenity space should be provided as part of a single project.

4.3 Alternative Design and Layout

The general principle of an urban park centred around the rich heritage of the Site with links to the City Centre and the Riverside Gardens as well as providing access to long hidden historical sites of St. Francis Abbey (National Monument), the City Walls, Evans Turret and St. Francis' Well, was set out in the Masterplan. The design evolution from a landscape design perspective is presented in the Landscape Design Statement that is included with this application.

4.3.1 Interaction with St. Francis Abbey

It was initially proposed to include St Francis Abbey within the proposed development boundary and include some works to the access and ancillary structures outside of the Abbey itself as part of the proposed development. However, following consultation with the OPW and NMS, given that they will be seeking to prepare a separate conservation plan for the Abbey, any works within and immediately adjoining the ownership boundary of the OPW were excluded from the design of the proposed development. Any works to the Abbey will be proposed and undertaken by the OPW as part an approved conservation plan.

4.3.2 River Crossing

It was initially proposed to include a second, separate pedestrian only crossing over the River Breagagh continuing directly from the Riverside Gardens walkway. It was however, decided at the early stages of the project, given the existing bridge crossing, that excluding an additional bridge from the design would eliminate the requirement of in river works and therefore the related potential environmental impacts.

4.3.3 Services Alignment

Although avoidance of known archaeological features has been taken into initial services design, this design was then reviewed by the specialist archaeologists. Following this review, services trenches were realigned to ensure avoidance of areas that are known to have underlying archaeology. The design depths of excavations were also revised in some places to avoid impacts on known underlying archaeology. Refer to Chapter 12 for further detail on the assessment of impacts on underlying archaeology.

4.3.4 Lighting Design

The initial lighting design was assessed by the ecological team for its potential impact on bats and other nocturnal species both on and adjacent to the Site. Following this review the lighting was redesigned to minimise light spill to the riparian and aquatic habitats in so far as is possible while still fulfilling the requirement for lighting to provide a safe area to walk and cycle for park users during darker hours. This revised design also took cognisance of the consultation response received from the HSA. The changes included the following:

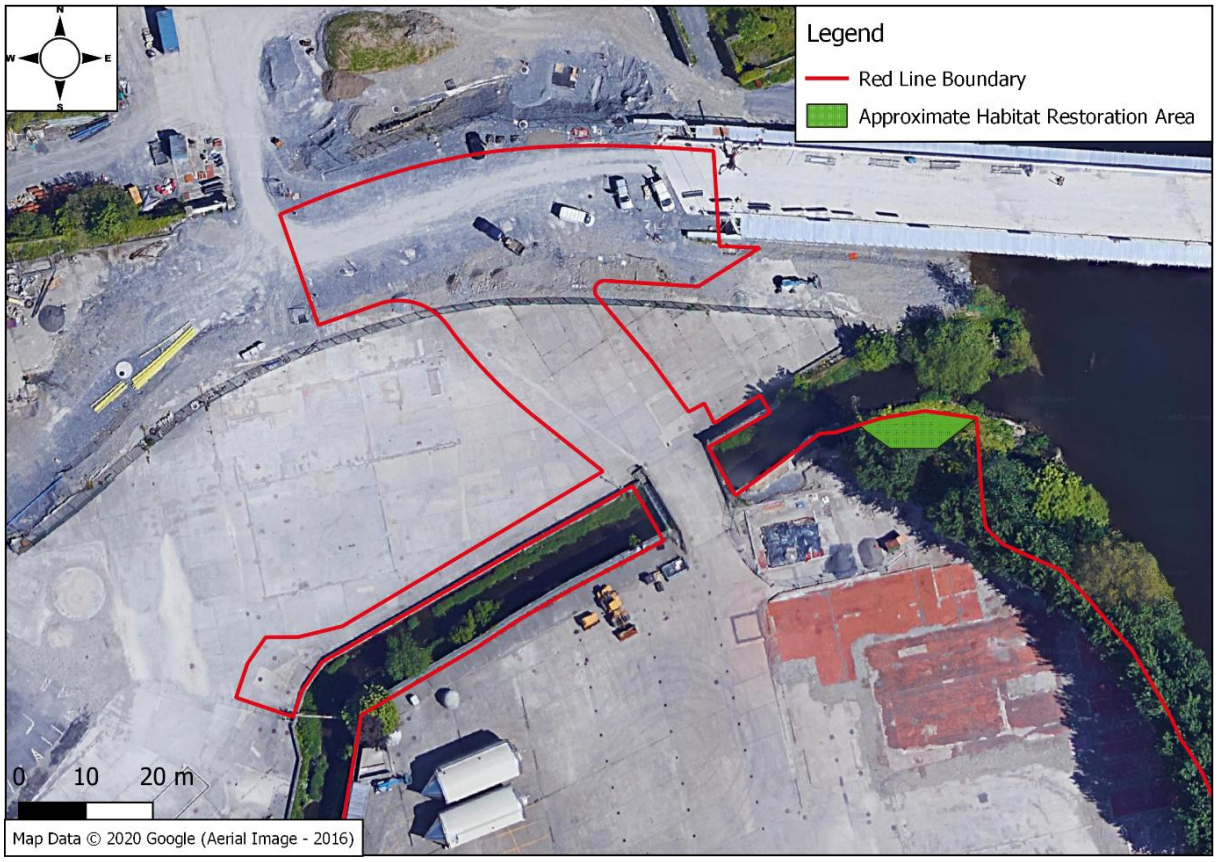
- Change in the orientation and shading of some light fittings to direct light away from the rivers and riparian habitat;
- Change in some light fittings to lower level fittings to minimise light spill over the River Breagagh, particularly at the bridge crossing; and,
- Changes to the tone of the light frequency spectra to ensure compliance with relevant guidance on protection of bats.

For further details of the lighting design please refer to the Lighting Design Statement included in Appendix 6.2. For further details of the ecological impact assessment of the lighting, refer to Chapter 6.

4.3.5 Ecological Enhancement

Initially it was proposed that no works would be proposed beyond the top of the bank of the River Nore where the existing Diageo Site boundary stands. However, following discussions with the local NPWS ranger, it was decided to extend a small section of the Site boundary closer to the bank of the River Nore. The purpose of this was to restore an area of riparian habitat that had been cleared by Diego as part of the closure works for the Site in 2014. This area, as presented in Figure 4-1: Proposed Habitat Restoration Area, is currently scrub and it is proposed to replant the area with native tree species. For further details on these ecological habitat works, refer to Chapter 6.

Figure 4-1: Proposed Habitat Restoration Area



4.4 The "Do Nothing" Alternative

The "do nothing" alternative would see the Site remain an empty, brownfield concrete slab. The Site would remain closed off to the public. It would not realise the significant benefits of urban renewable, provision of amenity spaces in the urban environment, potential ecological enhancement opportunities, protection and potentially enhancement of the archaeological and architectural heritage of the Site.

Furthermore, access and services to any potential future development of the Masterplan plots would have to be completed separately on a piecemeal basis. The proposed Urban Park and Street provides for the coordinated provision of this access and services to these future development sites.

5 POPULATION AND HUMAN HEALTH

5.1 Introduction

This chapter of the EIAR provides a description and assessment of the likely impacts of the proposed development on population and human health in the area.

The local or receiving population comprises a significant element of the overall environment. In carrying out development, one of the principle concerns is that people should experience no diminution in their quality of life as a consequence of the construction and operational phases of development.

Ultimately, effects of any development on the environment may impinge upon human beings, directly and indirectly, positively, and negatively. Any significant impact on the status of population and human health that may be potentially caused by a development proposal must, therefore, be comprehensively addressed. Direct effects include such matters as air quality, water quality, noise, road traffic and socio economic. Indirect effects pertain to such matters as landscape, flora, fauna, heritage, and archaeology.

5.2 Methodology

The Health Service Executive (HSE) issued a consultation letter dated the 29th March 2020 which outlined recommendations to be considered as part of the EIA process (see Appendix 1-3). Specifically, for Population and Human Health, the HSE outlined three elements that were to be considered;

- *"The assessment of likely significant impacts on population and human health from direct emissions into the environment as a consequence of the development";*
- *"The assessment of likely significant impacts on population and human health through socio economic changes"; and*
- *"The assessment of the likely significant impacts on population and human health with regard to the opportunity for health gain through the design of the built environment".*

A desk-based study was completed to characterise the environment in relation to the receiving population, having regard for the HSE consultation letter with the following sources consulted;

- Smartertravel – A New Transport Policy for Ireland 2009-2020 (DoT, 2009);
- Healthy Ireland - A Framework for Improved Health & Wellbeing 2013-2025 - (Healthy Ireland, 2013);
- Health Benefits from Biodiversity and Green Infrastructure (EPA, Health Benefits from Biodiversity and Green Infrastructure Report No. 195, 2014).
- Health Profile Kilkenny – 2015 (HSE, 2015a);
- Get Ireland Active – Physical Activity Plan (DoH, 2016);
- Healthy Ireland Community Plan – Kilkenny (KLCDC, 2018);
- Fáilte Ireland – Future Supply of Tourist Accommodation Cork, Galway & Kilkenny 2018-2022 (FI, 2018);
- Healthy Ireland Summary Report – 2019 (HSE, 2019b); and
- Central Statistics Office Database (CSO, 2020a).

5.2.1 Legislation/Policy Context

The National Planning Policy Statement 2015 (DoECLG, 2015) outlines a number of key principles that planning authorities and public bodies are expected to engage with during the planning process. The following key principles have been identified as relevant to the proposed development and its potential impact on population and human health;

> *"No 2: Planning must proactively drive and support sustainable development , integrating consideration of its economic, social and environmental aspects at the earliest stage to deliver the homes, business and employment space, infrastructure and thriving urban and rural locations in an economically viable manner that will sustain recovery and our future prosperity."*
>
> *"No. 3: Planning is about creating communities and further developing existing communities in a sustainable manner by securing high quality urban design through the design, delivery of new development providing a good quality of life for all existing and future users of land and buildings."*
>
> *"No 5. Planning must ensure that development facilitates and encourages greater use of public transport as well as making walking and cycling more attractive for people in support of active and healthy lifestyles by focusing development, whenever possible, at locations with more sustainable travel options."*
>
> *"No6. Planning will encourage the most efficient and effective use of previously developed brownfield land over the use of greenfield land to ensure the most efficient use of existing infrastructure, enhancing, and strengthening the continues vitality of existing communities through regeneration."*

The Kilkenny City & Environs Development Plan 2014-2020 outline following objectives in relation to Population & Human Health;

> *"Objective 3A – To promote the redevelopment and renewal of areas in need of regeneration";*
>
> *"Objective 4F: The Smithwicks lands, the subject of the masterplan referred to in Section 3.4.3, will be the focus for major new retail expansion in the City & Environs over the plan period";*
>
> *"Objective 5J: To integrate the planning and sustainable development of the country with regards to the social, community and cultural requirements of the county and its population";*
>
> *"Objective 6A: The council shall seek the preservation and improvement of amenities and recreational amenity facilities, and shall facilitate and provide for the extension of recreational amenities in the City where appropriate, and subject to environmental, heritage and financial considerations";*
>
> *"Objective 6B – To complete the River Nore Linear Park within the Lifetime of the Plan";* and,

The National Healthy Ireland Framework was published in 2013 as a "*Health in all Policies*" approach to enhancing the health of all communities (Healthy Ireland, 2013). The vision of this Framework is "*A healthy Ireland, where everyone can enjoy physical and mental health and wellbeing to their full potential, where well-being is valued and supported at every level of society and is everyone's responsibility".*

The goals of Healthy Ireland (hi) outlined in the framework are as follows;

> *"Goal 1: Increase the portion of people who are healthy at all stages of life";*
>
> *"Goal 2: Reduce health inequalities";*
>
> *"Goal 3: Protect the public from Threats & Wellbeing";* and
>
> *"Goal 4: Create an environment where every individual and sector of society can play their part in achieving a healthy Ireland."*

5.3 The Receiving Environment

It should be noted that the receiving environment described below does not take into account potential economic and other impacts associated with the Covid-19 pandemic in Ireland. These impacts have been omitted as they are anomalous in nature and therefore may present an unrealistic view of the local environment.

The proposed development is located within the former Smithwick's (Diageo) Brewery lands just off the centre of Kilkenny City. The Site is a 'Brownfield Site' and is primarily covered in concrete slab following the removal of the former brewery buildings in the area (See Section 1.4 for further details on Existing Structures at the Site). There is currently no public access to the Site.

Residential apartments and commercial units are plentiful along the City streets, with residential typically on the upper floor. The business district in the heart of Kilkenny City is to the south and south-west, providing a lively and busy urban area. Notable buildings in proximity include the Watergate Theatre to the west, Kilkenny District Court also to the west, the Bank of Ireland, and Dunnes Stores to the south.

Beyond the River Nore to the east the residential street of Michael Street and to the north-east St Canice's Place are present. On the eastern banks of the River Nore there is a pedestrian path and cycle way, with green areas and some planting, along with the Kilkenny Great War memorial and a handball court.

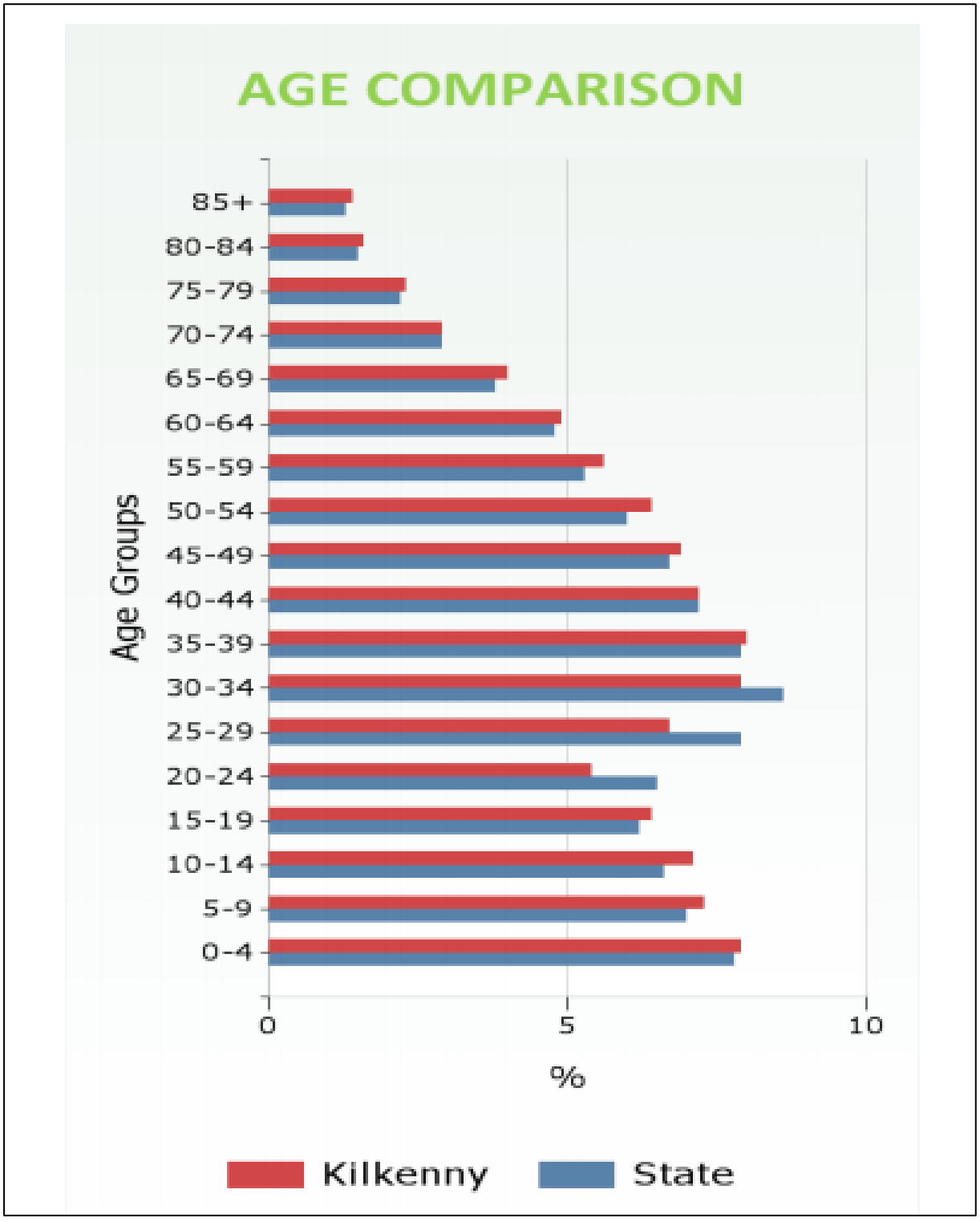
To the north of St Canice's Place lies the Bishops Meadows walk which forms part of the River Nore Linear Park trail, a recreational outdoor area for the City. It should be noted that the Riverside Gardens which is located immediately to the east of the Site is under construction at the time of writing.

5.3.1 Population Demographic

The most recent (2016) census (CSO, 2020a) has recorded a population of 99,118 for County Kilkenny. This represents an increase of 4% since 2011. The population of Kilkenny City was recorded to be 26,512, which is an increase of 8.5% over the same period. The Regional Spatial & Economic Strategy for the Southern Region (Southern Regional Assembly, 2020) predicts the population of County Kilkenny to grow significantly to 110,00 by 2026, with a significant portion of this to occur within Kilkenny City.

The average age of people in Kilkenny is 37.9 years old, which is slightly higher than the national average 37.4 years old. The Kilkenny age profile is largely similar to the national average with the biggest differences observed, being fewer 18-34-year olds (1% point fewer than national average). A graphic representation of these demographics is outlined in Figure 5-1 below.

Figure 5-1: Kilkenny Age Demographic (KLCDC, 2018)



According to the report titled '*Health Benefits from Biodiversity & Green Infrastructure - EPA Report No. 195*', public expenditure on health in Ireland will face increasing challenges posed by an ageing demographic and the potential burden of chronic diseases as a result of people living longer but not necessarily healthier lives (EPA, 2016). Kilkenny's age profile highlights (Figure 5-1) the need for a lifelong approach to policy planning (KLCDC, 2018).

5.3.2 Human Health

5.3.2.1 Physical Health

The HSE provides a health profile for each county. These were most recently published in 2015. The 5-year standardised death rates amongst all the most common causes of death were reported as slightly or significantly lower for Kilkenny than the national mean rates. Immunisation update was significantly higher than the state mean. (HSE, 2015a). Overall, in patient discharge rates were significantly lower in Kilkenny than the State mean.

More up to date national health statistics are available in the Health Ireland Survey (2019). It shows that only 46% of persons over the age of 15 are achieving the National Physical Activity Guidelines of 30 minutes of moderate activity 5 days per week. It also reported that 64% of people who did not achieve the recommended level of activity would like to be more physically active, with time restraints being the most common barrier. 60% of adults were reported to be either overweight or obese with these participants also reporting getting less sleep and less quality sleep. (HSE, 2019b).

According to the report titled '*Healthy Ireland Community Plan 2018-2022'* prepared by Kilkenny Local Community Development Committee (KLCDC, 2018), Kilkenny is largely similar to the national average with regards to transport, with only 13% of residents walking or cycling to school/work. While 8 out of 10 residents rely on some form of motorised transport (KLCDC, 2018).

5.3.2.2 Health Inequalities

There are a number of social determinants that influence health among local communities; personal behaviour; social and community influences; and structural factors such as housing, working conditions, access to essential facilities etc (KLCDC, 2018). Kilkenny was ranked the eight most affluent county in Ireland in 2016, according to the Pobal Deprivation Index. However, people living in small areas categorised as disadvantaged and very disadvantaged accounts for 1 in 10 of the county's population. Deprivation is frequently associated with poor health and health inequalities i.e. unequal access and outcomes for those of lower socio-economic status.

In relation to physical activity, local concerns identified, which are contributing to health inequality in the County among other items include;

- A lack of accessible and inclusive community sports and recreation facilities in the county; and,
- A lack of affordable options for people in recovery from drug/alcohol use.

5.3.2.3 Mental Health and Well Being

Mental health is a growing health, social and economic issue and it is believed that depressive mental illnesses will be the leading cause of chronic disease in high income countries by 2030 (Healthy Ireland, 2013). One in every four people will experience mental health problems during his/her lifetime (Healthy Ireland, 2013). In Ireland, the mortality rate from suicide in the 15-24 age group is the fourth highest in the EU and the third highest among men in the EU. Mental health and self-harm rates in Kilkenny were reported as being at or very close to the mean for the state as a whole (HSE, 2015a).

5.3.3 Economic Activity and Employment

There are reportedly 13,738 jobs in Kilkenny City (Southern Regional Assembly, 2020). Despite this, the South Eastern region has the highest unemployment rate in the State according to the most recently published quarterly labour force survey (Q4 2019). It showed a 6.8% unemployment in the South-East Region compared with a national rate of 4.5% (CSO,

2020b). According to the Southern Regional Assembly (2020), Kilkenny City is the "*8th largest employment centre in the State with strong performance in agri-business, finance and tourism/hospitality*".

According to Fáilte Ireland (FI), the most recent statistics available, indicate that the county of Kilkenny attracted c. 613,000 visitors in 2017, generating close to €100,000,000 in revenue (FI, 2018). These visitors can be broken down into overseas (315,000) and domestic (298,000). Kilkenny Castle and the Medieval Mile were considered key attractions for overseas visitors to the area, while the City's reputation as lively and compact make it appealing to domestic visitors. It is estimated that some 420,000 visitors (both overseas and domestic) or almost 70% accessed Kilkenny Castle. This may indicate a significant concentration of tourists and associated revenue in one part of the City, resulting in potential imbalance of economic activity centred around Kilkenny Castle.

5.3.3.1 Existing Public Amenity Availability

The report titled "*Kilkenny Open Space, Sports and Recreation Study*" (Cummins, 2013) outlines the results of an assessment of sports and recreation facilities across the City and County of Kilkenny (Chambers, 2003). In brief, the report identified '*more than adequate provision'* of open space and amenity areas in Kilkenny City, however these spaces were not contributing proportionate amenity value, quality, and functionality. In terms of opportunities, the most notable the report identified were;

- "A unique water corridor both ecological/green and urban/ hard associated with the Nore River with the potential to embellish the image and civic attractions of Kilkenny City"; and,
- "Open space in Kilkenny should provide visual enhancement to the fabric of the City, whether as a recreational amenity or not."

Since the findings of the report were published, KCC implemented a park building strategy which has seen a number of parks completed or are at various stages of planning or construction including the Nore Linear Park and enhancements to parts of the Medieval Mile project. Both of these projects were implemented to address the findings of the amenity study.

The Nore Linear Park provides a network of walking/cycling trails along the river in the City and environs combined with a sequence of high-quality public spaces which is considered to be a significant recreational asset to the City. However, currently, there is a fracture in the trail as the former Smithwick's Brewery Site did not allow public access along the riverbank. The Riverside Garden Project which will extend the Nore Linear Park through this section of the City is currently under construction and is adjacent the eastern boundary of the Site. As outlined in Section 5.2.1, it is an objective of KCC to complete the Nore Linear Park within the lifetime of the existing County development plan (KCC, 2014).

The Medieval Mile is a discovery trail running through the centre of Kilkenny City linking St Canice's Cathedral and Kilkenny Castle with a number of other historic sites.

5.4 Characteristics and Predicted Impact of Proposed Development

The potential impacts on human health, economic activity, and employment from the proposed development were assessed under the following headings:

- Construction Phase; and,
- Operational Phase.

The proposed development will present a mixed recreational park and pedestrian/cycleway along the River Nore, and ultimately a throughway from Bateman Quay to St Canice's Place for pedestrians and cyclists. The works will require ground-work activities during construction for the installation of road infrastructure, such as drainage and utilities pipework. Furthermore, some Site works will require the removal, regrading, and re-establishment of the concrete surface, to develop the desired elevation changes on the finished design as well as soft and hard landscaping.

5.4.1 Economic Activity and Employment

5.4.1.1 Construction Phase

It is estimated that construction of the proposed Urban Park and Street will take c. 14 months and up to 70 people in total will be employed during this period. In addition to this, existing businesses operating in the area will have increased potential for local enterprise to provide materials and services to the development and associated staff. In this respect, it is considered that the proposed development will have a short term slight positive impact in terms of local job creation and the local economy.

5.4.1.2 Operational Phase

The proposed development will bring the historic St. Francis Abbey and Kilkenny City Walls incorporating Evans Turret into an open and public space. This will likely add significant context and value to the Medieval Mile, one of Kilkenny's key attractions for overseas visitors. In addition, as the proposed development will provide a public meeting space, which will be available for outdoor events such as market stalls, busking and other small City Centre public events, Kilkenny's reputation among domestic visitors as a lively and compact City will be further enhanced. Moreover, Kilkenny will become a more attractive destination to both overseas and domestic visitors alike, contributing to further revenue generation through tourism. With this in mind, it may also reduce the apparent imbalance currently associated with tourism and economic activity centred around Kilkenny Castle, through opening the previously industrial north eastern quarter of the City to tourists and residents, providing a fairer distribution of revenue across the City. Although, there will be little to no direct employment stemming from the operational phase of the proposed development, the expected increased tourist activity will provide further jobs in the hospitality sector and aim to provide some spatial balance on distribution of tourism revenue.

The operational phase will therefore likely have a long-term, slight to moderate, indirect impact on existing businesses operating in the area through increased tourism activity.

5.4.2 Human Health and Wellbeing

5.4.2.1 Construction Phase

Potential impacts on human health, in particular, potential impacts on the residents in the vicinity of the proposed development is addressed in detail in the following chapters:

- Chapter 7: Land and Soil;
- Chapter 8: Water (Hydrogeology and Hydrology);
- Chapter 9: Air Quality and Climate;
- Chapter 10: Acoustics (Noise and Vibration); and,
- Chapter 14: Material Assets – Traffic and Transport.

5.4.3 Operational Phase

The provision of a pedestrian/cycleway in a central location as part of the proposed development will provide more access to residents within the area to City Centre locations, thereby potentially allowing for increased transport via walking/cycling. In addition, the Nore Linear Park and the various walks which form part of this trail will be more accessible. Walking is the most popular recreational activity in Ireland across all gender and age groups. It is estimated that c. 18% of people (over 16) met the physical activity guidelines in Ireland solely through walking. According to the report titled '*Get Ireland Walking – Strategy & Action Plan 2017-2020'*, recreational walking can be considered an 'equaliser', as social gradients which prohibit people from meeting physical activity guidelines are less pronounced when compared to all other sports (Healthy Ireland, 2017).

The provision of a fitness area within the proposed development will further equalise health inequalities in the area, by providing a free and accessible tool for physical activity to the local population, thereby addressing concerns previously outlined in Health Ireland Community Plan for Kilkenny (KLCDC, 2018).

As previously noted, time constraints were the biggest barrier for people not achieving the national physical activity guidelines, therefore ease of access to the walking trails and fitness areas for local residents will likely address this issue.

The provision of the proposed development would address the fracture of the Nore Linear Park walkway thereby completing Objective 6B from the Kilkenny City & Environs Development Plan in the process. In addition to this, the proposed development would provide additional open space with quality amenity value to a traditionally industrial part of the City, addressing the findings of the '*Kilkenny Open Space, Sports and Recreation Study*' (Chambers, 2003).

The report titled '*Health Benefits from Biodiversity and Green Infrastructure*' completed by the EPA Research Programme outlines the results of an extensive investigation to elicit evidence of benefits to health and well-being from contact with nature (EPA, 2014). In brief, the research showed that connecting with nature makes people feel happy, more restored, and motivated to be more active, which is in-keeping with the Healthy Ireland objectives. The WHO recommends at least 9 m^2/person of accessible green space in an urban environment. The proposed development would be considered a high-quality accessible green space and is c. 1.44ha in size therefore contributing a significant area of green space to the City of Kilkenny.

It is considered that the proposed development, in general terms, aligns with the objectives from the Kilkenny City & Environs Development Plan outlined in Section 5.2.1 above.

The operational phase will therefore likely have a long-term significantly positive impact on human health and well-being in the area through the potential for health gain provided by the proposed development.

5.5 Proposed Mitigation Measures and / or Factors

Mitigation measures against the potential impacts on human health from the proposed development are considered in detail under the following Chapters:

- Chapter 7: Land and Soil;
- Chapter 8: Water (Hydrogeology and Hydrology);
- Chapter 9: Air Quality and Climate;
- Chapter 10: Acoustics (Noise and Vibration); and,
- Chapter 14: Material Assets – Traffic and Transport.

5.6 Interactions with other Environmental Attributes

Population and human health have the potential to be impacted positively or negatively under several environmental issues including;

- Chapter 6 : Biodiversity
- Chapter 7: Land and Soil;
- Chapter 8: Water (Hydrogeology and Hydrology);
- Chapter 9: Air Quality and Climate;
- Chapter 10: Acoustics (Noise and Vibration);
- Chapter 11: Landscape and Visual;
- Chapter 12: Archaeology and Cultural Heritage; and,
- Chapter 14: Material Assets – Traffic and Transport.

5.7 Residual Impacts

The residual impact will be a moderate positive long-term impact in relation to the local economy and employment and a moderate, positive, long term impact on Human Health and Well Being.

5.8 Cumulative and In-combination Impacts

The completion of the demolition of the Maturation Building in combination with the proposed development may contribute to a minor increase in employment during the construction phase, presenting a short term slight positive impact. The potential cumulative and in-combination impacts from the construction on human health are addressed in the relevant chapters (7, 8, 9,10 & 14).

As stated in Chapter 2, the Masterplan proposes to develop several other elements including residential / commercial units and leisure spaces (known elements include Mayfair Building (City Library), Brewhouse Building, Skate Park and Riverside Gardens).

It is envisaged that the proposed development in combination with the overall masterplan will open the north eastern quarter of the City to the public and tourists alike, which may address the apparent existing imbalance of tourists visiting Kilkenny just to see the Castle. This will potentially attract new business and residents to the north eastern quarter of the City which would benefit the City as a whole. This will result in significant long term positive economic benefit to the City. Furthermore, the Park will serve as a recreational and amenity area for the future users of the Masterplan developments, both commercial and residential. This will potentially result in a long-term positive in combination impact on the health and well-being of these future residents and workers.

It is proposed by OPW and the NMS, in consultation with KCC to develop a conservation plan for St. Francis Abbey. Once complete, the Abbey will become the focal point of the Park further enhancing its amenity and indirect economic value within Kilkenny City.

Specific interactions are detailed under the relevant environmental topics within this EIAR.

5.9 Monitoring

Environmental monitoring is detailed under the relevant environmental topics within this EIAR.

5.10 Difficulties Encountered in Compiling this Information

No difficulties were encountered in undertaking this assessment.

6 BIODIVERSITY

6.1 Introduction

This Chapter of the EIAR details the methods and results of a desk-study and field surveys undertaken to establish the baseline ecological status of the Site and its immediate surrounds, and to assess the potential impacts of the proposed development.

6.2 Methodology

6.2.1 Legislation / Policy Context

Within Ireland, a number of sites of international or national importance to nature conservation, as well as many species of animals and plants are afforded a degree of legal protection, as set out in Box 1 below.

A study of biodiversity related planning policy at both national and local level has been undertaken for the Site and locality in order to highlight any potential conflicts with the relevant legislation and guidance documents.

Box 1 Designated Wildlife Sites and Protected and Otherwise Notable Habitats and Species

The National Parks and Wildlife Service (NPWS) notifies sites in Ireland that are of international or national importance for nature conservation (although some sites that are of national importance for certain species have not been so designated).

Internationally important sites may also be designated as:

- Special Areas of Conservation (SACs): the legal requirements relating to the designation and management of SACs in Ireland are set out in the European Communities (Natural Habitats) Regulations 1997 (as amended) (Habs Regs);
- Special Protection Areas (SPAs): strictly protected sites classified in accordance with Article 4 of the EC Directive on the Conservation of Wild Birds (79/409/EEC), also known as the Birds Directive; and,
- Ramsar sites: wetlands of international importance designated under the Ramsar Convention, to which Ireland is a signatory.

Other statutory site designations relating to nature conservation are:

- National Heritage Areas (NHAs): these represent examples of some of the most important natural and semi-natural terrestrial and coastal habitats in the country and are afforded protection under the Wildlife (Amendment) Act 2000. NHAs are legally protected from damage and receive protection from the date they are formally proposed for designation; and,
- Proposed Natural Heritage Areas (pNHAs): these sites are afforded the same protection as NHAs under the Wildlife (Amendment) Act 2000 from the date that they are formally proposed for designation.

Legally protected species

Many species of animal and plant receive some degree of legal protection. For the purposes of this study, legal protection refers to:

- Species included in the Wildlife (Amendment) Act 2000, excluding species that are only protected in relation to their sale, reflecting the fact that the site disposal will not include any proposals relating to the sale of species; and,
- Species afforded protection under the Flora Protection Order 1999.

Other notable habitat/species categories

- Biodiversity Action Plan (BAP) species: those targeted in local or national BAPs as being of particular conservation concern (priority species).
- Red and Amber List birds: those listed as being of high or medium conservation concern as listed by Birdwatch Ireland (Cummins, 2013).
- Other Irish Red Data Book species and Nationally / Regionally / Locally Notable species where appropriate.

6.2.2 National Planning Context

6.2.2.1 Planning Policy Statement

The National Planning Policy Statement 2015 (DECLG, 2015) states via key principle No. 8, in relation to biodiversity, that:

> *'Planning will conserve and enhance the rich qualities of natural and cultural heritage of Ireland in a manner appropriate to their significance, from statutorily designated sites to sites of local importance, and including the conservation and management of landscape quality to the maximum extent possible, so that these intrinsic qualities of our country can be enjoyed for their collective contribution to the quality of life of this and future generations.'*

The same document, in relation to conservation of natural heritage, states as key principle No. 9 that:

> *'Planning will support the protection and enhancement of environmental quality in a manner consistent with the requirements of relevant national and European standards by guiding development towards optimal locations from the perspective of ensuring high standards of water and air quality, biodiversity and the minimisation of pollution risk.'*

6.2.2.2 Project Ireland 2040, National Planning Framework

Project Ireland 2040 was launched by the Government in February 2018 (Government of Ireland, 2018). Project Ireland 2040 incorporates two policy documents i.e. National Planning Framework and the National Development Plan to 2027.

Under the biodiversity section "Project Ireland 2040 National Planning Framework" (Government of Ireland, 2018), National Policy Objective 59 states:

- 'Enhance the conservation status and improve the management of protected areas and protected species by:
- Implementing relevant EU Directives to protect Ireland's environment and wildlife;
- Integrating policies and objectives for the protection and restoration of biodiversity in statutory development plans;
- Developing and utilising licensing and consent systems to facilitate sustainable activities within Natura 2000 sites; and,
- Continued research, survey programmes and monitoring of habitats and species.'

National Policy Objective 60 in the same document states to: *'Conserve and enhance the rich qualities of natural and cultural heritage of Ireland in a manner appropriate to their significance.'*

6.2.3 Local Planning Context

6.2.3.1 Kilkenny County Development Plan (CDP) 2014-2020

The Kilkenny County Development Plan 2014-2020 (Kilkenny County Council, 2014) has a variety of statements in different sections which relate directly to the protection of biodiversity and natural heritage in the context of proposed developments. These include policies to ensure compliance with EU Habitats Directives and to ensure the protection of the integrity of European sites. The Kilkenny County Development Plan 2014-2020 states that:

> *'It is the aim of the Council to conserve, enhance and manage the County's natural heritage including its biodiversity, landscapes and geological heritage and to promote understand of and sustainable access to it.'*

The Kilkenny County Development Plan has multiple objectives in relation to biodiversity, which include:

Objective 1A:

'To implement the provisions of Articles 6(3) and 6(4) of the EU Habitats Directive.'

Objective 1B:

'To ensure that any plan or project within the functional area of the Planning Authority is subject to appropriate assessment in accordance with the Guidance Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 200944 and is assessed in accordance with Article 6 of the Habitats Directive in order to avoid adverse impacts on the integrity and conservation objectives of the site.'

Under the Rare or Protected Species and their Habitats section, the objectives of the Council are stated as:

Objective 8B:

'To protect and, where possible, enhance the natural heritage sites designated under EU Legislation and National Legislation (Habitats Directive, Birds Directive, European Communities (Birds and Natural Habitats) Regulations 2011 and Wildlife Acts). This protection will extend to any additions or alterations to sites that may arise during the lifetime of this plan.'

Objective 8C:

'To protect and, where possible, enhance the plant and animal species and their habitats that have been identified under European legislation (Habitats and Birds Directive) and protected under national Legislation (European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), Wildlife Acts 1976-2010 and the Flora Protection Order (SI94 of 1999).'

Under the Green Infrastructure section, the Council's objectives are stated as:

Objective 8D:

'To prepare and support the implementation of a Green Infrastructure Strategy for County Kilkenny, as resources allow.'

Under the Nature Conservation Outside of International and National Protected Areas section, the objectives of the Council are stated as:

Objective 8E:

'To protect and where possible enhance wildlife habitats and landscape features which act as ecological corridors / networks and stepping stones, such as river corridors, hedgerows and road verges, and to minimise the loss of habitats and features of the wider countryside (such as ponds, wetlands, trees) which are not within designated sites. Appropriate mitigation and / or compensation measures to conserve biodiversity, landscape character and green infrastructure networks will be required where habitats are at risk or lost as part of a development.'

Under the Hedgerows section, the Council's objectives are stated as:

Objective 8F:

'Kilkenny County Council will promote the planting of native tree and shrub species, by committing to using native species (of local provenance wherever possible) in its landscaping work and on County Council property.'

6.2.4 Desk Study

The desk study focused on identifying European designated sites within a 15km radius of the Site, nationally designated sites within a 5km radius of the Site and records of legally protected and notable species within a 2km grid square of the Site.

The area for which biological data was collected was based on an assessment of the ecological zone of influence of the Site (i.e. the area that could be affected by the scheme within which there is the potential for significant ecological effects). Given the scale and nature of the proposed works and the landscape surrounding the Site, significant effects on priority habitats and species as a result of the works are unlikely to occur more than 0.5km away.

The following literature sources listed below were checked for ecological information:

- The National Parks and Wildlife Service (NPWS) website was consulted with regard to the most up to date detail on conservation objectives for the Natura 2000 sites relevant to this assessment (National Parks and Wildlife Service, 2020);
- The National Biodiversity Data Centre (NBDC) website was consulted with regard to species distributions (NBDC, 2020);
- The EPA Envision website was consulted to obtain details about watercourses in the vicinity of the Site (https://gis.epa.ie/EPAMaps/) (EPA, 2020); and,
- The EPA Catchments website was consulted to obtain details about watercourses in the vicinity of the Site (https://www.catchments.ie/maps/) (EPA Catchments, 2020).

6.2.5 Consultation

The NPWS were sent a consultation request via the DAU, but no reply was received. However, informal consultation with Mr. Jimi Conroy, NPWS Ranger, took place on the 3rd of June 2020.

6.2.6 Field Surveys

Habitat Surveys were undertaken for the Site using the Fossitt's Guide to Habitats in Ireland (Fossitt, 2000). The surveys aimed to identify the extent and quality of habitats present on the Site. Site surveys were carried out by two (2No.) suitably qualified and experienced MOR ecologists on the 16th October 2019 and on 29th June 2020.

The assessment was extended to also identify the potential for these habitats to support other features of nature conservation importance, such as species afforded legal protection under either Irish or European legislation.

Due to the proximity of the Site to the River Breagagh and River Nore, it was deemed necessary to undertake additional specialist surveys. Specific otter and kingfisher surveys were undertaken on the 20th of March 2020 by two (2No.) suitably qualified MOR Ecologists. Aquatic surveys were also undertaken by Sweeney Consultancy on the 7th of August 2019 in the sections of the Breagagh and River Nore adjacent to the Site and also within the River Nore downstream of the Site.

Also, follow up inspections of the Maturation building were undertaken on the 3rd and 7th July 2020 by two (2No.) MOR ecologists to assess the building for its potential to support roosting bats.

6.2.7 Protected / Notable Species Survey

The methodologies used to establish the presence / potential presence of faunal species are summarised below. These relate to those species / biological taxa that the desk study and habitat types present indicated could occur within the area of the proposed development.

Aquatic Surveys

Aquatic surveys were undertaken by Sweeney Consultants to identify the possible presence of the designated qualifying interests of the River Barrow and River Nore SAC including:

- *Callitricho-Batrachion* Floating River Vegetation;
- Nore Freshwater Pearl Mussel (*Margaritifera m. durrovensis*);
- White-Clawed Crayfish (*Austropotamobius pallipes*);
- Atlantic Salmon (*Salmo salar*);
- Brook Lamprey (*Lampetra planeri*);
- Sea Lamprey (*Petromyzon marinus*); and,
- River Lamprey (*Lampetra fluviatilis*).

The survey methodology employed during the aquatic surveys can be found in Appendix 6.1.

Amphibians

The Site was assessed for its potential to provide sheltering, foraging and breeding habitat for amphibians. These include water bodies suitable for egg-laying, and terrestrial habitats comprising open areas with mixed-height vegetation, such as heathland, rough grassland, open scrub, or water body margins. Suitable well drained and frost-free areas are needed to enable amphibians to survive the winter.

Bats

An assessment of the suitability of the habitats within the Site to support bat roosting, foraging and commuting was carried out. Mature trees were inspected for evidence of cavities, splits, cracks, loose bark and dense and woody ivy (*Hedera helix*) growth that could be used by bats for roosting.

The Maturation building, which is scheduled for demolition under a separate Part VIII permission in advance of construction for the proposed development commencing, was inspected for bats. As part of the building inspection, an endoscope was used to assess a small number of potential roost locations within the building. These potential roost sites included holes in which pipes connected the Maturation Building to surrounding buildings.

Badgers

The survey aimed to identify and examine areas where badgers might occur by noting any evidence of badger activity. This included:

- Mammal paths;
- Badger hairs caught in sett entrances / fences / vegetation;
- Paw prints;
- Evidence of foraging (usually in the form of ‘snuffle holes’);
- Latrines; and,
- Badger setts.

A mammal path was assumed to be used by badgers if the character of the path (in terms of size) was appropriate and / or if any other signs were in close vicinity (e.g. a badger sett).

Birds

The Site was assessed for its potential to provide nesting habitat for breeding birds or to support important assemblages of birds of rare or notable species.

Kingfisher

The Site was assessed for its potential to provide nesting habitat for breeding kingfisher.

Otters

The survey aimed to identify and examine areas where otter might occur by noting any physical evidence of otter including:

- Holts (features log piles, caves and cavities);
- Slides (flattered areas of mud or vegetation);
- Paw prints;
- Evidence of foraging (usually in the form of feeding remains such as fish scales and shellfish); and,
- Spraints.

Camera Trap Survey

A mammal hole was identified on the riverbank at the confluence of the River Breagagh and the River Nore during the Site surveys. In order to confirm if the hole was active, a camera-trap survey was conducted from the 25th April 2020 to the 16th May 2020.

A Spypoint Force 11D Trail Camera was used. The camera trap was programmed to take 6 consecutive shots at each detection with a 3 second delay between each photo. The camera trap was checked at intervals to replace SD cards and batteries if necessary.

Invasive species

The field survey was also aimed at identifying the presence of any noxious / invasive species, such as Japanese knotweed (*Fallopia japonica*) and Himalayan balsam (*Impatiens glandulifera*), within the Site and adjacent land.

Other species

In addition, an assessment was carried out of the potential for the Site to support any other species considered to be of value for biodiversity, including those that were identified as occurring locally by the desktop study.

Survey Constraints

No survey constraints were encountered during the survey.

6.2.8 Assessment Methodology

The starting point for the assessment was to undertake a scoping exercise for those ecological receptors that would require further consideration as part of the assessment. This involved identifying the biodiversity receptors (i.e. designated sites, and habitats and species populations) that could be significantly affected by the proposed development.

The approach that was used for determining which receptors have the potential to be significantly affected by the proposed development involved using baseline data collected through the desk study (2km grid square for protected species and 15km for protected sites) and field surveys for the Site and to determine:

- Which, if any, of the species or habitat that have been recorded are legally protected or controlled (see Box 1); and,
- Which, if any, sites, areas of habitat and species that have been recorded are of importance for biodiversity conservation.

The next stage of the assessment was to determine whether the identified receptors are of sufficient biodiversity value that an impact upon them would be of potential significance in terms of this EIA. In this regard:

- Biodiversity conservation value relates to the quality and / or size of sites or habitats, or the size of species' populations; and,

- Potential significance means that the effect could be of sufficient concern or, for positive effects, of such substantial benefit that it could be material to influencing the decision on planning.

Receptors that have been identified as having sufficient value, and that an impact upon them could be of potential significance have been taken forward for further consideration. Legally protected species were also considered further. This involved:

- Identifying, for each receptor, any significant impact that is likely to be caused by the proposed development, which has the potential to lead to a significant effect and / or to contravene relevant legislation;
- Determining the area within which the likely impacts would cause a potentially significant impact on the identified receptor and / or could contravene relevant legislation (ecological zone of influence); and,
- If the receptor occurs or is likely to occur within the zone of influence and concluding that the receptor could be significantly affected and / or the relevant legislation contravened, the receptor would be subject to further assessment.

6.2.9 Evaluation of the Conservation Importance of the Site

In terms of biodiversity conservation value, identified receptors have been valued using the National Roads Authority Scheme (National Roads Authority (NRA), 2009), using the following scale:

- International importance;
- National importance;
- County importance (or vice-county in the case of plant or insect species);
- Local importance (higher value); and,
- Local importance (lower value).

6.3 Receiving Environment

The receiving environment is described in Sections 6.3.1 and 6.3.2, from a desk-based study and field surveys completed in October 2019, March, April, May, June and July 2020.

6.3.1 Desk Study

Prior to conducting any Site surveys, a desk-based review of information sources was completed. This baseline information provides a valuable insight to the types of flora and fauna that may occur onsite within the Site and allows for the identification of features / habitats located off-site that may require further assessment.

6.3.1.1 European Designated Site

There are two (2No.) designated European sites located within 15km of the Site (see Figure 6-1 and Table 6-1).

Figure 6-1: Site Location and Natura 2000 Designated Sites within 15km

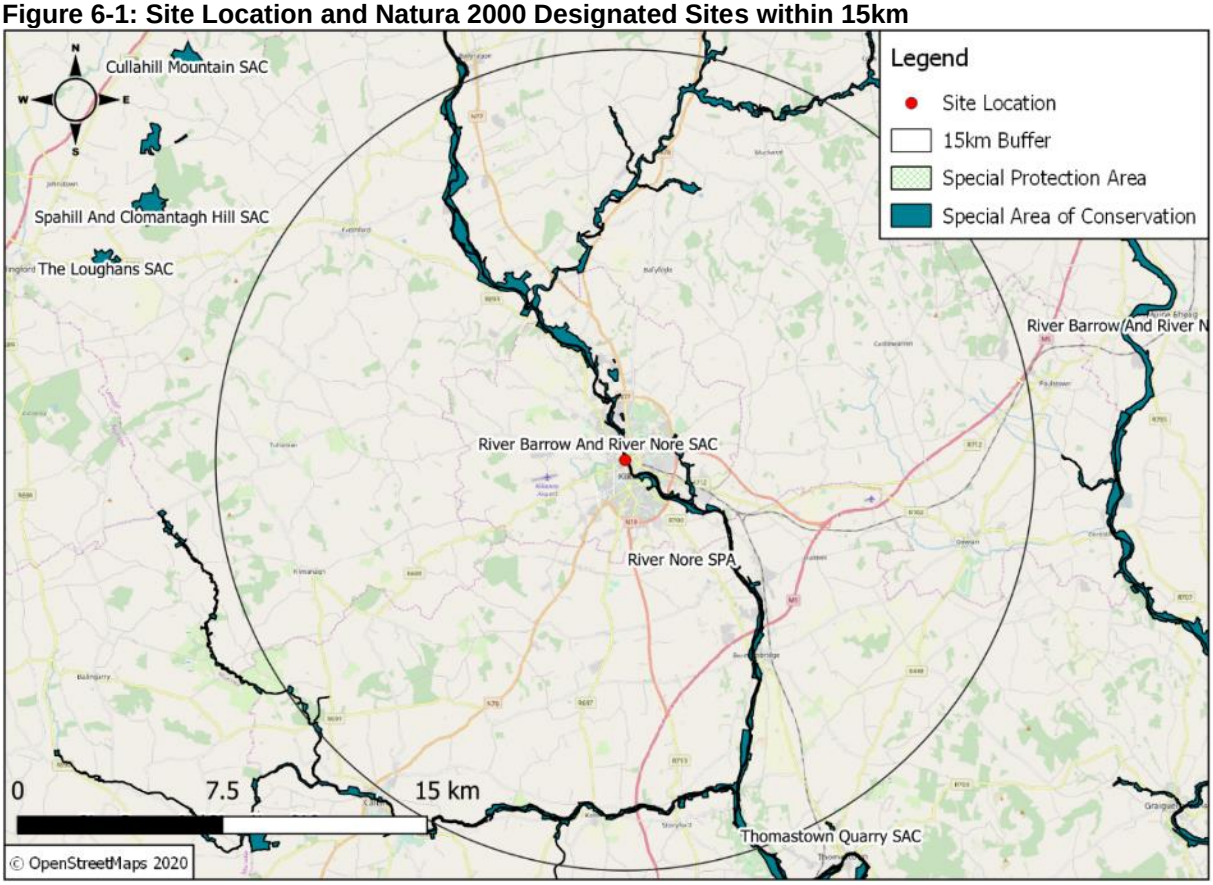


Table 6-1: European Designated Sites within 15km of the Site

Site Name	Code	Distance (m)	Direction from the Site
River Barrow and River Nore SAC	002162	<5m	E
River Nore SPA	004233	<10m	E

6.3.1.2 Natural Heritage Areas

No Natural Heritage Areas were identified within 5km of the Site. Four (4No.) proposed Natural Heritage Areas (pNHA) were located within 5km of the Site (see Figure 6-2 and Table 6-2). The Archergrove pNHA is located c.2.4km downstream of the Site along the banks of the River Nore.

Figure 6-2: Proposed Natural Heritage Areas (pNHAs) within 5km of the Site

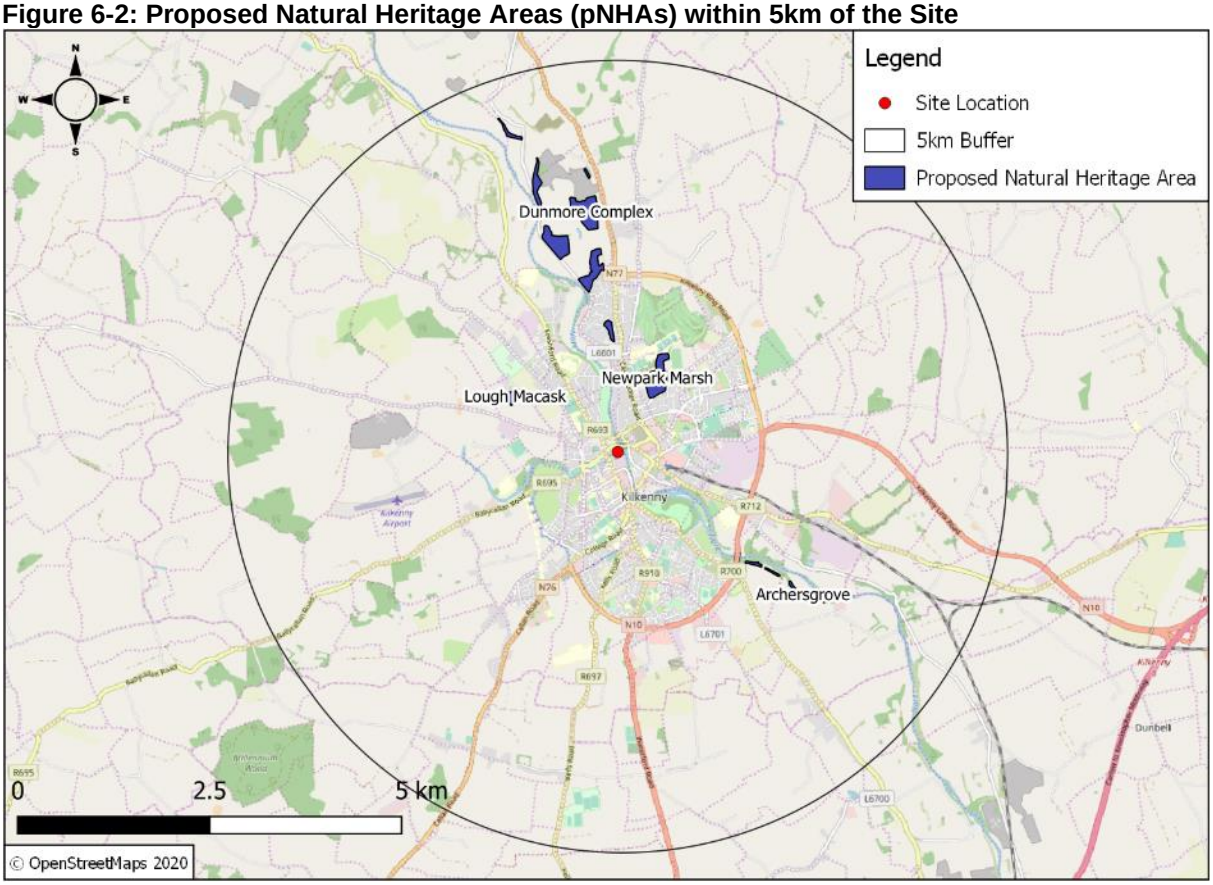


Table 6-2: Proposed Natural Heritage Areas (pNHAs) within 5km of the Site

Site Name	Site Code	Distance (km) & Direction	Description
Proposed Natural Heritage Areas (pNHAs)			
Newpark Marsh	845	0.75km NE	This small marsh, located on the outskirts of Kilkenny town, supports semi-natural fen that is dominated by tufted-sedge (*Carex elata*) and water dock (*Rumex hydrolapathum*). This area is a known feeding site for three bat species, Leisler's Bat (*Nyctalus leisleri*), Brown Long-eared Bat (*Plecotus auritus*) and Common Pipistrelle (*Pipistrellus pipistrellus*).
Lough Macask	1914	1.3km NW	This small pond, located north-west of Kilkenny City, fluctuates in size over the year. The underlying substrate is made up of glacial till with a shale content from the Slieve Ardagh Hills. The substrate is generally mineral without much content of peat, except, perhaps in the centre. The permanently flooded part contains plant species such as Broad-leaved Pondweed (*Potamogeton natans*), Water-plantain (*Alisma plantago-aquatica*) and Common Water-crowfoot (*Ranunculus aquatilis*) with the floating duckweeds, *Lemna minor, L. trisulca* and *Spirodela polyrhiza*. Towards the edge, Branched Bur-reed (*Sparganium erectum*) is important, leading into a zone of Floating Sweet-grass (*Glyceria fluitans*), Lesser Spearwort (*Ranunculus flammula*), Pink Water-speedwell (*Veronica catenata*), mints (*Mentha aquatica* and *M. arvensis*) and forget-me-nots (*Myostis scorpioides* and *M. laxa*). The surroundings of the pond are grazed and poached when the water levels are high. Silverweed (*Potentilla anserina*), Amphibious Bistort (*Persicaria amphibia*), Marsh Foxtail (*Alopecurus geniculatus*) and Marsh Ragwort (*Senecio aquaticus*) characterise this area.

Site Name	Site Code	Distance (km) & Direction	Description
			The vegetation shows that the site is similar in some ways to a turlough. It therefore differs from most other wetlands around Kilkenny and has a certain interest for this reason. In addition, it contains Greater Duckweed (*Spirodela polyrhiza*) which is not found elsewhere in the county.
Dunmore Complex	1859	1.3km N	No description available.
Archergrove	2051	2.0km SE	No description available.

6.3.1.3 Protected Species

Table 6-3 provides a summary of records of legally protected or otherwise notable species that occur within a 2km grid square of the Site (NBDC, 2020).

Table 6-3: Protected and or Notable Species within 2km Grid Square of the Site

Common Name	*Scientific Name*	Date of last record	Designation
Bird Species			
Barn Owl	*Tyto alba*	16/11/2012	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Red List
Barn Swallow	*Hirundo rustica*	02/06/2013	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Common Kingfisher	*Alcedo atthis*	08/05/2014	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex I Bird Species Birds of Conservation Concern Amber List
Common Starling	*Sturnus vulgaris*	21/05/2016	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Common Swift	*Apus apus*	12/07/2017	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Common Wood Pigeon	*Columba palumbus*	09/11/2012	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section I and Annex III Section I Bird Species
Great Cormorant	*Phalacrocorax carbo*	06/02/2014	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List

Common Name	***Scientific Name***	**Date of last record**	**Designation**
Great Crested Grebe	*Podiceps cristatus*	02/06/2013	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Greater Scaup	*Aythya marila*	21/05/2016	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section II and Annex III Section III Bird Species Birds of Conservation Concern Amber List
House Martin	*Delichon urbicum*	26/05/2010	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
House Sparrow	*Passer domesticus*	17/06/2015	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Mallard	*Anas platyrhynchos*	29/04/2015	Wildlife Acts 1976 / 2000 EU Birds Directive Annex II Section I and Annex III and Section I Bird Species
Mute Swan	*Cygnus olor*	31/12/2011	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Peregrine Falcon	*Falco columbarius*	16/05/2013	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex I Bird Species
Rock Pigeon	*Columba livia*	05/07/2012	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section I Bird Species
Sand Martin	*Riparia riparia*	16/11/2012	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Spotted Flycatcher	*Muscicapa striata*	02/06/2013	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Invasive species			
Himalayan Balsam	*Impatiens glandulifera*	28/12/2017	Invasive Species: High Impact Invasive Species

Common Name	***Scientific Name***	**Date of last record**	**Designation**
Terrestrial			
Eurasian Pygmy Shrew	*Sorex minutus*	23/12/2017	Wildlife Acts 1976 / 2000
European Otter	*Lutra lutra*	11/11/2013	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II and IV

Note: Table includes records of protected species recorded within the last 10 years, which relevant to the Site in the context of the habitats present both on and adjacent to the Site.

6.3.2 Field Surveys

The following section provides details of the field-based assessments that was undertaken on and adjacent to the Site.

6.3.2.1 Habitats

The following section provides details of the field-based assessments that were undertaken for the Site. The distribution of the habitats and target notes identifying the location of features of interested are shown in Figure 6-3.

Site Context and Surrounding Habitats

The Site is primarily covered in concrete slabs following the removal of the former Smithwick's brewery buildings in 2014 and 2015. The Maturation Building, the Abbey Tasting Room and St. Francis's Abbey are located within the Site as prominent features. The northern perimeter of the Site is bordered by the Old City Wall, followed by the River Breagagh. The eastern boundary of the Site is comprised of tree / scrub line which borders the River Nore.

The southern and western Site boundaries are bordered by well-established commercial developments, serving Parliament Street, Horse Barrack Lane, and Green Street.

At the time of the surveys, the Site was being used as part of a construction compound for the Riverside Gardens and Brewhouse Building projects. The Site is therefore currently subject to disturbance associated with these construction activities.

The following habitats were identified using Fossitt's Guide to Habitats (2000) within the Site and immediate surroundings (See Figure 6-3).

Buildings and Artificial Surfaces (BL3)

The majority of the Site is comprised of concrete slabs and is devoid of vegetation. Recolonising species have begun occupying the crevices between the concrete slabs. These species include, grasses, butterfly bush (*Buddleja davidii*), yarrow (*Achillea millefolium*), dandelion (*Taraxacum vulgaria*), common field-speedwell (*Veronica persica*), bramble (*Rubus fructicosus*), ragwort (*Jacobaea vulgaris),* bull thistle *(Cirsium vulagre),* fireweed (*Epilobium angustifolium)* and red valerian (*Centranthus ruber)*.

Multiple stands of Himalayan balsam (*Impatiens glandulifera*) was also identified along the northern and eastern boundary of the Site on and adjacent to the concrete slabs (Figure 6-3, TN2).

Three buildings are located within the proposed development boundary, the Maturation Building, the Tasting Room and a small building close to the southern boundary.

The Maturation Building is a single storey concrete building which formed part of the brewery process at the Site. This building is a derelict building and devoid of vegetation.

The Tasting Room is a single storey stone structure located adjacent the southern aspect of St Francis Abbey, and is currently used for meeting purposes. The Site surrounds St. Francis's Abbey, however this feature is surrounded by protective fencing, is owned by the OPW and is therefore excluded from this planning application. Multiple tree and hedge species were noted adjacent to the Abbey and the Tasting Room including, Norway maple (*Acer platanoides*), weeping willow (*Salix babylonica*), sycamore (*Acer pseudoplatanus*), weigela species (*Weigela spp.*), laurel (*Prunus lusitanica*) and blackberry (*Rubus bifrons*).

The small building to the south of the Site is a small c.2m by 3m single store prefabricated structure.

Scrub / Treeline (WS1 / WL2)

A scrub / treeline bounds the Site along the eastern perimeter. This scrub / treeline separates the concrete area of the Site from the River Nore. The species identified within this habitat included willow spp. (*Salix spp.*), alder (*Alnus glutinosa*), field maple (*Acer campestre),* horse chestnut (*Aesculus hippocastanum),* ash (*Fraxinus excelsior),* elder (*Sambucus nigra)*, hawthorn (*Crataegus monogyna),* balsam poplar (*Populus balsamifera),* dogwood (*Cornus spp.)*,and oak (*Quercus*).

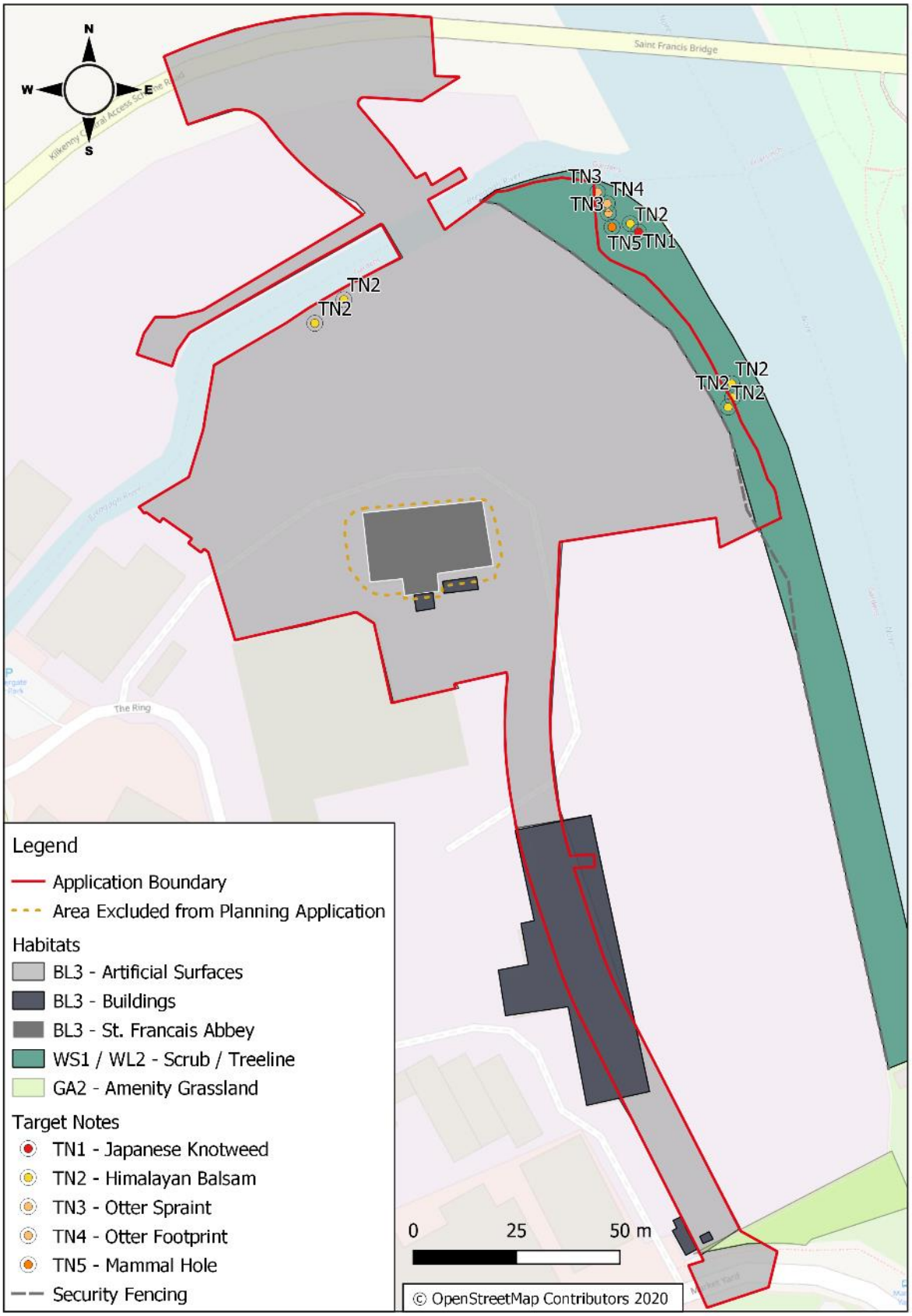
The understory included species such as ivy (*Hedera helix*), ragwort, bramble, butterfly bush, colt's foot (*Tussilago farfara*), St. John's worts (*Hypericum calycinum),* dandelion, common field-speedwell and creeping buttercup (*Ranunculus repens*).

Himalayan balsam (Figure 6-3, TN2) and Japanese knotweed (*Fallopia japonica*) (Figure 6-3, TN1) were also identified within the understory.

Amenity Grassland (GA2)

The southern boundary of the Site overlaps a small area of amenity grassland. This grassland had been cut and is heavily managed.

Figure 6-3: Habitat Map



6.3.2.2 Species

Amphibians

The NBDC does not hold any records for amphibians within 2km of the Site. The Site is dominated by areas of hardstanding and no suitable waterbodies are present within the Site for breeding amphibians. Both the sections of the River Breagagh and the River Nore adjacent to the Site are not considered suitable for breeding amphibians given the flow rate within these water bodies and the presence of good fish stocks.

Aquatic Species

The survey identified the following habitats and species within the survey area. The survey methodology employed during the aquatic surveys along with detailed results can be found in Appendix 6.1:

- *Callitricho-Batrachion* vegetation was the only designated habitat identified during the survey and was situated within the River Nore downstream of the Site;
- No Nore freshwater pearl mussels were identified;
- A single moribund white-clawed crayfish within the Nore was identified, which was confirmed to be infected by crayfish plague;
- Two Atlantic Salmon Parr were also identified in the kick-sample in the River Breagagh;
- No suitable nursery or spawning areas for salmon were identified within the vicinity of the Site, although suitable nursery and spawning sites are known downstream of the Site; and,
- The presence of juvenile lamprey was confirmed in sand / silt deposits by the riverbank, downstream of the Site, within the River Nore.

Furthermore, given the fact that the Site is 30km upstream of the nearest record of Twaite shad within the Nore catchment, it was considered that the surveyed area was not suitable for Twaite shad (Rooney, O'Gorman, Cierpial, & J.J., 2014).

Badger

The NBDC holds no records for this species within the area. No badger setts were identified onsite or within the vicinity of the Site. Furthermore, given the location of the Site within a predominantly urban environment, it is not considered that the Site is of any value to this species in terms of both foraging and sett construction.

Bats

The Site is located within an urban landscape in Kilkenny City. The NBDC does not hold records for any bat species within 2km of the Site within the last ten years (refer to Table 6-3). There are however historical records as recent as 2007.

The NDBC does indicate that the Site has high bat suitability (Suitability Index Score: 39.33) for all bat species except lesser horseshoe bats (*Rhinolophus hipposideros*) and Nathusius's pipistrelle (*Pipistrellus nathusii*), which had a suitability index score of 0 and 9 respectively (NBDC, 2020).

In addition, the following bat surveys conducted within the surrounding area and associated reports were reviewed for the Site's suitability for bats.

- In May 2012, Moore Group Environmental Services undertook surveys for the demolition of the brewery buildings. The following bat species were recorded; a single soprano pipistrelle (*Pipistrellus pygmaeus*) flying from the Market Yard car park to the south, a soprano pipistrelle flying inside the ruin of St. Francis' Abbey, a common pipistrelle (*Pipistrellus pipistrellus*) flying east along the River Breagagh corridor and

a common pipistrelle flying over the confluence of the Breagagh and the Nore (Moore Group Environmental Services, 2015);

- In May 2015, Brian Keely undertook surveys for repair works at the existing Teahouse at Bateman's Quay. Common and soprano pipistrelles and Daubenton's bats (*Myotis daubentonii*) were identified further upstream, and these results compares similarly with the Moore Group Surveys (Moore Group Environmental Services, 2015);
- In 2015 (September 22nd), Moore Group Environmental Services, undertook surveys for the creation of a Riverside Garden using a Pettersson D230 Heterodyne Bat Detector. Several Daubenton's bats flying around Green's Bridge along the River Nore and two common pipistrelle were identified within the vicinity of the mouth of the River Breagagh (Moore Group Environmental Services, 2015); and,
- In 2019 (September 12th), Bat Eco Services undertook bat surveys at the Mayfair Building, located adjacent to the west of the Site. These surveys identified soprano pipistrelles, common pipistrelles, lesser noctule (*Nyctalus leisleri*) and Daubenton's bats utilizing the River Breagagh for foraging and flying within the area However, no bats were identified roosting within the Mayfair Building (Eco Fact, 2020).

Bats are known to follow linear features as they travel though the landscape, therefore the scrub / treeline and the River Nore adjacent to the eastern Site boundary along with the River Breagagh crossing under the existing bridge would be considered to have potential to support commuting and foraging bat species.

The trees bordering the Site did not have features that were considered to be suitable to support roosting bats species, such features can include thick ivy growth, knot holes, cracks and loose bark. These trees were considered unsuitable for roosting bats.

It should also be noted that a number of buildings are located within the Site:

- Although, St. Francis Abbey has features that are considered potentially suitable for roosting bats, this structure has been excluded from the planning application. However, during the visual inspection of the Abbey no direct evidence of bat roosts was identified. This finding is consistent with previous surveys conducted at St. Francis Abbey that also did not identify bat roosts within the building;
- The Tasting Room, situated adjacent to the St. Francis Abbey, has been refurbished and is currently being used as meeting rooms. Therefore, the internal portion of the building was not considered suitable for bats. The roof of the building has been constructed with slate and currently there are cracks and gaps under a small number of tiles and also under the guttering. However, no evidence of bats roosting within this building was identified during the survey. Also, it should be noted that no works will be undertaken to this building as part of the proposed development. Additionally, the three maple trees located adjacent to this building, which will be removed as part of the proposed development, do not have any suitable features for roosting bats;
- The Maturation building, which will be demolished in advance of construction commencing under a separate Part VIII approval. The building inspection and endoscope survey conducted as part of this assessment did not identified any sign of bat activity or roosts within the building; and,
- The building to the south of the Site, near the Bateman Quay boundary, is a small building which did not have any features suitable for roosting bats.

Birds

The small sections of scrub / treeline along the River Nore has potential to provide both suitable nesting and foraging habitat for common bird species. Mallards (*Anas platyrhynchos*) Mute swans (*Cygnus olor*) and Grey heron (*Ardea cinereal*) were noted foraging at the confluence of the River Breagagh and the River Nore.

Kingfisher

The NBDC does hold records for kingfisher within 2km of the Site (refer to Table 6-3). The initial habitat survey of the Site, undertaken in October 2019, identified the presence of a small number of holes / cracks within the stone wall along the River Breagagh, which were considered to have potential to be used by kingfishers.

A follow-up survey for kingfisher and a visual inspection of these features using high powered binoculars confirmed that these features are not being used by kingfisher. Also, during the survey it was noted that the riverbank along the Site was overgrown with vegetation, which is considered suboptimal for kingfisher nest burrows.

Kingfisher were however observed within the River Breagagh: foraging, flying up and down the river and perching on a drainage outfall pipe.

Otter

The NBDC holds records for otter within 2km of the Site (refer to Table 6-3). The aquatic survey undertaken by Sweeney Consultancy identified a number of suitable prey species within both the River Nore and River Breagagh (Appendix 6.1).

The desktop study and initial habitat survey identified suitable habitat for otter within the River Breagagh and the River Nore bordering the Site. The otter survey identified spraints (TN3) and footprints (TN4) along the bank of the River Nore adjacent to the Site. Refer to Figure 6-3.

The survey also identified the presence of a large mammal hole along the banks on the River Nore. The camera trap survey confirmed that this hole was being used by a red fox (*Vulpes vulpes*).

Invasive Species

The aquatic surveys undertake by Sweeney Consultancy identified Japanese knotweed and Himalayan balsam within the vicinity of the Site. The Site surveys undertaken by MOR ecologists confirmed the presence of Japanese knotweed (Figure 6-3, TN1) and Himalayan balsam (Figure 6-3, TN2) onsite and within the vicinity of the Site.

Other Species

During the kingfisher survey an American mink (*Neovison vision)* was observed foraging along the River Breagagh.

6.4 Characteristics and Potential Impacts of the Proposed Development

6.4.1 Sensitive Design

In order to minimise the adverse effects of the proposed development on biodiversity and, where possible, enhance the ecological value of the Site, a range of environmental measures have been incorporated into the project. The key measures relevant to biodiversity for this project have been detailed below:

- The lighting for the proposed development has been designed in order to reduce any light spillage. The maximum potential light spillage into the River Nore and River Breagagh will be less than 1 lux (Appendix 6.2);
- Screening of the River Nore from the proposed development and where possible, and enhancement of the areas of retained and created habitats has been included in the Landscape Design Package (Drawing No. 100 - Landscape Masterplan);
- A Biodiversity Management Plan will be implemented as part of the management of the park, in order to conserve and, where possible, enhance the areas of retained and created habitat;

- The management of any trees will be undertaken in accordance with relevant legislation and be undertaken outside of the period between the 1st March to 31st August to avoid potential disturbance of nesting birds;
- An invasive species management plan has been developed for both Japanese knotweed and Himalayan balsam on the Site and will be implemented to prevent further spread and control these invasive species;
- The Site's standard operation hours during the construction phase will be from 07:00 to 19:00 on Monday to Friday and 09:00 to 16:00 on Saturdays. Thus, there will be no potential impacts on nocturnal species within the area; and,
- Water, dust and noise control measures will be implemented as part on going works, as detailed in Chapter 8 (Water), Chapter 9 (Air Quality and Climate) and Chapter 10 (Noise and Vibration).

6.4.2 Identification of Potentially Significant Effects on Identified Receptors

Based on the methodology that is set out in Section 6.2.8, Table 6-4 sets out the findings of the valuation of important and legally protected receptors. Each receptor was assessed and a scoping justification for each receptor is provided for the Construction and Operational phases.

Table 6-4: Valuation of Potential Ecological Receptors

Potential Biodiversity Receptor	Relevant Legislation / Policies	Valuation of the Site	Scoping Result and Justification
Protected sites			
Natura 2000 Sites	European Communities (Natural Habitats) Regulations 1997 (as amended)	Internationally designated sites for conservation.	A Stage Two: Appropriate Assessment – Natura Impact Statement (NIS) has been prepared and concludes that the proposed development would not cause any significant adverse impact on any European designated sites or any of their designated features of interest. Therefore, this receptor has been scoped out from further consideration.
Proposed Natural Heritage Areas (pNHAs)	Wildlife Act 2000 (as amended).	Nationally designated sites for conservation.	There are four (4No.) proposed Natural Heritage Areas (pNHA) are located within 2km of the Site. Impacts on the Newpark Marsh pNHA, the Lough Macask pNHA and the Dunmore Complex can be discounted given the intervening lands and distances separating sites. The Archergrove pNHA is located c.2.4km downstream of the Site; however, given the water mitigation measures that will be put in place, it is considered unlikely that this pNHA will be impacted by the proposed development. Therefore, this receptor has been scoped out from further consideration.
Habitats			
Buildings and Artificial Surface (BL3)	N/A	Low Local Value	The areas of concreate slab and the buildings within the Site boundary are largely devoid of vegetation and are not considered to be of any conservation value. Therefore, this receptor has been scoped out from further consideration.
Scrub / Treeline (WL1 / WL2)	N/A	Low Local Value	The scrub / treeline bordering the eastern edge of the Site is considered to be of ecological value and provides suitable habitat for a variety of commuting and foraging species. The habitat also provides suitable nesting habitat for a variety of bird species. Otter were also noted as utilising this habitat for foraging / commuting along this section of the River Nore. In addition to this, the area provides valuable screening to the River Nore. In addition, twelve (12No.) trees were identified within the Site and were classified as moderate to low value trees (see Appendix 6.3 Tree Survey Report). As part of the works, measures will be implemented in order to protect the retained trees and the scrub / treeline throughout the life cycle of the project (see Section 6.5.2 and Tree Report Appendix 6.3) along with proposed additional planting.

Potential Biodiversity Receptor	Relevant Legislation / Policies	Valuation of the Site	Scoping Result and Justification
Amenity Grassland (GA2)	N/A	Low Local Value	This is a common habitat type throughout Ireland and provides limited ecological value given the managed nature of the habitat. Therefore, this receptor has been scoped out from further consideration.
Flora and Fauna			
Flora	N/A	N/A	No plant species protected under the Flora Protection Order were noted onsite. Overall, the impact of the proposed development on both habitats and flora is considered unlikely to be significant. Therefore, this receptor has been scoped out from further consideration.
Amphibians	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex V	N/A	No amphibians or suitable habitat for amphibians was identified within the Site. Therefore, this receptor has been scoped out from further consideration.
Aquatic Species	Atlantic Salmon, River Lamprey, White-Clawed Crayfish, Nore and Freshwater Pearl Mussel, Twaite Shad EU Habitats Directive Annex II and V Brook and Sea Lamprey EU Habitats Directive Annex II	A number of species within both the River Nore and River Breagagh are internationally designated species for conservation.	There are no watercourses within the development area and therefore the Site does not provide suitable habitats for any designated aquatic species other than otter (see below). However, the Site is located adjacent to the River Nore and River Breagagh. The aquatic surveys conducted by Sweeney Consultation on the River Nore and River Breagagh, on these rivers identified suitable habitat for lamprey, Atlantic salmon, and white-clawed crayfish. However, it should be noted that, the crayfish identified within the study area was infected by crayfish plague. The survey also identified the presence of the designated habitat *Callitricho-Batrachion* vegetation within the River Nore downstream of the Site. It is therefore considered that there is potential for the proposed development to have adverse effects on this highly sensitive species in the absence of appropriate mitigation measures should pollutants enter the watercourse. Site specific mitigation as well as standard pollution prevention guidance is required to ensure that the proposed works do not have an impact on this species during the construction works. The measures that will be implemented for aquatic species are detailed in aquatic report (Appendix 6.1) and in Section 6.5.3.

Potential Biodiversity Receptor	Relevant Legislation / Policies	Valuation of the Site	Scoping Result and Justification
Badgers	Wildlife Acts 1976 / 2000	N/A	Given the absence of suitable habitat for badger within the Site, the Site not considered to be of any value for this species. Therefore, this receptor has been scoped out from further consideration.

Potential Biodiversity Receptor	Relevant Legislation / Policies	Valuation of the Site	Scoping Result and Justification
Bats	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex IV	High Local Value	The Site itself provides very limited opportunities for roosting, foraging and / or commuting bats. No trees suitable for roosting bats were identified within the proposed development area. Three buildings located onsite, St. Francis Abbey, Abbey Brewery Tasting Room and the Maturation building, were all inspected for bats. • The St. Francis Abbey has features that are suitable for roosting bats. However, no direct evidence of bat roosts was identified during the survey. Additionally, this feature is located outside of the application boundary and a separate conservation plan will be prepared for this feature; • The Tasting Room is considered to have some features suitable for roosting bats on the exterior of the building, however no works are proposed for this building. Also, the three maple trees located adjacent to the building, which will be removed, have no features suitable for roosting bats; and, • The Maturation building was inspected and was considered unsuitable for roosting bats. Furthermore, given the ongoing construction works within the immediate area along with the abundance of suitable habitats within the surrounding area, these buildings are considered sub-optimal for roosting bats. The Site is also located adjacent to the River Breagagh and the River Nore, both of which are known to be important for both foraging and commuting bats, including the Daubenton's bat. These areas are not within the proposed development area. It is not anticipated that bats will be impacted during the construction works given the fact that works will be limited to daylight hours during the season during which bats are active, 07:00 to 19:00 on Monday to Friday and 09:00 to 16:00 on Saturdays. However, potential impacts could occur on bats using these areas as a result of light spillage from the proposed development. Therefore, the lighting scheme has been development and designed in order to avoid light spillage onto the rivers and the riverbanks from the proposed development. The lighting design / mitigation measures that will be implemented for bat species are detailed in Section 6.5.8.1 and in Appendix 6.2 Lighting Design Report. Also, the proposed development presents opportunities to enhance the Site for bat species including planting of trees and the implementation of bat boxes (refer to Section 6.5.9 and Section 6.5.10.1. respectively).

Potential Biodiversity Receptor	Relevant Legislation / Policies	Valuation of the Site	Scoping Result and Justification
Birds	<u>Nesting Birds</u> Wildlife Acts 1976 / 2000 <u>Kingfisher</u> Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List EU Habitats Directive Annex I Bird Species	Low Local Value	<u>Nesting Birds</u> It is not considered that the proposed development will have a significant impact on birds given the majority of all hedgerows and treelines, which offer good foraging potential and nesting potential, will be retained and protected as part of the proposed development. Five maple trees were identified as unhealthy and are to be removed as part of the works. These trees are considered to be of low conservation value and do not support any notable species (see Appendix 6.3 Tree Survey Report). Birds may be subject to some temporary disturbance during construction; however, this is not considered likely to be significant. However, measures will be implemented for nesting birds (Section 6.5.3). Similarly, enhancement measures will be included as part of the proposed works (Section 6.5.10.2). <u>Kingfisher</u> Kingfisher were noted foraging and commuting along the River Breagagh, however no suitable nesting habitat was noted adjacent to the Site. There will be no in-river works as part of the proposed development and the areas of vegetation which run along the rivers will be retained. These areas of vegetation will help screen the rivers from the proposed development. There is a high stone wall along the majority of the Site that borders the River Breagagh and the river is set well below the height of this wall. The stone wall will also largely screen the River Breagagh from the development area. Given the urban location of the Site and the levels of activity within the surrounding areas and the screening provide by both the stone wall and the existing vegetation, it is not considered that kingfisher would be adversely affected by the proposed development either during the construction or operational stage.

Potential Biodiversity Receptor	Relevant Legislation / Policies	Valuation of the Site	Scoping Result and Justification
Otter	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II and IV	High Local Value	The main development area is not considered to be of value for otter, given the absence of cover and the areas of hardstanding. However, the Site is located adjacent to the River Breagagh and the River Nore, both of which are known to be used by otter. Furthermore, evidence of otter was identified adjacent to the River Nore within the vicinity of the Site, with suitable habitat for this species identified. However, the Site itself provides very limited opportunities for otter. The only potential impact to otter within the locality during the construction phase would be temporary disturbances, however, these disturbances would be short-term and localised in nature. During the operational phase, there is potential disturbance due to light spillage from the proposed development onto the adjacent riverbanks. The lighting design / mitigation measures that will be implemented are detailed in Section 6.5.8.1 and in the Lighting Design Report (Appendix 6.2). Furthermore, given the fact that the Site is located within the urban environment of Kilkenny City, it can be assumed that otter using the habitats within the vicinity of the Site will be habituated to levels of disturbance, and it is considered highly unlikely that any impacts will occur on this species. Nonetheless, measures will be put in place in order to minimise potential disturbances from effecting otter. Mitigation measures that will be implemented for otter as outlined in Section 6.5.5.

Following a detailed assessment, the following species and habitats were identified as significant receptors and were brought forward for further consideration in Section 6.5 below:

- Trees;
- Aquatic Species;
- Bats;
- Birds; and,
- Otter.

In addition to the species listed above, general mitigation / best practice measures have also been included for the project. As noted above, the project presents opportunities for enhancing the area for biodiversity. Further details of the proposed planting are provided in the Landscape Design Package (Drawing No. 100 - Landscape Masterplan) and further details for ecological enhancement measures are provided in Biodiversity Management Plan, see Section 6.5.10, which include measures for those species identified as part of the desk studies, field studies and for species that are likely to be present within the area.

6.5 Proposed Mitigation Measures and / or Factors

The following mitigation measures will be incorporated and adhered to during the Construction and Operational Phases at the Site to ensure that the works do not result in contravention of wildlife legislation:

- All activities will comply with all relevant legislation and best practice to reduce any potential environmental impacts. The mitigation measures detailed within this EIAR will be fully adhered to;
- The Site manager shall ensure that all personnel working onsite are trained and aware of the mitigation measures detailed within the EIAR;
- An Ecological Clerk of Works (ECoW) will be appointed for the duration of the project;
- Protected and notable species posters will be erected on the Site notice board and maintained throughout the duration of the works;
- In advance of works, all site personnel will receive a toolbox talk regarding notable and protected species. Everybody working onsite must understand the role and authority of the ECoW; and,
- If protected or notable species are encountered during operations at the Site, works should stop within the area that these animals are identified and the ECoW will be contacted for advice.

An ECoW will inspect the Site in advance of works commencing and will undertake Site inspections as required during the works, to ensure that all of the works are completed in line with the CEMP and all wildlife legislation.

6.5.1 Construction Phase

A CEMP will be prepared by the appointed main contractor and will be submitted to the planning authority in advance of works commencing at the Site. The following guidance will be referred to and will be followed during the construction phase of the project to prevent water pollution and impacts on flora and fauna that may occur within the area:

- C532 – Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (CIRIA, 2001);
- C648 - Control of Water Pollution from Linear Construction Projects: Technical Guidance (CIRIA, 2006);
- C649 - Control of Water Pollution from Linear Construction Projects: Site Guide (CIRIA, 2006);
- C741 - Environmental Good Practice on Site (4th edition) (CIRIA, 2015);

- Guidance for the Treatment of Otters Prior to the Construction of National Road Schemes (National Roads Authority, 2006);
- Guidance for the Treatment of Bats Prior to the Construction of National Road Schemes (National Roads Authority, 2006);
- All works will be undertaken in accordance with the 'Requirements for the Protection of Fisheries Habitat during Construction and Development' (Inland Fisheries Ireland, 2016); and,
- The recommendations included within the NRA Guidelines for the Crossing of Watercourses (National Roads Authority, 2005).

The contractor shall ensure that all personnel working onsite are trained and aware of the measures detailed within the CEMP.

6.5.2 Protection Measures for Trees

During construction, the majority of scrub / treelines identified onsite will be retained and protected from unnecessary damage during the lifetime of the proposed development. However, five maple trees identified within the Tree Survey Report will be removed due to their poor condition (see Appendix 6.3). All vegetation clearance required will be scheduled to take place outside of the nesting bird season.

During construction, care will be required to protect trees from both direct and indirect disturbance. The protected ground will be known as the Construction Exclusion Zone. The standard measure to achieve this is that every effort will be made to minimise works within the outer canopy limit of the trees. The following protection measures will be adhered to during the works:

- Sturdy tree protection fencing or suitable site hoarding will be erected before demolition or construction work commences along the lines shown on the Tree Protection Plan within Appendix 6.3 and should remain in place until their removal or re- location is authorised by a qualified arborist;
- The works to lift the existing concrete slab within the Root Protection Areas (RPAs) of the retained trees will be carried out by machinery or operators working with care from hard surfacing outside the RPAs where practicable;
- Where there is an existing sub-base, this should be left intact and re-used underneath the new concrete slab wherever possible;
- Where there is no existing sub-base and a compact surface is required beneath the new concrete slab within the RPAs of retained trees, the slab will be poured upon a layer of engineering product designed to minimise soil compaction;
- The area of new concrete slabs adjacent to retained trees will be lined with an approved geotextile prior to pouring to limit the caustic effects of wet concrete affecting the adjacent tree roots;
- Where it is considered appropriate, smaller roots of 25mm or less should be pruned back by a qualified arborist;
- All new underground services such as water, foul water and electricity will be routed away from the RPAs of trees to be retained; where this is not practical the services will be installed under any significant tree roots into trenches excavated by compressed air lance or other approved tree root friendly systems;
- All exposed roots and / or soil profiles containing roots of trees to be retained will be kept damp in dry conditions by regular watering and be covered with a double layer of hessian fabric to prevent desiccation;
- Backfill should be of good quality topsoil, structural soil or clean sand;
- Where machinery access has to encroach the RPAs of the trees to be retained for reasons unforeseen and unavoidable; suitable ground protection will be put in place to prevent any significant soil compaction or root damage near the trees;

- All site offices, materials storage, staff parking etc. will located outside of the RPAs of the trees;
- The tree protection measures and specialist work methods will be overseen and directed onsite by a dedicated site arborist. The arborist will also make regular visits to the site during the construction process to ensure compliance and be available to provide advice and guidance where necessary; and,
- The retained trees will be assessed by a qualified arborist following the completion of the construction works.

Further details for tree protection measures are provided in Appendix 6.3 Tree Survey Report.

6.5.3 Protection for Aquatic Species

Given that the Site borders the River Nore and the River Breagagh, mitigation measures will be put in place in order to ensure that the temporary works do not have significant impacts on the aquatic species within the vicinity of the Site and further downstream.

During the construction phase, measures to ensure the protection of water quality will be implemented as outlined in Chapter 8 Water and within the Aquatic report (Appendix 6.1).

6.5.4 Protection for Nesting Birds

Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000, restricts the cutting, grubbing, burning or destruction by other means of vegetation growing on uncultivated land or in hedges or ditches during the nesting and breeding season for birds and wildlife, from 1st March to 31st August. Therefore, the management of vegetation (including trees) will be restricted to outside the bird breeding season and will be monitored by the ECoW.

In the event that works need to be undertaken within the main breeding season, this would be undertaken in consultation with NPWS.

6.5.5 Protection for Otter

Given that otter are known to occur within the vicinity of the Site, and in order to ensure that the works in relation to the proposed development do not have significant impacts on mammals, general construction procedures and mitigation measures, which are in line with the NRA (now TT) guidance for Otters will be undertaken.

- A pre-construction survey will be carried out for otter within or close to the works areas;
- Defence planting and fencing will be installed along the boundary of the park;
- Where excavations will be required onsite, appropriate measures to protect mammals from ingress will be installed;
- No construction works will take place outside of daylight hours during the site clearance works without prior consultation with the appointed project ECoW; and,
- If unidentified burrows are identified within the works area during construction, the project ECoW will be contacted for advice.

6.5.6 Measures for Invasive Species

Stands of mature Japanese knotweed and Himalayan balsam were identified within the Site boundary. In advance of any construction works commencing, an updated survey for invasive species will be undertaken and an updated Site specific invasive species management plan will be prepared.

The invasive species management plan will be developed prior to the commencement of the works to ensure that the unintentional spread of these species will be avoided. The management plan will detail how the invasive species will be eradicated / managed as part of

the works and will provide further details with regards to the management of soils contaminated with Himalayan balsam and Japanese knotweed material during the works.

In order to ensure that invasive species are not introduced or spread from the Site, the following control measures will be put in place:

- All vehicles, machinery and any other equipment that may be used for the works will be washed and steam cleaned as required prior to being used on the Site to prevent the import of plant material / seeds;
- Before machinery or equipment is unloaded at the Site, equipment will be visually inspected to ensure that all adherent material and debris has been removed;
- Any vehicles and machinery that are not clean will not be permitted entry to the Site;
- All materials to be imported to the Site including additional planting will be sourced from a reputable supplier and records of all material / supplies to site will be maintained; and,
- In advance of works, all site personnel will receive an induction regarding invasive species. All site personnel must understand the role and authority of the ECoW managing the issue of the non-native species.

6.5.7 Unplanned Events

Given the presence of invasive species onsite, there is potential for material contaminated with invasive species to be spread within the Site during the Construction Phase. The key pathways being materials such as soils and aggregates being contaminated with invasive species or machinery and equipment being brought from certain areas of the Site and external sites that are contaminated and have not been cleaned / decontaminated.

On-going ecological monitoring and training of site operatives in the identification and risks associated with invasive species such as Japanese knotweed will form part of the on-going site operations

6.5.8 Operational Phase Mitigation Measures

6.5.8.1 Measures for Bats and other Nocturnal Species

The lighting strategy has been designed to mitigate against potential impacts on nocturnal species from the security lighting and associated footpaths. The lighting strategy involves avoiding excessive lighting and ensuring light spillage into the River Nore and River Breagagh from the proposed development does not exceed 1 lux. The lighting strategy has been prepared taking full cognisance of the draft Lighting Review of the lighting scheme that has been prepared for the adjacent Mayfair building redevelopment (Eco Fact, 2020).

Where lighting is essential for safety and security reasons the following measures will be taken into consideration:

- Avoidance of excessive lighting;
- Light Emitting Diodes (LED's) will be used and the brightness will be set as low as possible;
- Lighting will be aimed only where it is needed, with no upward lighting;
- Lighting will be directed away from landscaped areas, retained sections of vegetation and any waterbodies; and,
- The height of lighting columns has been reduced as much as possible to avoid light spillage.

Following the installation of the lighting for the proposed development, the project ECoW will undertake a further Site inspection, to check the lighting patterns and lux levels along the site boundaries.

The full details of the lighting strategy are provided in the Lighting Design Report (Appendix 6.2).

6.5.8.2 Measures for Otter

In order to safeguard otter and other species utilising the section of the riverbank along the proposed develop from disturbance, defence planting and fencing is to be installed along the boundary of the park. The planting / fencing will prevent access to the riverbank to walkers and dogs.

6.5.9 Landscape Design Package

A Landscape Design Package including Planting Schedule has been prepared as an integral part of the overall design and submitted with this application. The proposed tree planting is provided in the Landscape Design Package. The inclusion of the landscaping and the ecological enhancement works are in line with the recommendations as detailed within the County Development Plan.

The creation of the landscape park will require the planting of trees as part of the proposed development. In order to recreate the historical orchards of the Abbey, two large tree groves will be planted within the Site. These tree groves will be planted with fruiting trees as described below:

- An ornamental crab apple tree orchard will be planted in elevated flowerbeds with perennial planting within the eastern portion of the Site. A variety of crab apple trees will be planted including *Malus* 'Evereste', *Malus* ' Coralburst' and *Malus* 'Snowcloud';
- Perennial plants will be planted within the Site which are symbolic for the church, edible and medicinal forms of plants will be included such as: *Alchemilla mollis*, *Artemisia officinalis*, *Echinacea purpurea*, *Foeniculum vulgare*, *Fragaria vesca*, *Lavandula officinalis*, *Matricaria reticulata*, *Origanum* 'Rosenkuppel'*, Pulmonaria officinalis, Salvia officinalis, Sanguisorba officinalis* and *Valeriana officinalis;*
- An orchard of fruits will be also be planted using small scale trees including medlar (*Mespilus germanica),* quince (*Cydonia oblonga*) and Sorbocrategus Ivan's Belle; and,
- Planting will also be undertaken to enhance the area adjacent to the river side area, which will create a lush green almost natural vegetated area that will utilise a wide diversity of pollinator friendly plants including: corkscrew hazel (*Corylus avellana Contorta*), Tibetan cherry (*Prunus serrula*), bird cherry (*Prunus padus*), cut-leaved elder (*Sambucus nigra Laciniata*), guelder rose (*Viburnum opulus*) and laurustinus (*Viburnum tinus*).

Planting a range of flowering trees and plants will also provide a source of nectar for a range of species such as butterflies and bumblebees. This planting will also attract insects for bats and birds to feed on. Please refer to Landscape Design Package included with this application for further details.

6.5.10 Biodiversity Management Plan

6.5.10.1 Measures for Bats

Artificial bat boxes will be erected on suitable trees along the eastern Site boundary. Artificial bat roost boxes can provide vital roosting places in habitat devoid of natural roosting opportunities. These should be placed in a position sheltered from strong wind and exposed to the sun for part of the day. The boxes will be located in / close to linear features, such as the treelines. The number and location of which will be specified by the ECoW. Refer to Figure 6-9 for an example.

Figure 6-9: An example of a suitable bat roost box: Bat Box Schwegler 1FF

6.5.10.2 Measures for Birds

A variety of bird nest boxes designed to attract a variety of nesting bird species will be erected on suitable trees. General bird boxes designed to cater for a variety of species will be used, the number and location of which will be specified by the ECoW. Refer to examples provided in Figure 6-10.

Figure 6-10: Variety of bird box designs to accommodate a diversity of species

6.6 Interactions with other Environmental Attributes

The Environmental Attributes which flora and fauna interact include:

- Chapter 7 (Land and Soils): Earth movements will be required as part of the proposed development, therefore, soil erosion mitigation measures will be put in place in order

to ensure no significant impacts occur to water quality of the River Nore and the River Breagagh;

- Chapter 8 (Water): There are clear interactions between ecological receptors and surface and groundwater resources. However, appropriate mitigation measures will be put in place in order to ensure no significant impacts occur to water quality;
- Chapter 9 (Air Quality and Climate): Dust impacts that may affect local biodiversity will be mitigated through the Dust Management Plan;
- Chapter 10 (Noise and Vibration): Species within the locality have become habituated to noise arising from elevated human activity from Kilkenny City; and,
- Chapter 11 (Landscape and Visual): As part of both the mitigation measures proposed for both ecology and landscape and visual impacts, appropriate landscaping has been developed for the Site which will include reference to the retention where possible of existing tree and hedge lines. In addition, the landscaping includes the planting of trees and shrubs species of local providence in suitable locations at the Site.

6.7 Residual Impacts

The majority of the Site is considered to be of low ecological interest. Taking into account the history of the Site, the fact that a large concrete yard will be replaced with a landscaped park with associated planting, that the proposed drainage regime will improve storm water discharge quality and the extensive mitigation measures that will be implemented, the residual impact will be moderate positive in the medium to long term.

6.8 Cumulative and In-combination Impact

The proposed development is part of the Kilkenny Abbey Quarter Masterplan and therefore, these works will form part of the overall Masterplan. Currently there are several projects associated with the Abbey Creative Quarter Masterplan Development already approved. These projects are also stated objectives of the Kilkenny City and Environs Development Plan 2014 – 2020 (Kilkenny County Council, 2014). The projects include the following:

- The Riverside Garden Project – approved under Part 8 of the Planning and Development Regulations, 2001, as amended, in February 2016;
- The redevelopment of the Mayfair Ballroom into the City Library – Part 8 Development approved in July 2016; and
- The redevelopment of the former Smithwick's Brewery Brewhouse building into primarily office space – Part 8 Development approved in December 2017.

At the time of writing, construction works on these projects are all ongoing.

Therefore, taking into account the ongoing construction works related to the above mentioned projects, it is considered that there is potential for cumulative and in-combination impacts to the local biodiversity and the designated interests of the River Barrow and River Nore SAC and the River Nore SPA.

However, in 2015, a Natura Impact Report was prepared for the Masterplan for Abbey Creative Quarter, Kilkenny. This document addressed the potential risks to the qualifying interests and conservation objectives of the Natura 2000 sites and recommended mitigation measures for potential adverse effects that cannot be avoided. As part of the Masterplan, all plans and projects will be subjected to Appropriate Assessments (AA) and therefore, each project was assessed for potential adverse effects to the Natura 2000 sites (CAAS Ltd., 2015).

The Riverside Garden Project was subjected to Appropriate Assessment and Ecological Impact Assessment, and the redevelopment of the Mayfair Ballroom project and the redevelopment of the former Smithwick's Brewery Brewhouse building were also subjected to Appropriate Assessments (AA). The AA prepared for the Riverside Gardens concluded that the proposed development would not result in any adverse effects to the Natura 2000 sites

(Moore Group, 2015) and the EcIA concluded that this development would not result in any direct, indirect or cumulative impacts with appropriate mitigation measures put in place (Moore Group, 2015). Similarly, the AA for the redevelopment of the former Smithwick's Brewery Brewhouse concluded that the works would not affect the Natura 2000 sites either directly or indirectly (Moore Group, 2015). Also, the AA undertaken for the redevelopment for the Mayfair Building concluded that there would be no direct or indirect adverse effects on the Natura 2000 sites (Moore Group, 2014), and the updated AA prepared for the redevelopment for the Mayfair Building undertaken in 2019 also found that there would be no direct or indirect adverse effects on the Natura 2000 sites (Moore Group, 2019).

Therefore, given the fact that the ongoing projects will not result in any adverse effects to the local biodiversity and taking into account the small scale and localised nature of the proposed development, the mitigation measures that will be put in place and the best practice guidelines which will be implemented during the construction and operational phase of the proposed development, it is considered highly unlikely that any significant cumulative impacts will arise as a result of the proposed development.

6.9 Monitoring

An ECoW will inspect the Site in advance of works in order to undertake pre-construction surveys and will undertake Site inspections as required during the works, to ensure that all of the works are completed in line with the recommendations outlined within the EIAR. Details of the monitoring schedule will be detailed in the CEMP.

6.10 Reinstatement

Not applicable.

6.11 Difficulties Encountered in Compiling this Information

No difficulties were encountered in undertaking this assessment.

It is considered that the finding of the above assessment will remain valid for a period of two years, providing that the Site conditions remain broadly unchanged.

7 LAND AND SOILS

7.1 Introduction

This chapter of the EIAR provides a description and assessment of the likely impact of the proposed development on land and soils.

7.2 Methodology

A desk-based study was completed, including a review of publicly available geological information for the Site:

- Geological Survey of Ireland (GSI) Public Data Viewer (GSI, 2020); and,
- EPA Online Mapping (EPA, 2020).

The following Site-specific information related to the Site and wider Masterplan area, was reviewed:

- Detailed Quantitative Risk Assessment (DQRA) carried out for the Site by MOR in 2020 (MOR, 2020) – presented in Appendix 7.1;
- Soil monitoring data compiled for the Site and wider Masterplan area by MOR (2017 – 2018) (MOR, 2018) The data collected between 2017 and 2018 is presented within the DQRA; and,
- Closure, Restoration and Aftercare Management Plan (CRAMP) – Detailed Risk Assessment Report completed for St Francis Abbey Brewery by Arup on behalf of Diageo (Arup, 2014).

A Site investigation was conducted by MOR during January 2020 as part of the DQRA for the proposed development and consisted of the installation of five (5No.) probeholes and collection of nine (9No.) soil samples.

This chapter has been completed taking into account the “Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements” (IGI, 2013).

7.3 The Receiving Environment

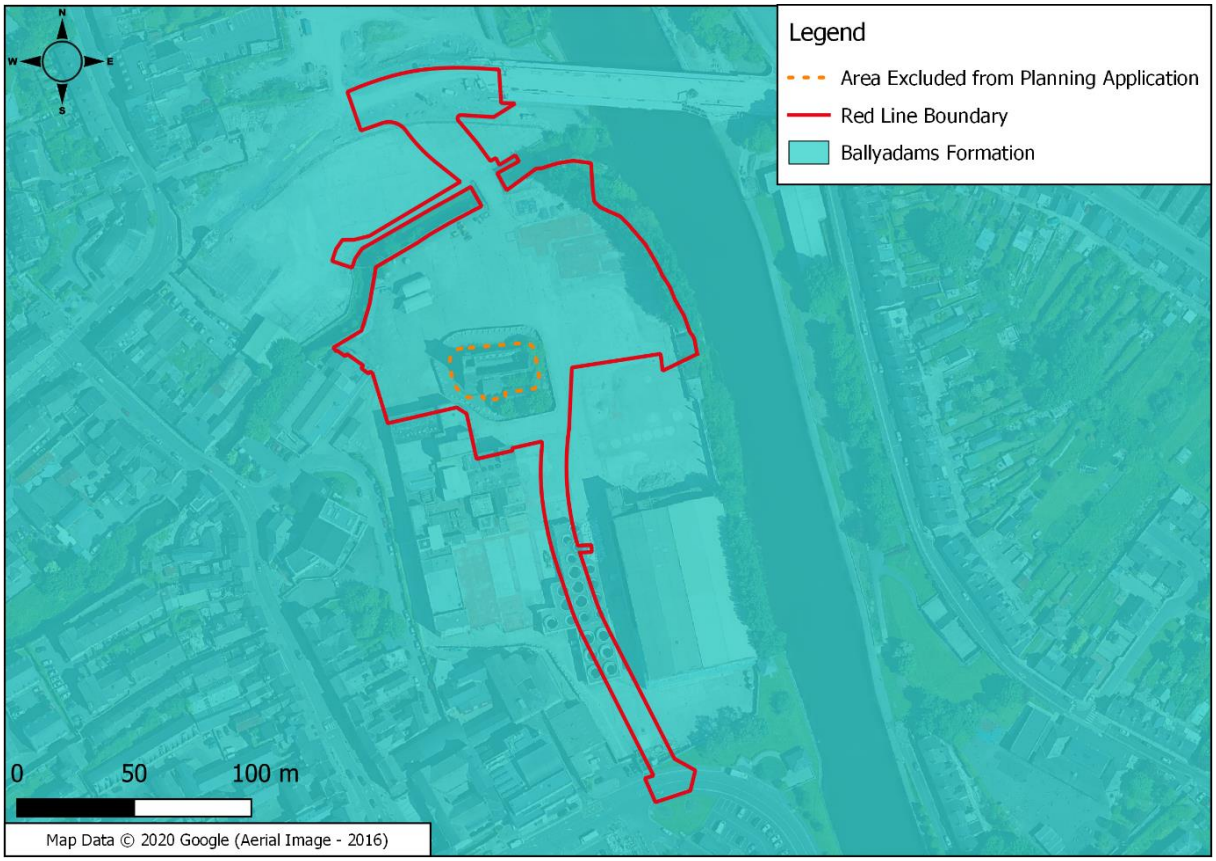
7.3.1 Topography

The majority of the Site is situated on relatively flat concrete hardstanding, with a topography of c.44 metres above Ordnance Datum (mAOD). Three existing structures are also located at the Site, known as the “Tasting Room”, the “Maturation Building” and the pump house.

7.3.2 Bedrock Geology

According to the GSI, the bedrock beneath the Site consists of the Ballyadams Formation. This comprises thick-bedded crinoidal wackestone / packstone limestone with clay wayboards (GSI, 2020). Refer to Figure 7-1. According to the Arup report (Arup, 2014), the bedrock was encountered in the Masterplan area at approximately 15 metres below ground level (mBGL). According to the EPA, the Ballyadams Formation is at least 200m thick (EPA, 2011).

Figure 7-1: Bedrock Geology



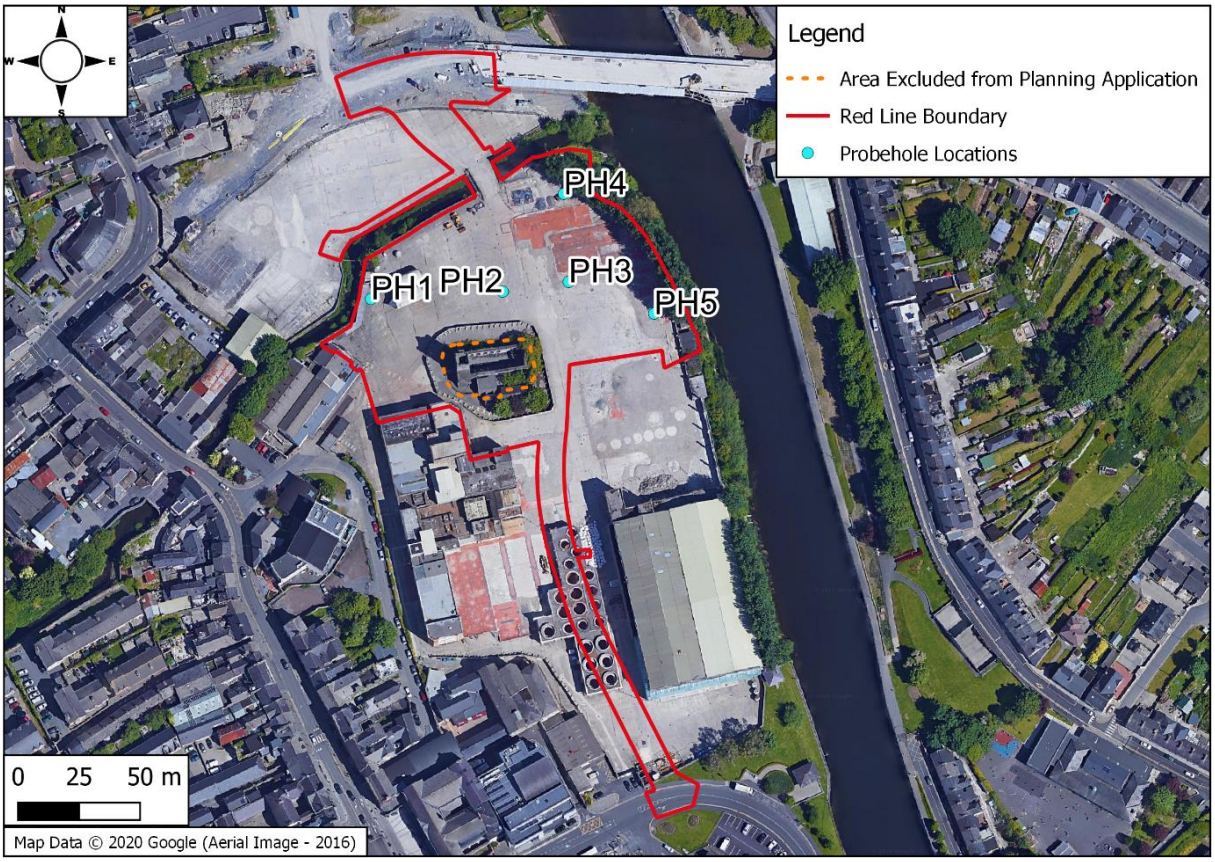
7.3.3 Quaternary Geology

According to the GSI, the quaternary geology beneath the majority of the Site is classified as urban, indicating deposits associated with anthropogenic action. The quaternary geology beneath the eastern portion of the Site is alluvium, associated with the River Nore. Refer to Figure 7-2.

Figure 7-2: Quaternary Geology

This corresponds with the findings of the MOR Site investigation conducted during 2020 where c. 0.25 – 0.35m of reinforced concrete hardstanding was encountered followed by up to 2.3m of made ground. Natural ground was encountered beneath the made ground in one location (PH5) and comprised silty clay underlain by gravels. Probehole locations are presented in Figure 7-3 and probehole logs are presented within the DQRA (Appendix 7.1).

Figure 7-3: Probehole Locations (MOR, 2020)



7.3.4 Soils

7.3.4.1 Soil Quality

Upon surrender of the IPPC Licence (Register No. P0448-01) by Diageo, the EPA noted in their Surrender Memo dated 28th May 2015 (EPA, 2015) that:

"The EPA considers that the investigations have demonstrated that the ite is in a 'satisfactory state' and that no further investigation or remedial action is necessary. However, this is a 'brownfield' site and Kilkenny County Council should take this into account during future development works."

The EPA also stated they were "*satisfied the condition of the installation is not causing or likely to cause environmental pollution and the site of the activity is in a satisfactory state*".

The baseline soil quality at the Site was determined not to present a risk to either human health or the environment on the basis that concrete hardstanding covers the entirety of the Site. This concrete hardstanding removed the pathway in the pollutant linkages and thus the potential risk was considered to be minimal for the identified linkages as follows:

- Human Health - The presence of the concrete hardstanding would prevent direct contact with any contaminants present in the shallow subsurface; and,
- Environmental - Leaching of any potential residual contaminants from the soil to groundwater via rainfall infiltration would be minimised.

Notwithstanding the fact that the EPA signed off on the Site, a range of contaminants have been identified to be present primarily within shallow fill materials beneath the Site. Such contaminants associated with the past Site use include hydrocarbons, heavy metals and trace

concentrations of asbestos fibres. The results of all of the soil samples are presented in the DQRA report included in Appendix 7.1

7.3.5 Current Land Use

The Site is currently a brownfield site, largely covered by concrete hardstanding. Currently, part of the Site is used as a construction compound for construction of ongoing Masterplan projects (i.e. the Riverside Gardens and Brewhouse Building). Existing stockpiles of crushed concrete from these construction works are currently being stored on the Site.

7.4 Characteristics and Predicted Impact of Proposed Development

The proposed development has been specially designed to be constructed on top of the existing concrete hardstanding which covers the Site as much as practicable. Where the concrete hardstanding has to be removed for the installation of services, every effort will be made to reinstate new concrete hardstanding upon completion of the construction works. Based on this approach only a small section of the Site will be left with no concrete hardstanding. In such locations given the past industrial use at the Site, a layer of clean inert imported fill materials (e.g. soil and/or stone), with a minimum depth of 600mm will be placed, to achieve the proposed finished ground levels. In soft landscaped areas, a geo-textile membrane will also be placed on top of the existing fill materials separating them from the clean imported materials. This precautionary design measure will mitigate potential future direct contact with the existing fill materials.

The proposed development will consist of two (2No.) distinct phases:

- Construction phase; and,
- Operational phase

These two (2 No.) phases have been dealt with separately as the impacts associated with each are distinct.

7.4.1 Construction Phase

Construction of the proposed development will require the removal of c. 3,052m^2 of the existing 13,658m^2 concrete hardstanding to facilitate utility installation, construction works and landscaping works. Of this, c. 370m^2 of existing concrete hardstanding will be permanently removed to allow for landscaping works and infiltration of surface water from soft landscaped areas. The majority, c. 2,682m^2 will be reinstated with hardstanding as part of the proposed design within approximately 9 months.

Construction of the proposed development will require the removal of surplus soils from the Site. Clean inert imported engineering grade fill materials including top-soil, will need to be imported to the Site. A summary of the required cut and fill volumes is provided in Table 7-1.

Table 7-1: Cut and Fill Volume Estimates

Cut / Fill	Material Type	Volume (m^3 / m^2)
Cut	Concrete	C. 763m^3
	Made Ground	C. 3,8000m^3
	Natural Soils	C. 500m^3
Fill	Aggregates	C. 5,127m^3
	Topsoil	C. 1,552m^3
	Concrete	C. 6,165m^2

Excavation and management of potentially contaminated fill materials has the potential to impact on human health and the environment in the absence of the required mitigation measures. Evaluation of the potential construction risks are presented in the DQRA report included in Appendix 7.1.

The potential for a slight impact on land and soils during the construction phase may arise from accidental spillages into the soils from machinery, and therefore, potentially into surface water and groundwater.

Furthermore, some scrub clearance and planting will be undertaken on the riverbanks at the confluence of the River Nore and River Breagagh. Therefore, there is the potential for erosion of riverbank soils during the construction phase.

7.4.2 Operational Phase

The laboratory analytical results for soil samples collected by MOR during January 2020 were screened against the human health (LQM/CIEH S4ULs and Defra C4SLs) for public open space (park) land-use (1% soil organic matter) in order to assess the risks to future Site users (members of the public). Refer to Figure 7-3 for the soil sampling locations. Soil analytical results for the samples collected by MOR during 2020 are presented as part of the DQRA in Appendix 7.1.

No exceedances of the public open space criteria were noted in any of the nine (9 No.) soil samples collected during January 2020. Based on a review of all historic soil analytical data, there were no noted exceedances of the public open space criteria within the Site (Arup, 2014) (MOR, 2020).

The DQRA carried out for the Site by MOR (MOR, 2020) concluded that there would be no unacceptable risk to the sensitive receiving water environment, in particular the adjoining River Nore, associated with the known condition of the Site.

During the operational phase, the land use will change from a predominantly disused industrial space to a public open space. Therefore, the impact of the proposed development on land use will be significantly positive. Details of the proposed landscape design and infiltration areas are presented in Chapter 3.

During the operational phase, there is the potential for a slight impact on land and soils due to the risk of accidents or spillages (i.e. leakage of fuel / oil from maintenance equipment in soft landscaped areas). All other areas will be covered in hardstanding and will be contained within a closed drainage system. Therefore, there will be no impact on land and soils during the operational phase in these areas.

Mitigation measures referenced under Chapter 7.5 and 8.5 will minimise the identified potential land and soils risks associated with the operational phase of the proposed development.

The impact on land and soils during the operational phase is likely to be slight positive.

7.5 Proposed Mitigation Measures and / or Factors

The mitigation measures for the protection of land and soils, as well as the protection of surface water and groundwater, which are related to the land and soils, are described below and in Chapter 8 (Section 8.5).

7.5.1 Construction Phase

To minimise the potential impacts arising from the construction phase, the works will be carried out taking cognisance of the best industrial practice procedures. The following guidance will be included in the CEMP and will be strictly followed during the construction phase of the project:

- C532 – Control of Water Pollution from Construction, Guidance for Consultants and Contractors (CIRIA, 2001)

General construction mitigation measures are outlined in Chapter 3. Construction phase mitigation measures detailed in Chapter 8 – Water and Chapter 9 – Air and Climate, are also applicable to land and soils.

The contractor shall ensure that all personnel working on-site are trained and aware of the measures detailed within the CEMP.

7.5.1.1 Stockpiling / Soil Management

Stockpiling of excavated material will be required on-site during the construction phase. Appropriate management of stockpiles will be undertaken to prevent siltation of nearby surface waters, refer to Chapter 8 (Water).

Specific control measures will be specified in the CEMP for the handling and temporary storage of potentially contaminated materials that may be encountered during the works.

A Materials Management Plan will be implemented by the approved Contractor, to minimise the overall impact arising during the construction programme. This will include measures to:

- Maximise excavated materials reuse;
- Reuse existing stockpiles of crushed concrete on-site, where possible;
- Minimise subsoil disturbance; and,
- Minimise exportation of materials for disposal.

Soil erosion on the riverbanks at the confluence of the River Nore and River Breagagh will be prevented through the implementation of the following measures:

- The works will be undertaken when the seasonal water levels will be at low levels;
- Works will be restricted to scrub clearing and replanting by hand to avoid unnecessary ground cover removal and soil erosion; and,
- No vehicles will be permitted beyond the concrete hardstanding.

7.5.1.2 Oil Storage / Refuelling

In order to minimise the impacts on land and soils from potential spillages during construction phase, the following measures will be implemented:

- All plant and machinery will be serviced before being mobilised to the Site;
- All oil stored on the Site for construction vehicles will be kept in a locked and bund protected area;
- Preventative maintenance and relevant maintenance logs will be kept for all on-site plant and equipment;
- Refuelling of plant and machinery will be completed in a controlled manner using drip trays (bunded container trays). Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile containers. Bunds for the storage of hydrocarbons and chemicals will have a holding capacity of 110% of the volume to be stored;
- Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on-site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,

- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill.

7.5.1.3 Cement Handling During Construction

The measures detailed below will be employed when poured concrete is being used in the construction process. The production, transport and placement of all cementitious materials will be strictly planned and supervised. Measures related to the use of poured concrete will include:

- All concrete pours will be carefully planned to avoid any impacts;
- Water supply points, if required, will be agreed with the appointed Contractor in advance of the works;
- Shutters will be designed to prevent failure. Grout loss will be prevented from shuttered pours by ensuring that all joints between panels achieve a close fit or that they are sealed;
- Chemicals used will be biodegradable where possible;
- Any spillages will be cleaned up immediately and disposed of correctly;
- Where concrete is to be placed by means of a skip, the opening gate of the delivery chute will be securely fastened to prevent accidental opening;
- Where possible, concrete skips, pumps and machine buckets will be prevented from slewing over water when placing concrete; and,
- Surplus concrete will be returned to batch plant after completion of a pour.

7.5.2 Operational Phase

During the operational phase, all maintenance equipment used on soft landscaped areas will be regularly checked for leaks and serviced to minimise the risk of fuel / oil spills.

7.6 Interactions with other Environmental Attributes

Land and soils have the potential to be impacted positively or negatively under several environmental issues including:

- Chapter 5 – Population and Human Health: Potential impacts associated with the change in land use at the Site and management of contaminated soils could impact on human health and wellbeing.
- Chapter 6 - Biodiversity: Potential impacts on the underlying land and soils could also impact on ecological conditions. Planting on the riverbank has the potential to impact on land and soils.
- Chapter 8 - Water: In the event of soil contamination, there could be a negative impact on the underlying bedrock aquifer (groundwater) and surface water quality. Soil erosion could also impact on surface water quality. Removal of existing concrete hardstanding could also impact on infiltration patterns at the Site.
- Chapter 11 - Landscape and Visual: Potential impacts associated with change in land use at the Site and the integration of the development within the landscape.
- Chapter 13 (Material Assets - Waste and Use of Natural Resources): Some waste soils are likely to arise and soils / aggregates will be imported during the construction phase.

7.7 Residual Impacts

As a result of the mitigation measures and factors listed in Section 7.5 above, there will be no significant adverse impacts on soils and geology as a result of the proposed development. Given that the existing Site is a predominantly unused industrial site which is inaccessible to the public, the impact on land use will be significantly positive.

Given all of the control measures incorporated into the Design the risk to future Site users (members of the public) and future Site workers from direct contact or inhalation exposure to any contaminated materials associated with past Site operations will be negligible.

7.8 Cumulative and In-combination Impacts

As stated in Chapter 1, part VIII approval (P11/19) has been granted for the demolition of the Maturation Building, which is within the Site boundary at the time of writing. It is anticipated that these works will be completed prior to the construction phase of the proposed development. However, the potential for these demolition works to be completed in tandem with the proposed development cannot be ruled out.

In terms of land and soils, the demolition of the Maturation Building would result in an alteration to the land use in that particular area. However, given that construction works are currently ongoing for future Masterplan structures, the predicted 'neutral' impact previously outlined for the construction phase will remain unchanged.

As stated in Chapter 2, the Masterplan proposes to develop several other elements including residential / commercial units and leisure spaces including the Mayfair Building (City Library), Brewhouse Building (commercial / educational), Skate Park and Riverside Gardens(leisure). Although the proposed development on its own will not have any significant impact on soils and will have a positive impact on land use, the cumulative impact of future Masterplan structures will be considered by the planning authority when assessing any future related planning applications.

7.9 Monitoring

Any excavated materials that require offsite disposal will undergo sampling and testing to ensure disposal in accordance with the relevant waste legislation.

7.10 Reinstatement

Reinstatement of concrete hardstanding was included as part of the design so far as was reasonably practicable. Further detail is discussed in section 7.4.1.

7.11 Difficulties Encountered in Compiling this Information

No difficulties were encountered in compiling this chapter.

8 WATER

8.1 Introduction

This chapter of the EIAR provides a description and assessment of the likely impact of the proposed development on the receiving hydrology (surface waters) and hydrogeology (groundwater). The existing surface water and groundwater regime present at the Site is described in terms of drainage patterns, water quality and resources present.

An evaluation of the potential impacts of the proposed development on these factors is presented. The mitigation measures to be employed to minimise the potential impact of the proposed development on the surrounding water environment are also identified.

8.2 Methodology

A desk-based study of publicly available data was undertaken in order to characterise the receiving environment, using the following data sources:

- Geological Survey Ireland (GSI) Public Data Viewer (GSI, 2020); and,
- EPA Online Mapping (EPA, 2020).

A desk-based study of data pertaining to the Site was also undertaken, using the following data sources:

- Detailed Quantitative Risk Assessment (DQRA) carried out for the Site by MOR in 2020 (MOR, 2020) – presented in Appendix 7-1;
- Soil monitoring data compiled for the Site and wider Masterplan area by MOR (2017 – 2018) (MOR, 2018) The data collected between 2017 and 2018 is presented within the DQRA in Appendix 7.1; and,
- Closure, Restoration and Aftercare Management Plan (CRAMP) – Detailed Risk Assessment Report completed for St Francis Abbey Brewery (Arup, 2014).

8.2.1 Flood Risk Screening

In November 2009, the Department of Environment, Heritage and Local Government (DEHLG) issued the document "The Planning System and Flood Risk Management – Guidelines for Planning Authorities" (DEHLG, 2009).

The Guidelines recommend a risk based sequential approach to managing flood hazard and potential risk through the planning system. The key principles are:

1) Avoid the risk where possible;
2) Where avoidance is not possible, substitute less vulnerable uses;
3) Mitigate and manage the risk, where avoidance and substitution are not possible; and,
4) Inappropriate types of development that would create unacceptable risk from flooding should not be planned for or permitted.

The Guidelines recommend that a staged approach is adopted in carrying out Flood Risk Assessment (FRA). The stages of assessment are screening, scoping and appropriate risk assessment. These are described as follows:

Screening assessment – to identify whether there may be any flooding or surface water management issues related to a plan area or proposed development Site that may warrant further investigation;

Scoping assessment – to confirm sources of flooding that may affect a plan area or proposed development Site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding and potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures; and,

Appropriate risk assessment – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

A screening assessment was therefore conducted to ascertain if there are any flooding or surface water management issues associated with the Site. This screening exercise involved the following:

- Review of the Office of Public Works (OPW) Flood Info website (OPW, 2020);
- Review of the Flood Risk Management Plan for River Basin 15 – Nore (OPW, 2018);
- Review of topographical mapping; and,
- A walkover survey to assess potential receptors and the impact of the proposed developments key features.

8.3 The Receiving Environment

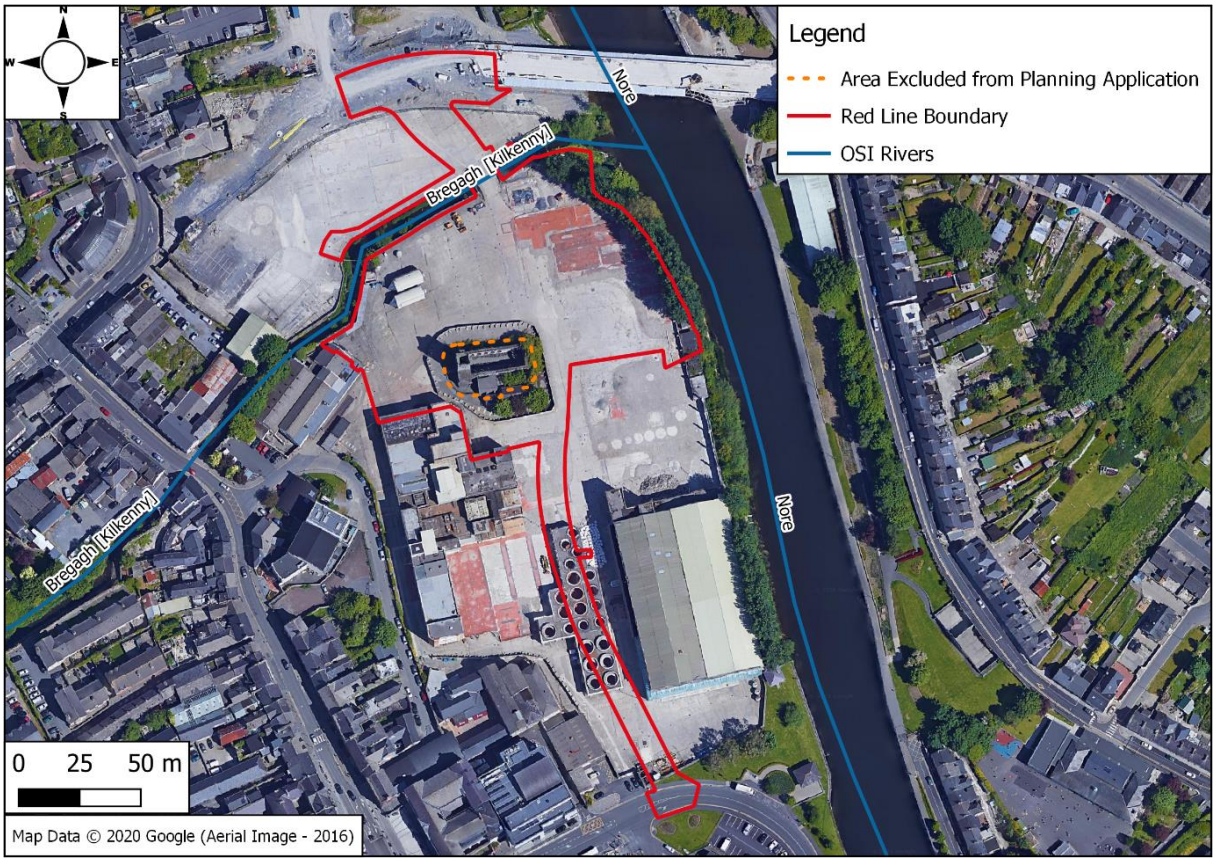
8.3.1 Hydrology (Surface Water)

The following subsections set out the hydrological context of the Site.

8.3.1.1 Nearby Water Courses

The Site is located within the Nore Catchment (Catchment ID:15) and the Nore_SC_090 sub-catchment under the Water Framework Directive (WFD) (EPA, 2020). The River Breagagh (EPA code: IE_SE_15N011950 – Segment 15_10316) traverses the Site in the northern portion. The Site is bounded by the River Nore (EPA code: IE_SE_15N011950 – Segment 15_164) to the east. The River Breagagh travels in an easterly direction through the Site and discharges to the River Nore. The River Nore travels in a south-easterly direction for c. 45km and discharges to the River Barrow (EPA code: IE_SE_100_0250). Surface water features in the vicinity of the Site are presented in Figure 8-1.

Figure 8-1: Watercourses in the Vicinity of the Site



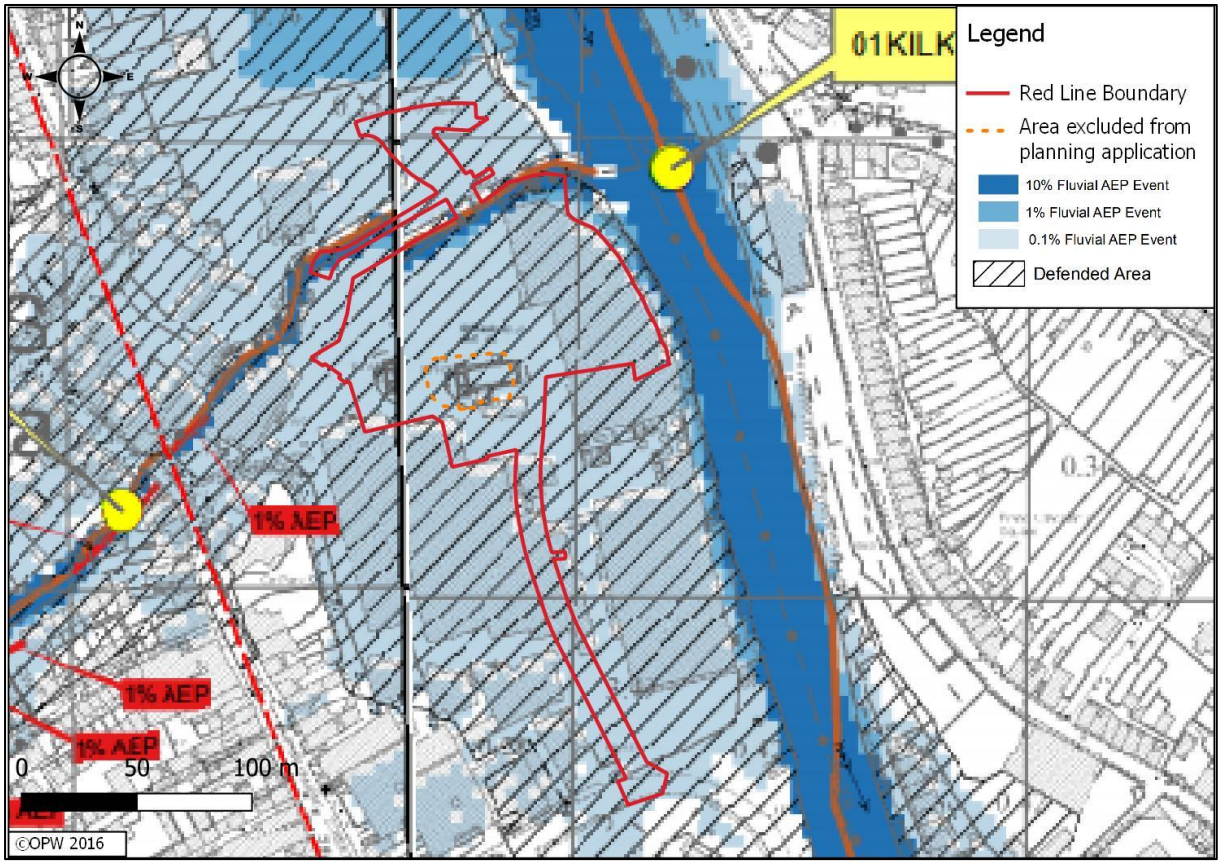
8.3.1.2 Surface Drainage

Currently, almost the entire former brewery Site is covered by a concrete slab and surface run-off from the impermeable concrete hardstanding across the Site is collected and passed through oil / water interceptors before being discharged to the River Nore and River Breagagh via existing outfalls. The existing outfalls are presented in Figure 1-3.

8.3.1.3 Flood Risk

The Kilkenny City Flood Relief Scheme was initiated in 1995 and was constructed from 2001 to 2005. The Scheme, which comprises flood defence walls, embankments, and channel conveyance improvements, provides protection for 200No. properties, including the Abbey Quarter, against a 100 year flood (1% Annual Exceedance Probability) from the River Nore and lower section of the River Breagagh (OPW, 2018). The OPW mapping confirms that the Site is located within flood risk Area C (0.1% AEP) but is within a “defended area” (OPW, 2020). Refer to Figure 8-2.

Figure 8-2: Flood Risk Map (Base Map Extracted from OPW Flood Info Mapping)



8.3.1.4 Surface Water Quality

According to the WFD, the River Breagagh and River Nore have a status of good in the segments adjacent to the Site and it is the objective of the WFD to protect these waterbodies (EPA, 2020). Both the River Breagagh and the River Nore are noted as requiring review in relation to the potential risk of deterioration or being at less than good status in the future.

Surface water quality data is collected by the EPA at the monitoring locations presented in Figure 8-3. A summary of the key water quality results for the monitoring stations is provided in Table 8-1.

Figure 8-3: National Water Monitoring Stations in the Vicinity of the Site

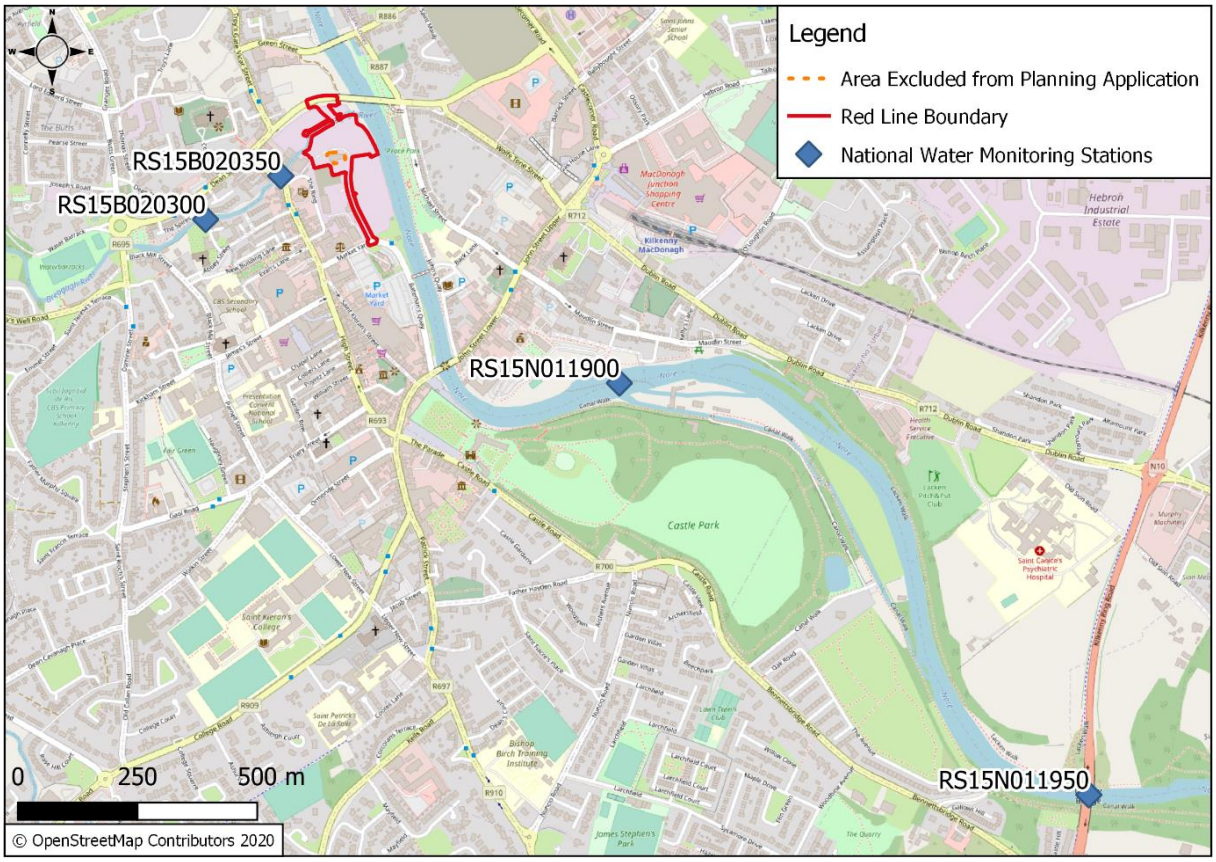


Table 8-1: EPA Surface Water Monitoring Results - River Breagagh and River Nore

Parameter	Units	Surface Water Standards[3]	2019 Average – River Breagagh (upgradient of the Site)[4]	2019 Average – River Nore (downgradient of the Site)[5]
pH	pH units	6 - 9	7.89	8.07
Total Ammonia (as N)	mg/l	0.14	0.02	3.52
Chloride	mg/l	-	25.7	22.2

8.3.2 Hydrogeology (Groundwater)

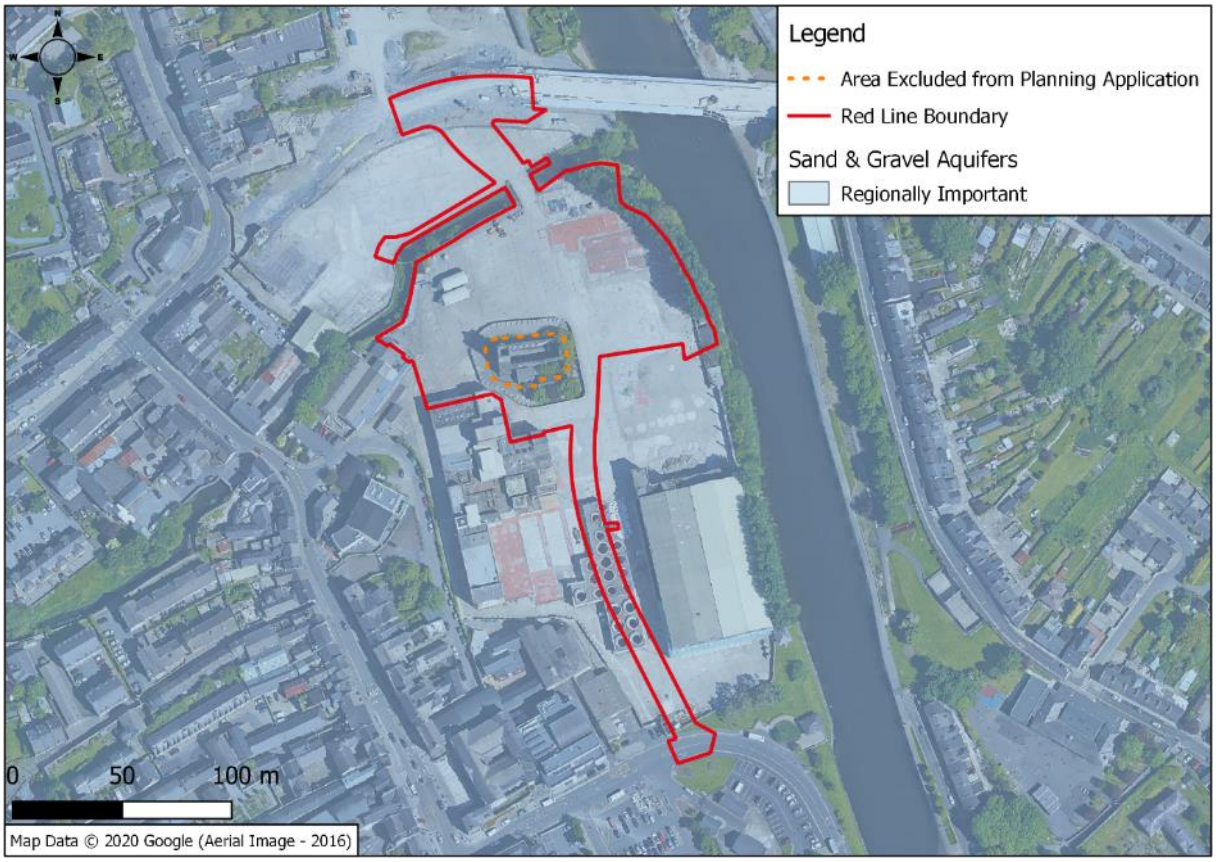
8.3.2.1 Aquifer Characteristics

The GSI provides a methodology for aquifer classification based on resource value (regionally important, locally important and poor). Resource value refers to the scale and production potential of the aquifer.

According to the GSI, the Site is underlain by the Nore Gravels Group. This is classified as a regionally important and extensive sand and gravel aquifer. Refer to Figure 8-4.

[3] Surface Water Regulations 2009 (S.I. No. 272 of 2009) as amended (S.I. No.327 of 2012 and S.I. No.386 of 2015 and S.I. No. 77 of 2019)
[4] National Water Monitoring Stations: RS15B020300 and RS15B020350
[5] National Water Monitoring Stations: RS15N011900 and RS15N011950

Figure 8-4: Sand and Gravels Aquifer



According to the GSI, the bedrock aquifer beneath the Site comprises the Ballyadams Formation, consisting of thick-bedded crinoidal wackestone / packstone limestone with clay wayboards (GSI, 2020). The bedrock aquifer beneath the Site is classified as a regionally important karstified aquifer. Refer to Figure 8-5. Groundwater in the bedrock (Ballyadams Formation) is noted to be artesian (Arup, 2014) with upwards hydraulic gradient to the overlying sands and gravels and River Nore. No karst features were identified by the GSI within the Site. The closest identified karst feature is St. Canice's Well, located c.0.7km to the west of the Site.

Figure 8-5: Bedrock Aquifer

A historic well known as St Francis Well is noted as being located in the eastern portion of the Site. Refer to Figure 1-2.

8.3.2.2 Vulnerability Rating

The GSI provides a methodology for aquifer classification based on vulnerability (extreme, high, moderate or low), referring to the ease with which groundwater may be contaminated by human activities. This vulnerability classification is primarily based on the permeability and thickness of subsoils. The groundwater vulnerability rating beneath the Site is classified as high. Refer to Figure 8-6.

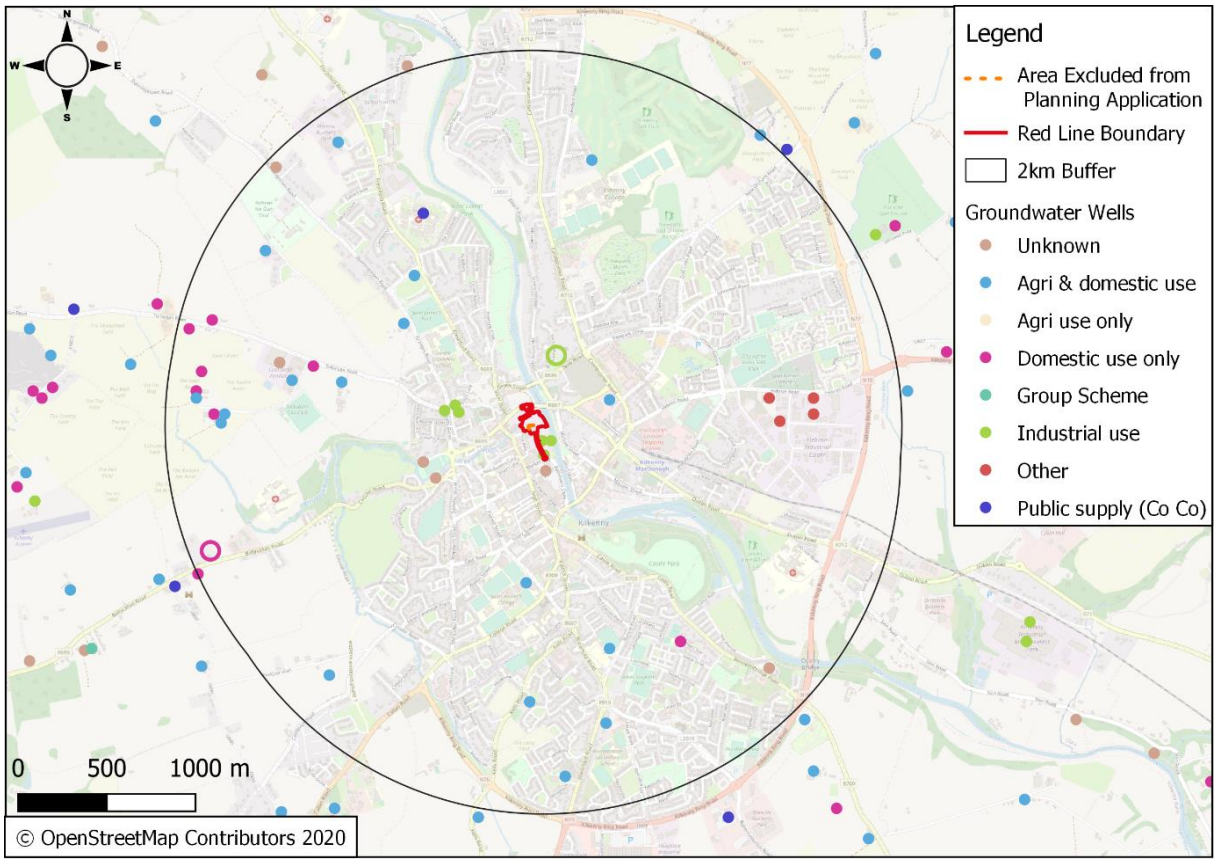
Figure 8-6: Aquifer Vulnerability

8.3.2.3 Groundwater Use and Source Protection

A search of the GSI groundwater well database was conducted to identify registered wells within the Site and surrounding area. Refer to Figure 8-7. There are forty-four (44 No.) reported wells recorded within a 2km radius of the Site, with the following uses reported:

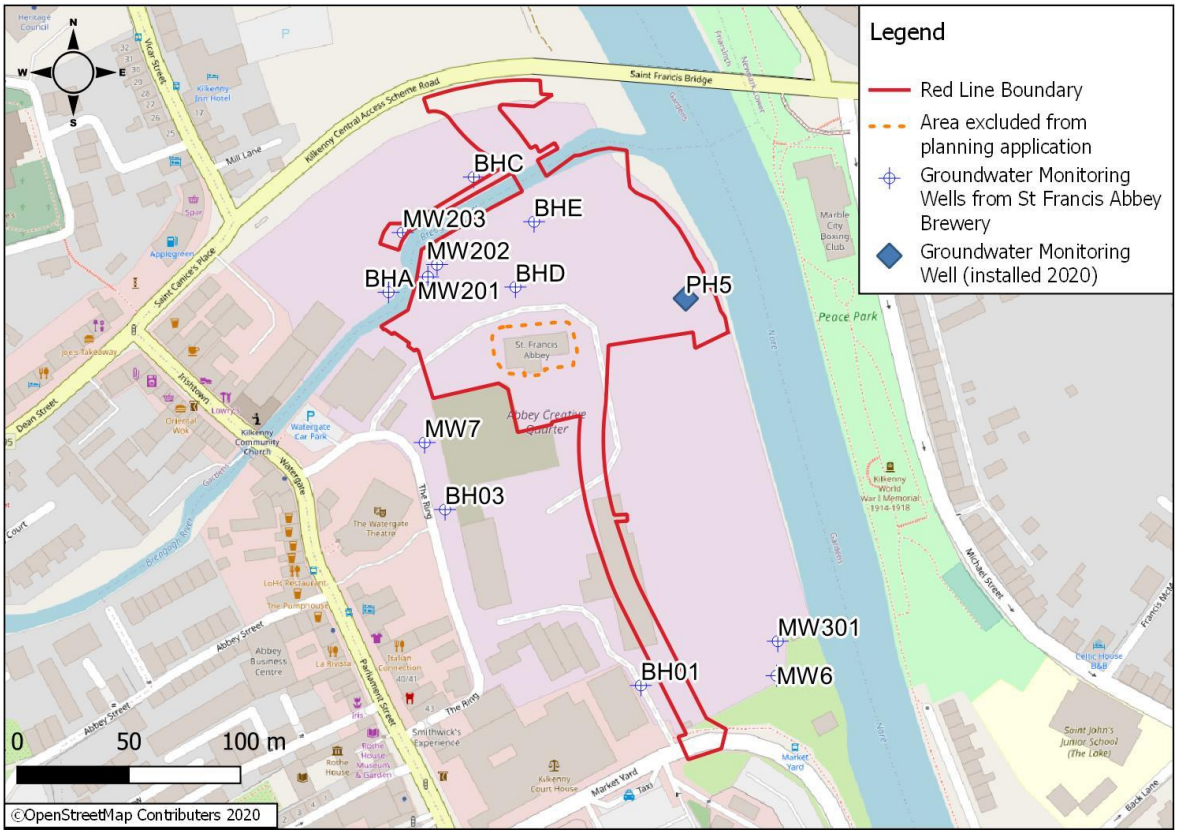
- Seventeen (17 No.) reported agricultural and domestic wells;
- One (1 No.) reported agricultural well;
- Nine (9 No.) reported domestic use wells;
- Seven (7 No.) reported industrial use wells – three (3 No.) of which appear to be associated with the former St Francis Abbey Brewery;
- Four (4 No.) wells reported for “other” uses;
- One (1 No.) public supply well; and,
- Five (5 No.) wells with a reported unknown use.

Figure 8-7: Groundwater Wells within 2km of the Site



There are twelve (12 No.) groundwater monitoring wells within the Site and wider Masterplan area. A new groundwater monitoring well was installed during January 2020 (PH5) by MOR to assess any localised changes in groundwater flow around the St Francis Abbey Well. The locations of these monitoring wells are presented in Figure 8-8.

Figure 8-8: Groundwater Monitoring Wells within the Site and wider Masterplan area



8.3.2.4 Groundwater Flow and Groundwater Levels

Based on measured groundwater levels since January 2018, groundwater flow direction beneath the Site is predominantly to the east / north-east, towards the River Nore and River Breagagh. Groundwater level monitoring conducted by MOR during 2020 noted no localised impact on groundwater flow in the vicinity of the historic St Francis Well.

8.3.2.5 Groundwater Quality

Groundwater monitoring has been carried out within the Site and wider Masterplan area on six (6 No.) occasions since the Council acquired the Site:

- 16th January 2018 by MOR;
- 7th March 2019 by TE Laboratories;
- 5th June 2019 by TE Laboratories;
- 18th September 2019 by TE Laboratories;
- 12th December 2019 by TE Laboratories; and,
- 18th February 2020 by TE Laboratories.

The groundwater monitoring locations are presented in Figure 8-8.

The DQRA carried out for the Site by MOR in 2020, presented in Appendix 7-1, details the groundwater monitoring results collected between 2018 - 2020 (MOR, 2020).

8.4 Characteristics and Predicted Impact of Proposed Development

The proposed development will consist of two (2No.) distinct phases:

- Construction phase; and,
- Operational phase.

These two (2No.) phases have been dealt with separately as the impacts associated with each are distinct.

8.4.1 Construction Phase

Construction and Site development works in general can potentially and significantly impact on groundwater and surface water quality in the following ways:

- Silt runoff and the incorrect handling of deleterious materials such as lubricants, waste oils, cement etc;
- Earthmoving activities and associated temporary stockpiling have the potential to release sediment during construction works to the existing drainage system on-site; and,
- Given the fact that the Site is intersected by the River Breagagh and is bounded to the east by the River Nore, there is the potential for a slight impact on surface water / groundwater during the construction phase from accidental spillages into soils from machinery, and therefore, potentially into surface water and / or groundwater.

The DQRA carried out for the proposed development concluded that based on the available soil data, it is considered that there is no unacceptable risk to the sensitive receiving water environment (River Nore SAC, River Breagagh and the 2No. regionally important aquifers) associated with the removal of existing concrete hardstanding during the construction phase. It also concluded that there will be no significant impact to the local hydrogeological regime at the Site associated with the removal of concrete hardstanding. Refer to the DQRA in Appendix 7-1 for further details.

8.4.2 Operational Phase

8.4.2.1 Drainage / Water Quality

There will be three (3No.) separate proposed drainage networks as detailed in Chapter 3. Surface water run-off from the hardstanding areas of the Site will be collected in a closed drainage system before passing through new silt / oil separators and discharging to the River Breagagh / River Nore.

Surface water run-off from soft landscaped areas will drain by infiltration via cores and tree boxes in existing concrete hardstanding. The proposed lawns are located over the existing concrete hardstanding and will drain to the soil through the cores. An indicative infiltration design is illustrated in Figure 3-8.

A drainage board will form part of the landscape build-up over the concrete hardstanding. The purpose of the drainage board will be to retain 10-12 litres of water per m^2. The retained water will support the growth of grass and planted areas in order to minimise the requirement for watering.

The inclusion of planted and grass areas, a drainage board within areas of lawn and infiltration holes in soft landscaped areas will result in a reduction of surface water discharge. The design will provide natural attenuation. Therefore, while it is not proposed to to include hard engineered storm water attenuation as part of the proposed development, there will be an overall reduction of surface water run-off from the proposed development when compared to the existing Site which is almost entirely impermeable. This will result in a slight positive long, term impact on storm water runoff from the Site in terms of both quality and flow.

The DQRA carried out for the proposed development concluded that based on the available soil data, it is considered that there is no unacceptable risk to the sensitive receiving water environment associated with increased rainfall infiltration on the Site during the operational phase. It also concluded that there will be no significant impact to the local hydrogeological

regime at the Site associated with the proposed development. Refer to the DQRA in Appendix 7-1 for further details.

8.4.2.2 Water Supply

The proposed development will only require a water supply for maintenance and the water feature. However, a mains water supply will be provided through the centre of the proposed development to provide a connection to the public water supply for any future developments in line with best practice. The onsite water feature will recirculate and treat the water so will only require filling during commissioning and topping up periodically when water is lost to evapotranspiration. There will therefore be no significant impact on the availability of water in the area as a result of the proposed development.

8.4.2.3 Foul Water Drainage

No wastewater will be generated from the proposed development itself. However, the proposed development will include a new mains foul drainage sewer to cater for wastewater discharge from any future nearby developments in line with best practice. There will therefore be no direct impact arising from wastewater discharge as a result of the proposed development.

8.5 Proposed Mitigation Measures and / or Factors

Prior to the commencement of the construction phase, existing groundwater monitoring wells located within the Site (MW203, BHD, BHE, MW201,MW202 and PH5) will be decommissioned in accordance with industry standards in order to ensure that they do not present a conduit for any potential contaminants to enter the underlying aquifer.

8.5.1 Construction Phase

The following guidance will be followed during the construction phase of the project:

- C532 – Control of Water Pollution from Construction, Guidance for Consultants and Contractors (CIRIA, 2001).

General design measures are outlined in Chapter 3. Construction phase mitigation measures detailed in Chapter 6 – Biodiversity and Chapter 7 – Lands and Soils are also applicable to surface water / groundwater. Specifically, with regard to the protection of surface water / groundwater, the measures outlined in section below will be adhered to. These mitigation measures will form part of the Site-specific CEMP:

- Construction works within close proximity (<20m) of the River Breagagh / River Nore will be subject to inspections by a suitably qualified environmental consultant.
- The release of suspended solids to the River Breagagh / River Nore will be prevented during the riverbank works through the mitigation measures discussed in Chapter 7, section 7.5;
- Visual inspection and sampling of the River Breagagh and River Nore will occur during the construction works, refer to section 8.9 for further detail;
    - Limits on parameters to be monitored will be agreed prior to construction works commencing within the final CEMP to be agreed with the KCC planning section and in consultation with IFI;
- Existing fuel / oil interceptors will be maintained until they are ready to be replaced;
- The installation of new oil / silt interceptors will be conducted during dry weather;
- If dewatering is required as part of the proposed works e.g. in trenches for services in wet areas, water must be treated prior to discharge. The Contractor shall employ best practice settling systems to ensure maximum removal of suspended solids prior to discharge of any surface water or groundwater from excavations to receiving

waterbodies. This may include treatment via settlement tanks. There will be no direct pumping of water from the works to watercourses at any time; and,
- Existing drains which are not being used as part of the proposed development will be grouted at both ends and associated gullies will be blocked.

8.5.2 Operational Phase

Impacts to groundwater beneath the proposed development are considered to be negligible during the operational phase. All surface water runoff from hardstanding areas will be collected in a closed drainage system before passing through silt / oil separators and discharging to the Rivers Breagagh and Nore. The drainage system will be inspected regularly and maintained as required.

8.5.3 Flood Risk

Regardless of the low flood risk and the existing flood relief scheme which serves the Site, the proposed development would be considered to be a "*less vulnerable land use*" which "*should be located in areas of higher flood risk*" in accordance with the guidance (DEHLG, 2009). The proposed development would also be considered "*amenity open space*" and as such, would be considered to be a "*water-compatible development*" in accordance with the guidance (DEHLG, 2009). The DQRA completed for the proposed development considered that the removal of some concrete hardstanding will not have a significant impact on the Site in terms of potential flood risk. Refer to the DQRA in Appendix 7-1 for further details. Therefore, the risk of flooding to / from the Site does not warrant any further consideration beyond a screening assessment.

8.6 Interactions with other Environmental Attributes

Water has the potential to be impacted positively or negatively on several environmental issues including:

- Chapter 6 (Biodiversity): Reduced water quality and / or supply can negatively impact on biodiversity. Chapter 6 describes the impact of the proposed development on biodiversity in this regard; and,
- Chapter 7 (Land and Soils): Water flow can impact on soil erosion. Chapter 7 describes the impact of the proposed development on land and soils in this regard.

8.7 Residual Impacts

The proposed development will not result in any significant impacts on the hydrogeological regime of the area. There will be a slight positive long, term impact on storm water runoff from the Site in terms of both quality and flow.

8.8 Cumulative and In-combination Impacts

As stated in Chapter 1, Part VIII approval (P11/19) has been granted for the demolition of the Maturation Building, which is within the Site boundary at the time of writing. It is anticipated that these works will be completed prior to the construction phase of the proposed development. However, the potential for these demolition works to be completed in tandem with the proposed development cannot be ruled out.

In terms of water, the demolition of the Maturation Building is unlikely to result in impact on water quality given it is set back c. 70m from the River Nore and c. 180m from the River Breagagh. Therefore, the predicted 'neutral' impact previously outlined for the construction phase will remain unchanged.

As stated in Chapter 2, the Masterplan proposes to develop several other elements including residential / commercial units and leisure spaces including the Mayfair Building (City Library), Brewhouse Building (commercial / educational), Skate Park and Riverside Gardens(leisure).

These uses have been taken into account in the design of the services as part of the proposed development in line with best practice standards (refer to engineering services design report for further detail). These potential future developments have not yet been designed and therefore the water demand and wastewater loading cannot be quantified at this time.

- Although there will be no wastewater arising directly as a result of the proposed development; the capacity of the proposed new foul drainage sewer has been estimated as 2l/s (average discharge flow). The peak flow capacity has been estimated as 12l/s. The IPPC licence for the St Francis Abbey Brewery (P0448-01) stipulated that the peak flow per hour to the public sewer was permitted to be 225m3 (i.e. 62.5l/s). Therefore, any future loading from this new foul sewer will be significantly lower and therefore the cumulative impact will be negligible.

Although the proposed development on its own will not have any significant impact on hydrology / hydrogeology, the cumulative impact of future Masterplan structures has the potential to have a significant impact on surface water and groundwater. However, it is not foreseen that this will be the case in this scenario for the following reasons:

- The cumulative impact of any future Masterplan structures on the local environment and available infrastructure (e.g. WWTPs and water quality) will be considered by the planning authority when assessing any future related planning applications;
- The DQRA carried out for the proposed development concluded that the cumulative impact on water quality and hydrogeological regime as a result of the proposed development and the adjoining Riverside Gardens development is unlikely to be significant; and,
- Water Conservation is an objective of the Masterplan. It is recommended design specifications for future buildings within the Masterplan should encourage conservation of potable water and incorporate rainwater harvesting where possible.

8.9 Monitoring

For the duration of the construction works, visual inspection of the River Breagagh / River Nore will be undertaken at the following locations twice daily:

- Upgradient of the Site in the River Breagagh;
- Downgradient of the Site in the River Breagagh;
- Upgradient of the Site in the River Nore; and,
- Downgradient of the Site in the River Nore.

These visual inspections should include a photographic record and notes regarding water quality and works occurring at the time both on the Site and in the vicinity of the observation points.

Daily sampling of the River Breagagh / River Nore will be undertaken at the locations outlined above for the following parameters:

- pH;
- Suspended solids; and,
- Oils, Fats and Greases (known as FOG)

This sampling should take place, during the working day, from the time that removal of the concrete slab or drainage works commence, whichever is first. Until all groundworks and concrete works are finished and the new drainage system, including oil/water interceptor and silt traps, are fully commissioned.

Records of both the visual inspections and surface water analytical results should be submitted to the KCC planning section monthly.

8.10 Reinstatement

Reinstatement of concrete hardstanding was included as part of the design so far as was reasonably practicable.

8.11 Difficulties Encountered in Compiling this Information

No difficulties were encountered in compiling this chapter.

9 AIR AND CLIMATE

9.1 Introduction

This chapter of the EIAR provides a description and assessment of the likely impact of the proposed development on air quality in the locality and climate change.

Due to the nature of the proposed development which involves ground level works or low structures only, no significant impacts on microclimate, such as shading or wind tunnelling, are expected and therefore were scoped out of this assessment.

Within the Kilkenny City & Environs Development Plan 2014-2020 (KCC, 2014), in relation to air quality, the following is stated –

- *"Council's role in relation to air quality is mainly is to promote a reduction in air pollution, through the implementation of relevant legislation and through the provision of advice and guidance on best practice. The Council also implements the provisions of the Air Pollution Act 1987 and Air Pollution (Licensing of Industrial Plant) Regulations 1988."*

In relation to climate change, the following is stated –

- *"The Council will promote walking, cycling, public transport and other more sustainable forms of transport as an alternative to the private car, together with the development of necessary infrastructure."*
- *"Objective 1D: To prepare a Climate Change Adaptation Plan following the adoption of the Development Plan".*
- *"Objective 8D: To prepare and support the implementation of a Green Infrastructure Strategy for County Kilkenny, as resources allow."*

9.2 Methodology

The following key sources of information were referred to as part of the assessment on climate:

- Department of Communications, Climate Action and Environment – National Adaptation Framework; Planning for a Climate Resilient Ireland (DoCCAE, 2018);
- The Kilkenny City and Environs Development Plan 2014-2020 (KCC, 2014);
- National Adaptation Framework; Planning for a Climate Resilient Ireland (DoCCAE, 2018);
- Climate Action Plan 2019 (Department of Communications, Climate Action and Environment, 2019); and
- Kilkenny County Council Climate Change Adaptation Strategy 2019-2024 (KCC, 2019).

The following key sources of information were referred to as part of the assessment on air quality:

- Air Quality Standards Regulations 2011 (S.I No. 180/2011);
- World Health Organisation Air Quality Guidelines 2005 (WHO, 2005);
- Air Quality Monitoring at Seville Lodge, Kilkenny (EPA, 2020);
- Environmental Protection Agency - Air Quality in Ireland 2016 (EPA, 2017);
- Environmental Protection Agency - Air Quality in Ireland 2017 (EPA, 2018);
- Environmental Protection Agency - Air Quality in Ireland 2018 (EPA, 2019); and
- The Kilkenny City and Environs Development Plan 2014-2020 (KCC, 2014).

In addition, the key guidance document utilised during the risk assessment of dust that could potentially arise during the construction phase was:

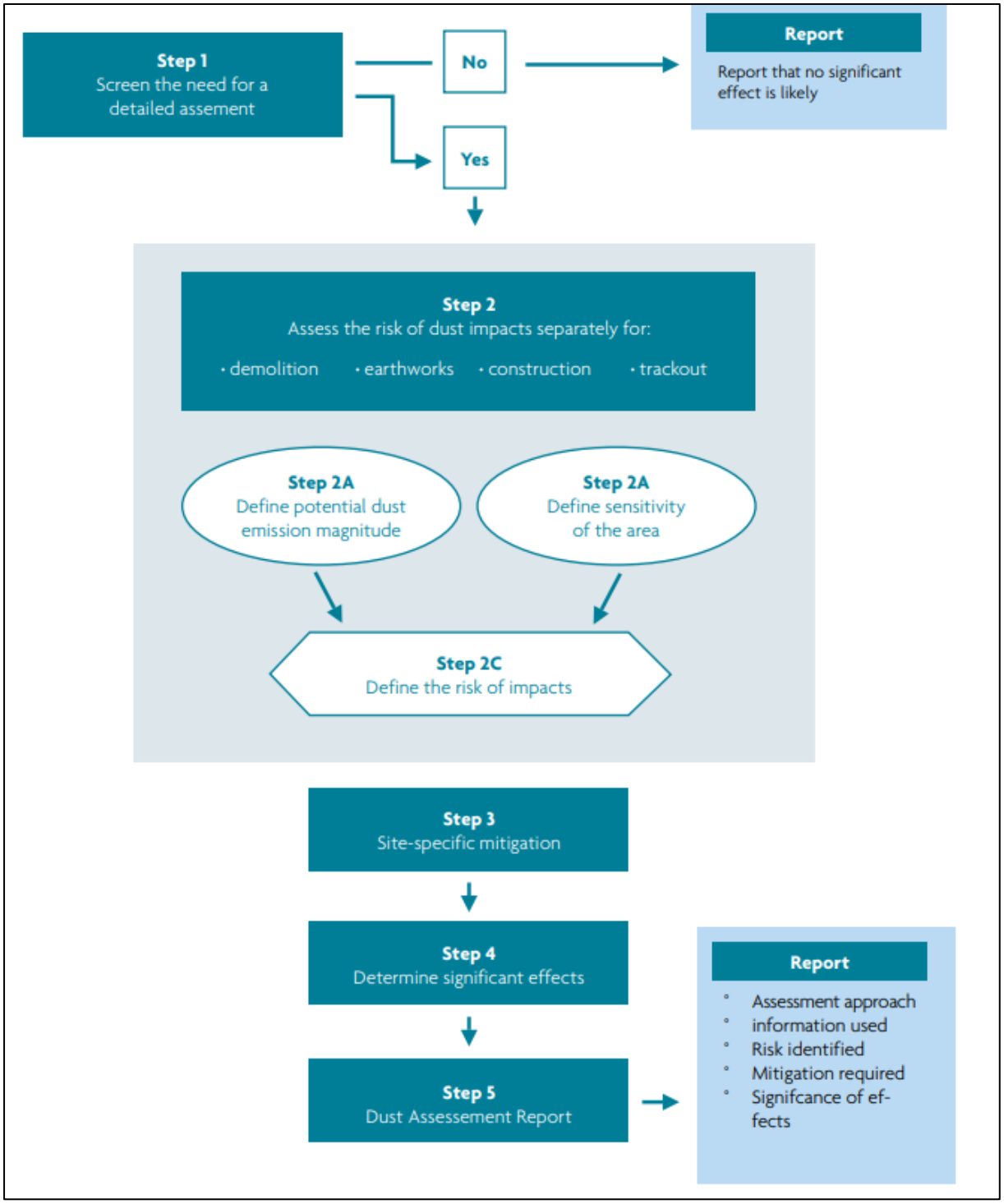
- Institute of Air Quality Management – Guidance on the Assessment of Dust from Demolition and Construction 2016 (IAQM, 2016).

As there will be no significant point sources at the proposed development, air dispersion modelling was not considered necessary for the proposed development. In addition, as the proposed development will predominantly be a pedestrian/cyclist dominated space, potential impacts on air quality from traffic were not assessed using methodology specified in the UK Highways Agency's Design Manual for Roads and Bridges (DMRB).

9.2.1 Construction Dust Risk Assessment

A risk assessment of dust emissions arising from construction activities was completed in accordance with the Institute of Air Quality Management – Guidance on the Assessment of Dust from Demolition and Construction 2016 (IAQM, 2016). The steps used to perform a dust risk assessment can be observed in Figure 9-1 below and detailed methodology is presented in Appendix 9-1.

Figure 9-1: Steps to Perform a Dust Assessment (IAQM, 2016)



As outlined in (IAQM, 2016), an assessment for the potential impact of dust associated with the construction phase is required when there is:

- A receptor within 350m of the boundary of the Site; and/or 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the Site entrance(s); and,

- An ecological receptor is within 50m of the boundary of the Site and/or 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the Site entrance(s).

9.2.2 Competent Person

The assessment of dust from demolition and construction activities associate with the construction phase was completed by a MOR air specialist, who is a Chartered Environmentalist and a full member of the Institute of Environmental Management and Assessment with over 12 years' experience in air quality assessments.

9.3 The Receiving Environment

9.3.1 Climate

Climate is described as the average weather prevailing in an area over a period of time. Ireland can be characterised as "*Cfb*" or "*temperate oceanic climate*" using the Koppen-Geiger climate classification. This classification indicates a temperate oceanic climate, with a relatively narrow annual temperature range and few extremes of temperature. Precipitation is generally more evenly distributed throughout the year.

Climate Change is recognised as one of the most serious global environmental problems. The Paris Agreement 2015 (United Nations, 2016), an international effort to limit the global increase in temperature to below 2°C above pre-industrial levels, recognises the necessity to mitigate against climate change.

The EU Climate Change and Energy Framework (European Commission, 2014) has set ambitious targets for 2030, which include:

- At least a 40% reduction in domestic greenhouse gas (GHG) emissions compared to 1990; and,
- A reduction in the Emissions Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30% by 2030, compared to 2005, respectively.

Ireland's emission reduction target is to reduce non-ETS emissions by 20% below the 2005 levels by 2020; however, the EPA projections indicate that emissions will be at 4 - 6% below the 2005 levels by 2020 (EPA, 2017). The Department of Communications, Climate Action and Environment has published its Climate Action Plan, 2019 which sets an objective of meeting a 30% reduction in non-ETS emissions relative to 2005 levels (Department of Communications, Climate Action and Environment, 2019).

Studies suggest that by the 2020's the average seasonal temperature in Ireland will increase by between 0.75°C - 1.0°C and by 2050 the temperature will rise to between 1.4°C - 1.8°C above the base period of 1961 - 1990 (Department of Communications, Climate Action and Environment, 2019). Winter and autumn periods are projected to become wetter with a 5% - 10% increase in rainfall by mid-century, with summers becoming drier with a 5% - 10% decrease in rainfall by mid-century (Department of Transport, Tourism and Sport and the Department of Housing, Planning and Local Government, 2019).

To counteract the effects of climate change, climate adaptation has been identified as a vital strategy. The Intergovernmental Panel on Climate Change (IPCC) defined climate adaptation as "*the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects*."

To address the forthcoming challenges associated with climate change, Ireland's first National Adaptation Framework (NAF) was published in January 2018 (DoCCAE, 2018). The NAF sets out the national strategy to reduce the vulnerability of the country to the potential negative

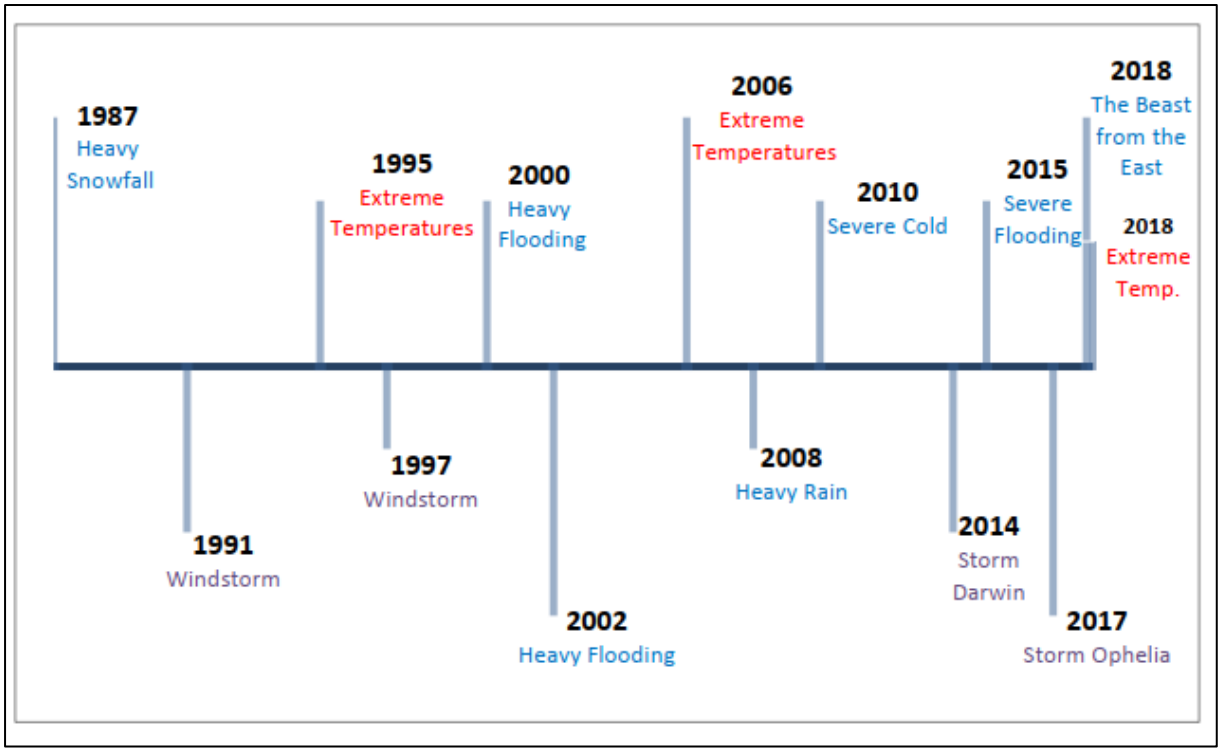
effects of climate change and to avail of positive impacts. Under the NAF, all local authorities were required to prepare and adopt a five-year Climate Adaptation Strategy.

KCC completed and adopted their Climate Adaptation Plan (CAP) on the 16th of September 2019 (KCC, 2019). Climate change has diverse and wide-ranging impacts on Ireland's economic and natural resources including (KCC, 2019):

- More intense storms and rainfall events giving rise to disruption to society;
- Increased river and coastal flooding;
- Water shortages in summer;
- Increased risk of new pests and diseases;
- Adverse impacts on water quality; and,
- Changes in the distribution and phenology of plant and animal species on land and in aquatic environments.

As part of the CAP (KCC, 2019), the occurrence of climactic events considered to be unique in intensity and/or abnormal weather patterns were recorded to define baseline climate change conditions in Kilkenny. This timeline is outlined in Figure 9-2 below.

Figure 9-2: Major Climatic Events in Kilkenny Timeline (KCC, 2019)



The following key objectives of the KCC adaptation strategy have been identified as being relevant to the proposed development:

Flood Risk Management – FAB Plus Strategy

- Flood risk mitigation;
- Amenity enhancement;
- Biodiversity opportunity; and
- Plus: reduction/sequestration, waste reuse, potential for regeneration and recreational enhancement.

Resource Management

- Promoting and maximising resource management initiatives; and
- Integrating climate action considerations into waste management policies.

Transport

- Identifying and supporting opportunities that may arise from pursuing modal shift through the functions of Kilkenny County Council.

9.3.2 Air Quality Standards and Objectives

Assessment of the significance of emissions to air is made with reference to limit values established in the latest EU legislation, the Clean Air for Europe (CAFE) Directive (2008/50/EC) (European Parliment, 2008) which was transposed into Irish law in 2011 (S.I. No. 180 of 2011).

The Air Quality Standards (AQS) set out in Air Quality Directive (2008/50/EC) and S.I. No. 180 of 2011 are shown in Table 9-1 below. The AQS are based on the effects of pollutants on human health, although other factors such as effects on vegetation and ecosystems are also considered.

As the Site is located within Kilkenny City, residential heating and traffic are the main sources of air pollutants. Therefore, primary contaminants of concern identified were Nitrogen Oxides (NO_X) and Particulate Matter (PM_{10} and $PM_{2.5}$). NO_X is primarily produced during combustion at high temperatures with contributions from traffic, residential heating and industry. PM_{10} are particles in air with diameters of 10µm (microns) or less. These particles can consist of direct emission from combustion engines and burning solid fuels, while natural sources can be windblown salt, plant spores, and pollens. $PM_{2.5}$ or fine particulate matter is composed of varying components depending on its source but can include nitrates, sulphates, volatile organic compounds (VOCs), metals and soil or dust particles.

The World Health Organization (WHO) Air Quality Guidelines offer guidance on threshold limits for key air pollutants that pose health risks and provide a reference for setting air pollution targets at regional and national levels to improve air quality (WHO, 2005). The guidelines recommend exposure levels to encourage a progressive improvement in air quality. The 2005 update represents the most current assessment of air pollution health effects, although it should be noted they are currently under revision.

Table 9-1: EU and Irish Air Quality Standards (AQS) Limit Values

Pollutant	Objective			
	Concentration	**Maximum No. of Exceedances permitted**	**Exceedance Expressed as Percentile**	**Measured as**
Oxides of Nitrogen	200 µg/m^3 as NO_2	18 times per year	99.79th percentile	1 hour mean
	40 µg/m^3 as NO_2	-	-	Annual mean
	30 µg/m^3 as NO_2	-	-	Annual mean (October – March) (Protection of ecosystems)
Particulates (PM_{10})	50 µg/m^3	35 times in a year	90.40th percentile	24 hour mean
	40 µg/m^{3S}	None	-	Annual mean
Particulates ($PM_{2.5}$)	25 µg/m^3 – Stage 1	None	-	Annual mean
	20 µg/m^3 - Stage 2	None	-	Annual mean

Table 9-2: WHO Air Quality Guideline Values

Pollutant	Concentration	Measured as
Nitrogen Dioxide	200 µg/m^3 as NO_2	1-hour mean
	40 µg/m^3 as NO_2	Annual mean
Particulates (PM_{10})	20 µg/m^3	Annual mean
	50 µg/m^{3S}	24-hour mean
Particulates ($PM_{2.5}$)	10 µg/m^3 – Stage 1	Annual mean
	25 µg/m^3 - Stage 2	24-hour mean

There is no legislative limit for dust deposition, so the guidelines presented by the German Government TA Luft guidance are frequently used in Ireland. TA Luft specifies a limit of 350mg/m^2/day as an annual average at sensitive receptors. The Irish EPA have adopted this standard for all licensable activities and the Department of Environment, Community and Local Government (DoECLG) have proposed its adoption by Local Authorities for planning applications with reference to quarries and aggregate extraction. The standard method of measurement of dust deposition is referred to as the 'Bergerhoff Method'.

9.3.2.1 Baseline Conditions

EU legislation on air quality requires that all Member States divide their territory into zones for the assessment and management of air quality. The current trends in air quality in Ireland are reported in the EPA publication Air Quality in Ireland – 2018 (EPA, 2019) which is the most up to date report on air quality in Ireland.

For ambient air quality management and monitoring in Ireland, four zones, A, B, C and D are defined in the AQS Regulations (S.I. No. 180 of 2011) and are defined as follows:

- Zone A: Dublin Conurbation;
- Zone B: Cork Conurbation;
- Zone C: 24 cities and large towns. Includes Galway, Limerick, Waterford, Clonmel, Kilkenny, Sligo, Drogheda, Wexford, Athlone, Ennis, Bray, Naas, Carlow, Tralee, Dundalk, Navan, Newbridge, Mullingar, Letterkenny, Celbridge and Balbriggan, Portlaoise, Greystones and Leixlip; and,
- Zone D: Rural Ireland, i.e. the remainder of the State excluding Zones A, B & C.

According to the above classification, the proposed development is in Zone C[6]. Table 9-3 below shows the baseline air quality data (annual summary data) measured by the EPA at various monitoring stations across Zone C from 2016-2018.

In addition to Annual Monitoring Reports, the EPA reports real-time results of localised monitoring (NOx, O_3 and PM_{10}), providing the public with indicative data on current ambient air quality throughout the country. This data is published on the EPA website[7]. Figures 9-3 and 9-4 outline the ambient nitrogen dioxide (NO_2) and ozone (O_3) and PM_{10} concentrations recorded between the 21st of May and 04th June 2020 recorded at the Seville Lodge, Kilkenny monitoring station located c. 2km south-west from the proposed development. It should be noted that O_3 has not been identified as a contaminant of concern for this development, however, the EPA presents this data alongside NO_2, therefore it is included in the graph below (Figure 9-3). It is not discussed any further.

Table 9-3: Annual Mean Concentrations of Pollutants

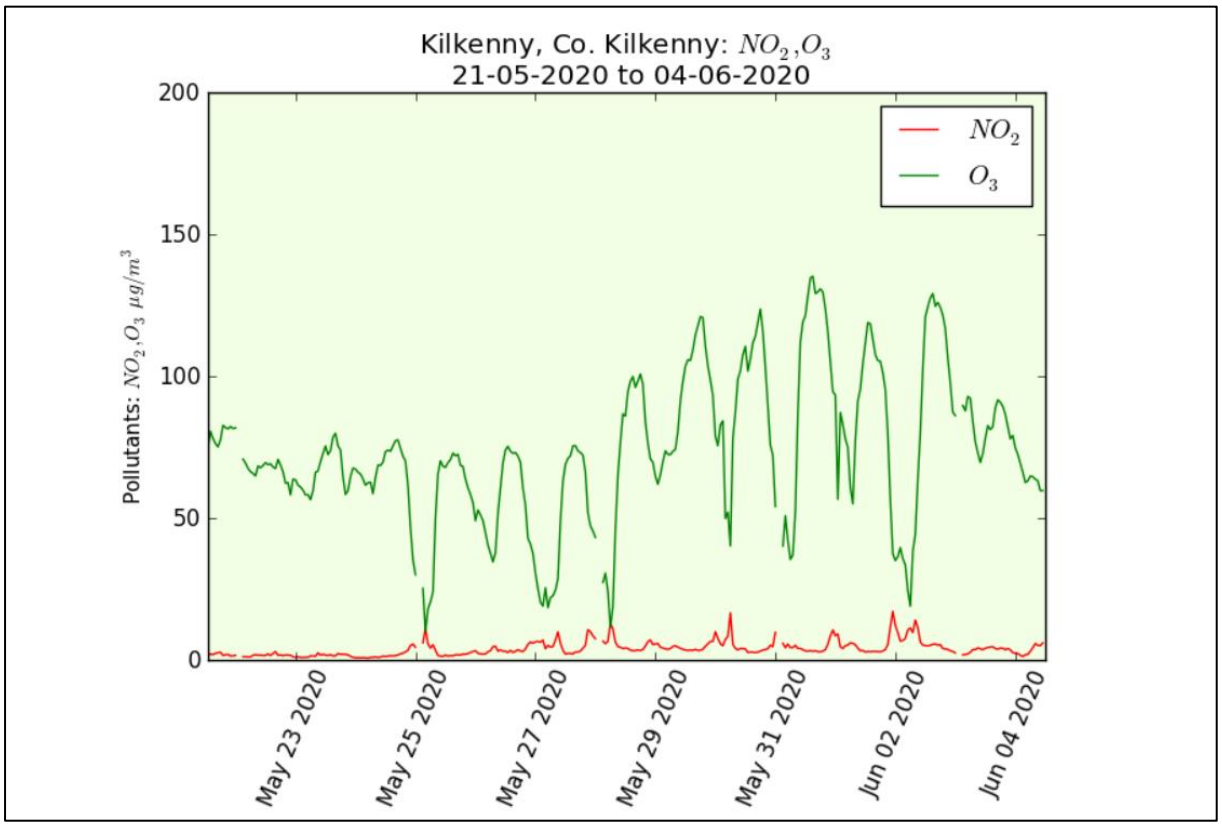
Year	Nitrous oxides (NO_x) Annual Mean for Seville Lodge (µg/m³)	Total Particulates PM_{10} Annual Mean Zone C (µg/m³)	Total Particulates ($PM_{2.5}$) Annual Mean Zone C (µg/m³)
2016	9.7	14.7 [a]	10 [a]
2017	7.9	12.65 [a]	7.9 [a]
2018	7	14 [a]	8.25 [a]
Average 2016 - 2018	8.2	13.7	8.72
% of AQS[2]	20%[b] / 27% [c]	34%	43.6%
% of WHO	20%	68.5%	87.2%

[a] denotes average values derived from stations across Zone C provided by the EPA for Annual Reports.
[b] denotes human health limit value comparison.
[c] denotes ecological health limit value comparison.

The results from annual monitoring reports (2016-2018) indicate that the annual mean concentrations of NO_X and PM were considerably lower than their respective AQS limit values, indicating good air quality. In addition, the concentrations of all contaminants of concern were below the WHO limit values.

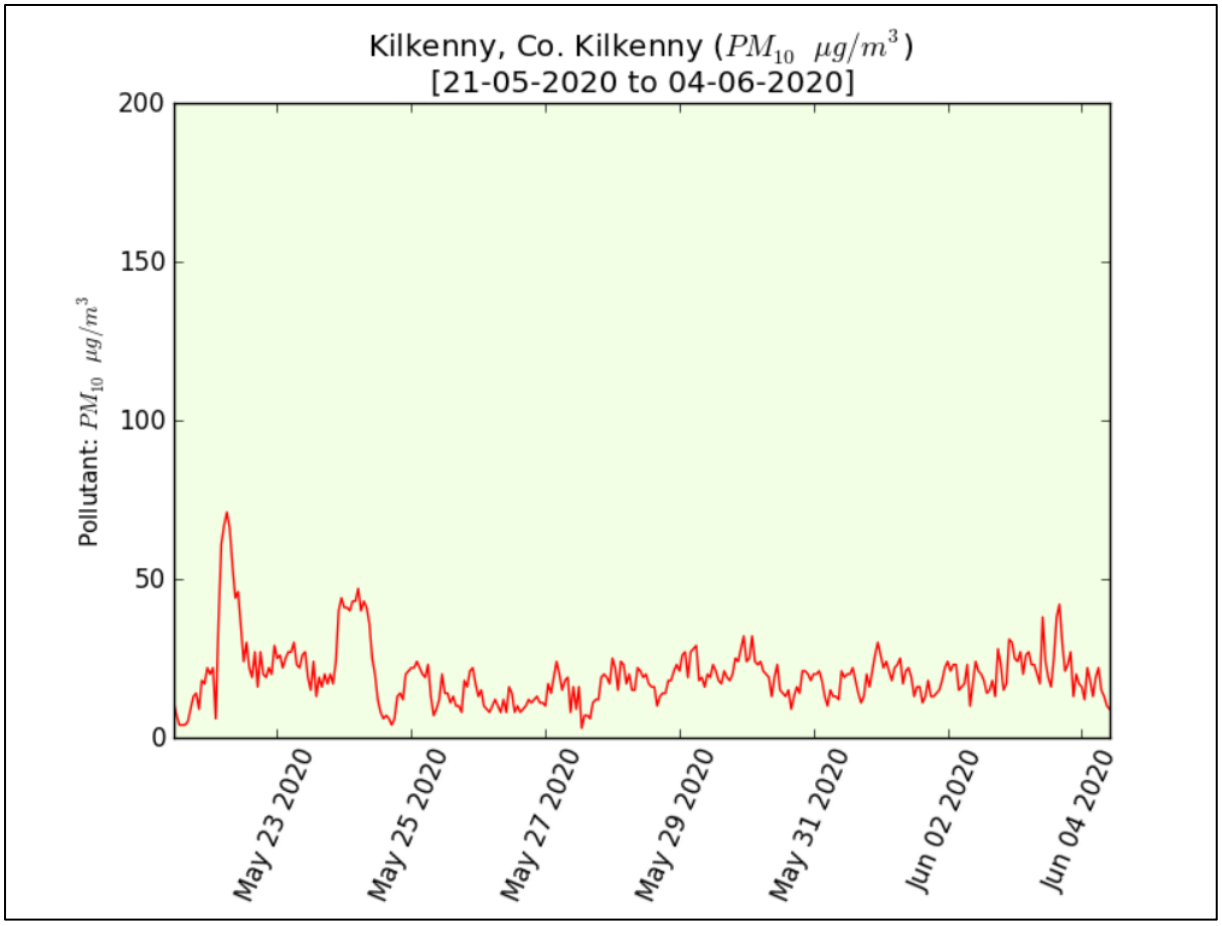
[6] The EPA have an air quality monitoring station in Seville Lodge, Co. Kilkenny which is c. 2km south west of the Site. However annual summary statistics provided by the EPA from 2016-2018 only included NOx data from this station. Therefore, PM data included in table 9-2 below is from monitoring stations across Zone C provided by the EPA.
[7] Localised Air Quality Monitoring - https://www.epa.ie/air/quality/localairqualitydata/ - (URL accessed 04-06-2020)

Figure 9-3: Indicative NO_2 and O_3 concentrations, Seville Lodge, Co. Kilkenny (Source: EPA 2020)



All values for NO_2 are below relevant hourly AQS and WHO limit value of 200 µg/m³ respectively, and broadly in line with Zone C average annual NOx value outlined in Table 9-3 above.

Figure 9-4: Indicative PM_{10} concentrations, Seville Lodge, Co. Kilkenny (Source: EPA, 2020)



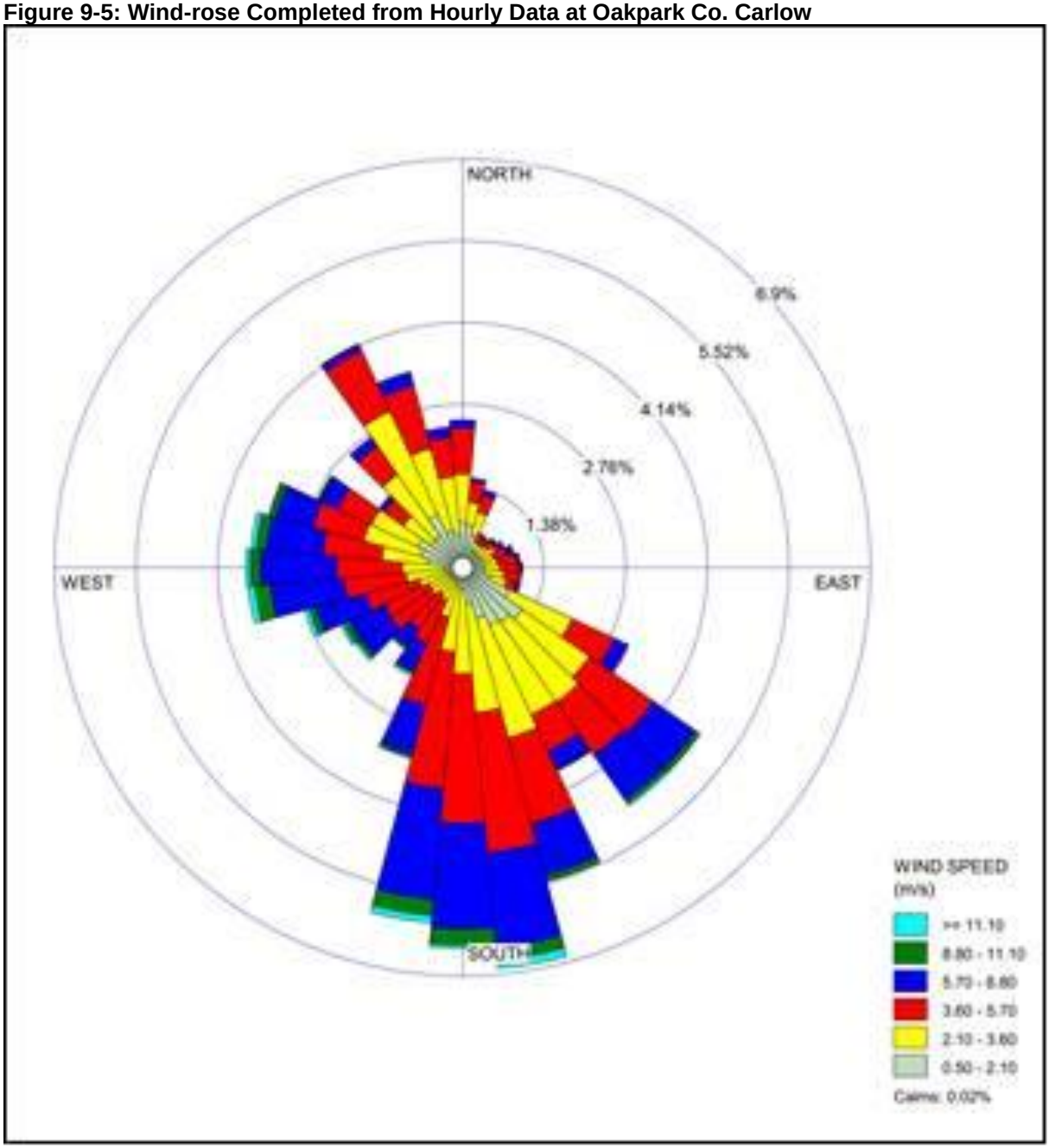
As shown in Figure 9-4, there have been exceedances of the relevant daily limit AQS and WHO limit value (50 µg/m³), with a peak in concentration observed on the 22nd of May 2020, for the monitoring period. However, the EPA confirm that the data is not validated, and sharp changes are often due to maintenance and other instrument effects and should be treated cautiously. Furthermore, the daily limit for PM_{10} of 50 µg/m^3 is only deemed breached if more than 35 exceedances are recorded in a calendar year.

9.3.3 Receptors

Receptor refers to any location where a person or property may experience the adverse effects of airborne dust or dust soiling. Ecological receptors refer to any sensitive habitat affected by dust soiling (IAQM, 2016).

A wind-rose was completed to determine the potential influence of wind direction on airborne dust particles. The closest met Eireann weather station which records hourly data is at Oakpark, Co. Carlow located c. 32km north east of the Site. A wind rose utilising five years of data (from Oakpark, Co. Carlow) indicated that the prevailing wind blows from a south/south-easterly direction (Figure 9-5 below).

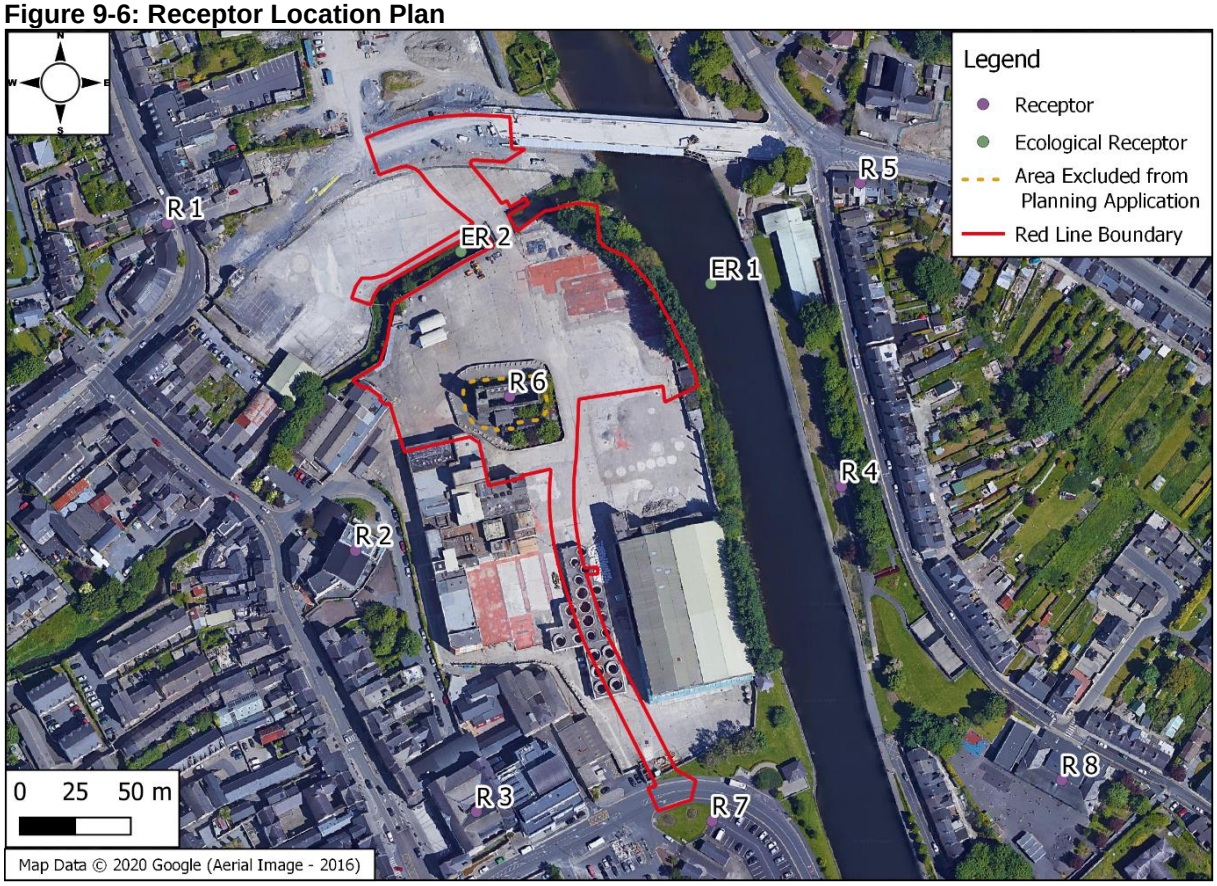
Figure 9-5: Wind-rose Completed from Hourly Data at Oakpark Co. Carlow



The average windspeed is 3.8 m/s. Due to the prevailing wind direction, receptors to the north and north-west were deemed to be the most sensitive to potential dust emissions.

Figure 9-6 below identifies the location receptors in proximity to the Site. Table 9-4 describes the receptors and outlines their distance to the Site boundary.

Figure 9-6: Receptor Location Plan



Due to the nature of the urban environment, to ensure this assessment is clearly presented, only proxy locations on each boundary are given. Proxies are presented as they are the most notable and/or closest receptors to the proposed development. Receptors that are located further away than the proxy from the proposed development will experience either a similar or a reduced impact due to distance attenuation of dust emissions.

When numerating the receptors at each proxy, exact counting is not required (IAQM, 2016). As an alternative, it is recommended that professional judgement is utilised by the competent person and determine the approximate number of receptors (i.e. residential dwelling: 1 receptor, school: >100 receptors).

Table 9-4: Identification of Receptors

ID	Description of receptors	Number of Receptors	Distance to Site Boundary (m)- Orientation
R 1	Youth Hostel, apartments, commercial units. Vicar Street	10-100	90 - NW
R 2	Watergate Theatre, apartments, commercial units. Parliament Street	10-100	50 – W
R 3	Kilkenny District Court. Apartments, commercial units. Parliament Street and Bateman Quay.	10-100	80 – SW
R 4	Pedestrian and cycle path east of River Nore, Marble City boxing club, peace park residential homes along Michael Street (R 887).	10-100	120 - E
R 5	Recreational building and residential homes. R 887 and St Canice's Place (R 887).	10-100	110 - W
R 6	St. Francis Abbey, Evans Turret, Kilkenny City Wall, Mayfair Building and Brewhouse Building.	1-10	0
R 7	Market Yard Car Park	>1	15 - S
R 8	St John's Junior School (>200 pupils and staff), residential housing (st john's quay), Butler Gallery, Kilkenny City Library	>100	120 - SE
ER 1	River Barrow and River Nore SAC - 002162	N/A	3 - E
	River Nore SPA - 004233	N/A	8 - E
ER 2	River Breagagh	N/A	0

9.4 Characteristics and Predicted Impact of Proposed Development

The potential impacts from the proposed development were assessed under the following stages:

- Construction Phase; and,
- Operational Phase.

9.4.1 Construction Phase

The construction works will require groundworks for the installation of road infrastructure, such as drainage and utilities pipework. Furthermore, Site works will require removal, regrading, and re-establishment of the concrete surface, to develop the desired elevation changes on the finished design. Crushing and screening of concrete slab will be utilised to ensure re-use of existing resources where appropriate. Such construction related activities have the potential to impact receptors through:

- Dust deposition, resulting in soiling of surfaces and impacting ecological receptors from exposed soils due to surface run-off.
- Elevated PM_{10} concentrations in ambient air because of dust generating activities on Site potentially impacting local human health.
- NOx and PM emissions due to vehicle movements to, from and within the Site.

The characteristics of the proposed development during the construction phase which have the potential to impact on climate include:

- Use of fossil fuels by on-site plant; and
- Carbon embedded in the materials used for construction of the proposed development.

The on-site plant, which will be powered by diesel engines or potential generators (if required) and proposed works, will emit nitrogen oxides and particulate matter. However, due to the low numbers of on-site plant for a limited amount of time during the construction phase and development strategy (i.e. retaining original features where possible), coupled with the low background concentrations of pollutants outlined in Table 9-2 potential impact of on-site plant on air quality is not quantitatively assessed further.

However, given the proximity of a number of receptors and the potential dust generating activities associated with the construction of the proposed development, a dust risk assessment was completed and is outlined in Section 9.4.1.1 below.

9.4.1.1 Construction Dust Risk Assessment

Step 2A: Define Potential Dust Emission Magnitude

Construction activities can be divided into four types (demolition, earthworks, construction and track-out) to reflect their potential impacts. These activities are rated by their potential dust emission magnitude (small, medium and large) (IAQM, 2016).

Table 9-5 below presents the construction activities proposed as part of this development and their respective dust emission magnitude in accordance with methodology presented in Appendix 9-1.

Table 9-5: Potential Dust Emission Magnitude Classification

Activity	Proposed Development – Construction Activities	Dust Emission Magnitude Category
Demolition	Proposed development demolition activities will primarily include: • Cutting and lifting concrete slab. • Crushing and screening of concrete slab may also occur at the Site.	**Large**
Earthworks	Proposed development earthwork activities will primarily include: • Landscaping area <3,000m^2 • Unlikely to be >10 earth moving vehicles active at any one time; • Total material to be moved <100,000 tonnes; • Earth bunds will be <8m in height	**Medium**
Construction	Proposed development construction activities will primarily include: • Majority of works to be completed at ground level; • Installation of granite paving, concrete surfacing with aggregate, • Development of paths, cycleways, play-grounds, and roads.	**Medium**
Track-out	Proposed development track-out activities will primarily include • Estimated that between 10-50 HDV outward movements in any one day; and • Estimated that unpaved road length will not exceed 100m at any one time.	**Medium**

Notes: [1] denotes a vehicle movement is a one way journey i.e. A to B and excludes the return journey.

Step 2B: Define Sensitivity of the Area

The sensitivity (high, medium and low sensitivity) of receptors was assessed based on the following effects:

- Sensitivity of people to dust soiling effects;
- Sensitivity of people to the human health effects of PM_{10}; and
- Sensitivity of receptors to ecological effects.

When determining the sensitivity of people to dust soiling, IAQM give indicative examples of high, medium and low sensitive receptors which are presented in Table 2 in Appendix 9-1.

Table 5 in Appendix 9-1 outlines the criteria to assess the sensitivity of people to dust soiling effects. In terms of receptors, there have been eight (8No.) proxies identified (R1-R8). The sensitivity of these receptors is outlined in Table 9-6 below.

Table 9-6: Sensitivity of Receptors to Dust Soiling

ID	Number of Receptors	Distance to Site Boundary (m)	Receptor Sensitivity	Reason for Sensitivity Rating
R 1	10-100	90	Low	>50m from closest point of boundary
R 2	10-100	50	Low	≤50m from boundary and screened by Mayfair/Brewhouse Buildings
R 3	10-100	80	Low	>50m from closest point of boundary
R 4	10-100	120	Low	>50m from closest point of boundary
R 5	10-100	110	Low	>50m from closest point of boundary
R 6	6	0	Low	No amenity value for public/or proprietors likely during construction phase
R 7	>1	15	Low	Short term car parks are low sensitivity receptors
R 8	>100	120	Low	>50m from closest point of boundary

Notes: N/A denotes distance not applicable as receptor is adjacent Site boundary.

The receptor sensitivity of dust soiling for R1, R2, R3, R4, R5, & R8 were classified as low due to the distance of proxy location from the Site boundary being greater than 50m. R2, although is 50m from the Site boundary, it is protected by the Brewhouse building and therefore has been classified as low sensitivity. R6 is a proxy for historic structures which are considered low sensitivity due to the absence of proprietors/visitors (will not be tourist attractions until after proposed development is completed). R7 is a short-term car park and therefore is considered a low sensitivity receptor.

When determining the sensitivity of people to the health effects of PM_{10}, IAQM give indicative examples of high, medium and low sensitive receptors which are presented in Table 3 in Appendix 9-1.

Table 6 in Appendix 9-1 outlines the criteria to assess the sensitivity of people to the health effects of PM_{10}. In brief, the criteria is based on whether a receptor is likely to be exposed to elevated concentrations of PM_{10} over a 24 hour period and utilises background concentrations of PM_{10} as part of the assessment. As R6 is a proxy for historic buildings which will unlikely be occupied/used during the construction works, it was omitted from this assessment, as it was not considered a viable receptor. As outlined in Table 9-3 above, the annual mean background concentration of PM_{10} in Zone C from 2016-2018 is 13.7 $\mu g/m^3$. The sensitivity of the receptors has been defined taking cognizance of the criteria outlined by the IAQM. The results are outlined in Table 9-7 below.

Table 9-7: Sensitivity of Receptors to the Effects of PM_{10}

ID	Annual Mean PM_{10} Concentration	Number of Receptors	Distance to Site Boundary (m)	Receptor Sensitivity
R 1	13.7 µg/m^3	10-100	90	Low
R 2	13.7 µg/m^3	10-100	50	Low
R 3	13.7 µg/m^3	10-100	80	Low
R 4	13.7 µg/m^3	10-100	120	Low
R 5	13.7 µg/m^3	10-100	110	Low
R 7	13.7 µg/m^3	>1	15	Low
R 8	13.7 µg/m^3	>100	120	Low

The sensitivity of receptors to the effects of PM10 have been classified as low at all proxy locations. This is primarily due to the existing low-level background concentrations of PM_{10} across Zone C.

When determining the sensitivity of receptors to ecological effects, IAQM give indicative examples of high, medium and low sensitive receptors which are presented in Table 4 in Appendix 9-1. According to the IAQM, dust can have two types of effects on vegetation (chemical and physical). Direct physical effects are from smothering, which reduces the plants capacity to photosynthesise, complete respiration and transpiration. Direct chemical effects can include the altering of pH in soil and watercourses through the deposition of alkali rich particles. Indirect effects can include increased susceptibility to pathogens and air quality (IAQM, 2016).

Table 4 in Appendix 9-1 outlines the criteria to assess the sensitivity of receptors to ecological impacts. In terms of ecological receptors, there have been two (2No.) proxies identified (ER1 and ER2). The sensitivity of these receptors has been defined taking cognizance of the criteria outlined by the IAQM. The results are outlined in Table 9-8 below.

Table 9-8: Sensitivity of Receptors to Ecological

ID	Distance to Site Boundary (m)	Receptor Sensitivity	Reason for Sensitivity Rating
ER 1	3	Low	Primarily aquatic habitat with no known dust sensitive species present.
ER 2	8	Low	Primarily aquatic habitat with no known dust sensitive species present.

The receptor sensitivity of both ecological receptors is considered to be low. Although, ER1 is a proxy for the River Barrow and River Nore SAC-002162 and the River Nore SPA-004233, which are valuable aquatic sites, neither contain any known dust sensitive species or habitats (i.e. acid heathland). In addition, it is considered unlikely that pH adjustment would occur at either river due to the apparent buffer capacity of both rivers.

Step 2C: Define the Risk of Impacts

To identify the risk of impact from dust emissions with no mitigation measures applied, the dust emission magnitude determined in Step 2A (Table 9-5) was combined with the sensitivity of the receptors defined in Step 2B (Tables 9-6, 9-7 and 9-8) for each construction activity (Demolition, Earthworks, Construction and Track-out). Following this method the risk of impact on the following receptors was defined:

- Sensitivity of people to dust soiling effects;
- Sensitivity of people to the human health effects of PM_{10}; and
- Sensitivity of receptors to ecological effects.

As the potential risks to all receptors were consistent across all construction activity stages during the risk assessment, they are summarised in Table 9-9 below. The full risk impact assessment tables are presented in Appendix 9-1 (Tables 13 to 23).

Table 9-9: Risk of Impact from Dust Soiling, Human Health (PM_{10}) and Ecological Receptors

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Low risk	Low risk	Low risk
Human health - PM_{10}	Medium risk	Low risk	Low risk	Low risk
Ecological	Medium risk	Low risk	Low risk	Low risk

It should be noted that the risks associated with impacts are short-term in nature. The level of risk identified for each activity outlined in Table 9-12 determines the level of mitigation required (IAQM, 2016). The mitigation measures are outlined section 9.5.1 below.

9.4.2 Operational Phase

Following construction, the area will be utilised as a public space and a park, with occasional limited access for service vehicles and delivery vehicles. Therefore, emissions to air from traffic within the proposed development will be negligible once operational, and these will not be assessed any further.

Due to the type of the proposed development, i.e. a public social space with a park, it will have likely positive impact on air quality and climate due to the following characteristics:

- The social areas, including fitness area and playgrounds, will promote sustainable travel alternatives to personal vehicles such as cycling, walking and use of public transport, reducing emissions generated by traffic in Kilkenny City; and
- Planting of trees and shrubbery in an urban environment will reduce dust levels and absorb carbon.

9.5 Proposed Mitigation Measures and / or Factors

9.5.1 Construction Phase

Mitigation measures are divided into general measures applicable to the whole Site and measures applicable specifically to the defined construction activities (i.e. demolition, earthworks, construction and track-out). As the risk of dust impact on receptors from soiling has been identified to range from medium to high during the demolition stage specifically, the highest risk category should be applied when considering general mitigation measures (IAQM, 2016).

A Dust Management Plan (DMP) will be prepared by the appointed contractor for the Site and submitted to the KCC for written agreement prior to commencement of construction. This Plan will at a minimum include the following mitigation measures listed below (Table 9-10 and 9-11) to minimise and manage potential dust emissions.

Table 9-10: Proposed General Mitigation Measures

General Mitigation Measures for the Entire Site
Site Management • Record all dust and air quality complaints, identify cause(s), take appropriate action; • Keep complaints log on-site and available for review at all times; • Record any exceptional circumstances which may give rise to dust/emissions either on-site/off-site and take action to resolve if required;
Monitoring • Undertake daily on-site and off-site visual inspections of receptors for evidence of dust, with results logged and maintained on-site. This will include regular dust soiling checks of surfaces with particular attention street furniture, windowsills and cars within 100m of the Site should also be checked. If necessary, cleaning should be provided to ensure dust soiling is removed; • Complete regular inspections of Site works to ensure compliance with the DMP. The frequency of these inspections should be increased to coincide with activities where the risk of impact (demolition and earthworks) is high or during dry and/or windy conditions; • To provide a body of evidence to support the likely contribution of the Site works in the event of complaints, it is recommended that passive monitoring at three Site boundary locations should be completed for the duration of the construction works (Bergerhoff method).
Site Preparation and Maintenance • Plan Site layout so that machinery and dust causing activities are located away from receptors, as far as practicable; • Erect solid screens (hoarding) around St Francis Abbey and Site Boundaries (Maturation building if still present). The hoarding should be at least as high as any potential stockpiles on-site; • Fully enclose activities with barriers as far as practicable, including cutting concrete slab, crushing and screening, • Prevent Site run-off of water or mud*; • Keep surfaces such as Site fencing and barriers clean using wet methods; • Remove materials from Site that have potential to produce dust as soon as practicable. Materials should be covered using tarpaulin or an equivalent which is weighted down until it can be removed appropriately; and • Cover or enclose stockpiles to prevent wind whipping.

Operating vehicle/machinery and sustainable travel • Switch off vehicle engines when stationary – no idling; • Avoid the use of diesel or petrol powered generators where possible, using mains electricity or battery powered items where practicable; • Impose and signpost a speed limit of 20 km/hr on sealed surfaces and 15 km/hr on unsealed surfaces.
Operations • Ensure an adequate water supply on the Site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate*; • Use enclosed skips/chutes; • Minimise drop heights from loading shovels and other loading/handling equipment. Using fine water spray on such equipment as deemed necessary; and • Ensure equipment is readily available on-site to clean any dry spillages which may occur using wet methods if necessary.
Waste Management • No burning of waste is authorized on-site.

Notes: * denotes specific mitigation measures to address potential run-off entering the adjacent watercourses are outlined in Chapter 8 Water.

Table 9-11: Proposed Mitigation Measures – Specific Construction Activities

Specific Mitigation Measures: Construction Activities
Demolition (Medium Risk): • Ensure effective water suppression is used during all demolition activities (i.e. cutting and lifting concrete slab, potential crushing/screening activities, loading/transporting waste concrete etc) for the proposed development. Hand-held sprays should be used instead of hoses attached to equipment. • High volume suppression systems, manually controlled, which can provide fine water droplets should be considered, if visual inspections suggest dust emissions are impacting receptors. • Implement passive monitoring using the Bergerhoff method at selected boundaries.
Earthworks (Low Risk): • Re-vegetate earthworks and exposed soils to stabilize surfaces as soon as practicable; • Use hessian, mulches or trackifiers where it is not possible to re-vegetate or cover; and • Only remove cover as required and minimise exposed surfaces where possible. • Implement passive monitoring using the Bergerhoff method at selected boundaries.
Construction (Low Risk): • Avoid roughening of concrete surfaces; • Ensure sand and other aggregates are stored in bunded/enclosed areas and prevented from drying out; • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and • For smaller supplies of fine powder materials ensure bags are sealed after use and stored in an appropriate place to prevent dust emissions. • Implement passive monitoring using the Bergerhoff method at selected boundaries.
Track-out (Low Risk):

- Use water assisted dust sweepers on the access and local roads, to remove, any material tracked out of Site as necessary;
- Avoid dry sweeping of large areas;
- Inspect on-site haul routes for integrity and repair where necessary. Record inspections and actions taken as necessary;
- Install hard surfaced haul routes and keep them damped down with a water bowser or other such mechanism capable of reaching all parts of the route;
- Implement a wheel washing system until earthworks are completed. Wheel wash system should have an adequate amount of hard surface between it and the Site exit;
- Ensure vehicles entering and leaving the Site are covered to prevent escape of materials during transport;
- Ensure internal roads are free of debris; and
- Access gates to be located at least 10m from receptors where possible.

Isolated asbestos fibres associated with historic Site operations were identified within fill materials beneath the concrete slab at specific locations within the Site. The appropriate control measures will be specified in the Dust Management Plan, in the event such fill materials have to be excavated as part of the proposed works. The implementation of the specified control measures will prevent any potential human health impacts on construction workers and residents.

9.5.2 Operational Phase

As the emissions to air of both pollutants and greenhouse gases during the operational phase will be minimal, there is no requirement for mitigation measures. Nonetheless, the development of such a brownfield Site reduces the need for further land-use change, which impacts climate. Other design mitigation measures include:

- Reuse/recycling of crushed concrete and concrete slabs from on-site where possible reducing emissions related to production of virgin materials;
- Natural materials will be sourced from Kilkenny where possible reducing traffic emissions;
- LED lighting, which is proven to use 75% less energy when compared to traditional incandescent bulbs will contribute to further reduce already minimal indirect emissions due to electricity use; and,
- Planting of trees contribute to carbon sequestration and improved air quality.

9.6 Interactions with other Environmental Attributes

The air quality and climate change have the potential to interact with the following environmental issues:

- Chapter 5 (Population and Human Health).
- Chapter 6 (Biodiversity);
- Chapter 7 (Soils and Land);
- Chapter 8 (Water); and,
- Chapter 14: Material Assets – Traffic and Transport.

9.7 Residual Impacts

Construction stage impacts will be short duration (c.14months), and upon completion, will have no further impact on the local environment.

Mitigation measures have been outlined to control dust during the construction stage, to minimise the potential for impact. Following implementation of these measures, a short term, localised minor impact is likely.

During construction, specifically the crushing/screening and subsequent re-use of existing concrete slabs ensure maximum use of resources while integrating waste management policies contributing to climate action considerations. Once operational it is considered that the proposed development will likely present a modal shift to the community of Kilkenny, therefore aligning with key objectives of the Kilkenny CAP (KCC, 2019). In addition, to this the urban park will enhance amenity and biodiversity in the locality. The EPA report 'Research 195: Health Benefits from Biodiversity and Green Infrastructure' (EPA, 2016) notes that while urban green spaces are often small, they provide services such as improving air quality, urban cooling and protection from urban noise. Having considered the characteristics of the proposed development, the predicted impact from the operational phase on air quality and climate will be positive, slight, long term impact.

9.8 Cumulative and In-combination Impacts

It should be noted that the demolition activities associated with this proposed development primarily include the cutting and lifting of concrete and potentially crushing/screening of concrete slab only. However, the demolition activities granted under the Part VIII approval (P11/19) for the Maturation Building will include demolishing and subsequent removal of a building. It is considered that if these demolition works were to occur at the same time, there is the potential for greater dust emissions. In addition, works might occur in closer proximity to receptors in the vicinity of the southern portion of the Site. If these works do occur concurrently, to reduce the associated risks, the Site manager of the construction phase for the proposed development will be required to liaise with their counterpart for the Maturation Building demolition works to ensure the following:

- Plans are coordinated in a way that potentially dusty works are not completed concurrently at both sites and that the weather is also considered when scheduling these works;
- Deliveries to the Site are coordinated to ensure optimum access/egress is maintained (avoid idling, traffic build up); and,
- Where vehicles are accessing/egressing both sites using the same roads, shared responsibility for their maintenance/cleaning should be agreed.

It is considered that if the demolition of the Maturation Building is conducted in combination would the proposed development with communication and appropriate phasing (as outlined above), the predicted residual impact will be unchanged from that previously outlined in Section 9.7 and therefore remain short-term, localised minor impact.

As stated in Chapter 2, the Abbey Quarter Masterplan proposes to develop several other elements including residential / commercial units and leisure spaces (known elements at the time of writing include Mayfair Building (City Library), Brewhouse Building, Skate Park and Riverside Gardens). Although the proposed development on its own will not have any significant impact on air quality and climate, the cumulative impact of future Masterplan structures has the potential to have a significant impact on these elements. However, it is not foreseen that this will be the case here as the cumulative impact of any future Masterplan structures on the local environment and available infrastructure (e.g. natural resources and waste infrastructure) will be considered by the planning authority when making such decisions. Moreover, similarly to the proposed development, sustainable development is one of the key objectives of the Masterplan. The sustainability strategy outlined in the Abbey Quarter Master Plan is in line with that of the National Sustainable Development Strategy of the Government of Ireland, the Southeast Regional Planning Guidelines 2010-2016, Kilkenny Climate Adaptation Plan and the Kilkenny City and Environs Development Plan 2020.

The following characteristics/strategies were identified in the Master Plan for the Abbey Creative Quarter:

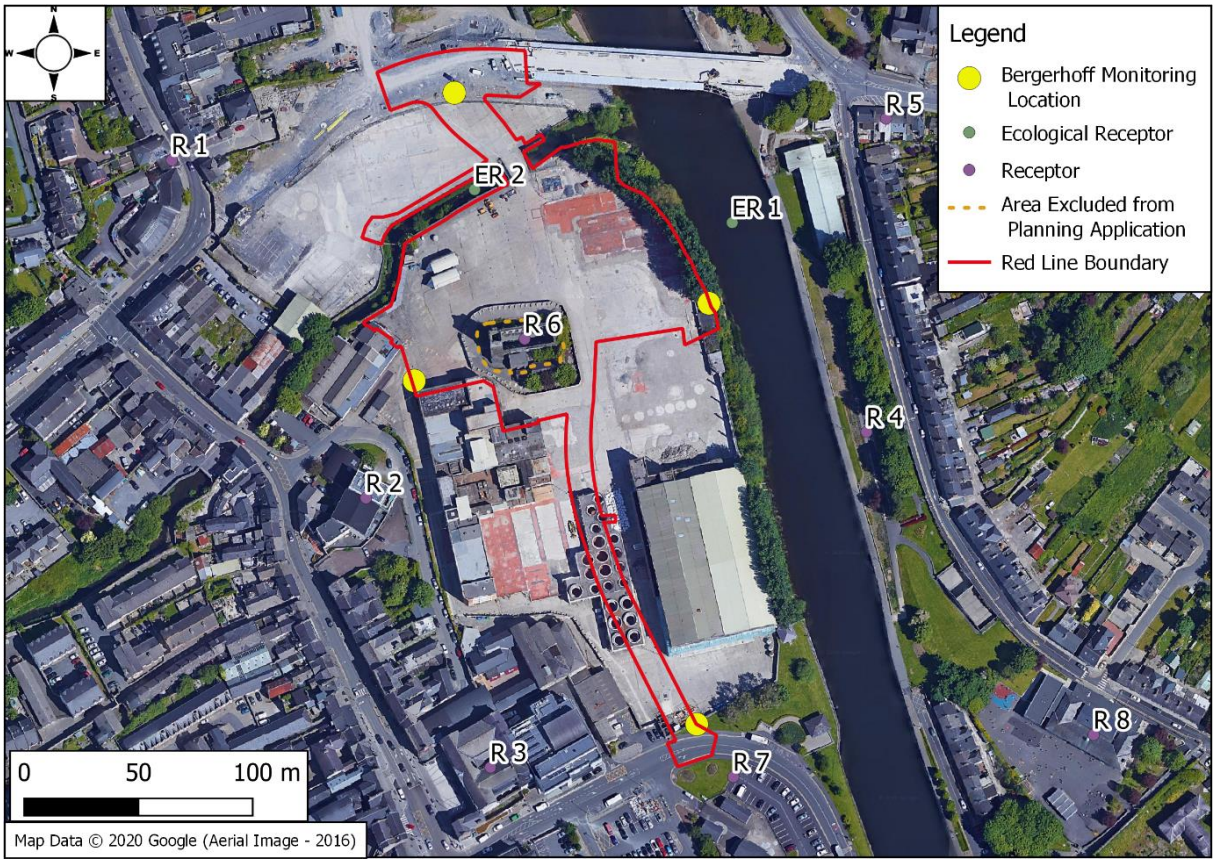
- Movement across the Abbey Quarter Master Plan area will be dominated by pedestrians and cyclists, with vehicle movement only allowed for low level access or circulatory purposes;
- Provision of linkages between the east and west banks of the River Nore for pedestrians and cyclists will promote sustainable transport measures within the City further, thereby reducing air pollutants associated with vehicles whilst also reducing the consumption of fossil fuels associated with the use of personal vehicles;
- New buildings will be developed to be energy efficient in accordance with nearly zero energy building standard (nZEB) etc.;
- New buildings with net zero energy requirements or net zero carbon emissions when averaged over the year;
- Refurbishment of existing buildings to bring them to the lowest possible energy consumption levels; and,
- Integrate renewable heat and electricity generation and export potential in Site development energy.

9.9 Monitoring

The guidance document titled '*Guidance on Monitoring in the Vicinity of Demolition and Constuction Sites*' dated October 2018 and authored by IAQM outlines considerations when devising a air quality monitoring plan (IAQM, 2018).

To provide a body of evidence to support the likely contribution of the Site works in the event of complaints, it is recommended that passive monitoring at four (4No.) Site boundary locations should be completed for the duration of the construction works (Bergerhoff method). The proposed sample locations are outlined in Figure 9-7 below. The prevailing wind direction was considered when devising the proposed sample locations.

Figure 9-7: Proposed Monitoring Locations



9.10 Reinstatement

Not applicable.

9.11 Difficulties Encountered in Compiling this Information

No difficulties were encountered in compiling this chapter.

10 ACOUSTICS AND VIBRATION

10.1 Introduction

This Chapter of the EIAR provides an assessment of the likely impact of the proposed development on noise and vibration that includes the following:

- Existing noise levels at the Site;
- Existing noise levels at nearby Noise Sensitive Locations (NSL's);
- The potential impacts of the proposed development on the existing and future ambient acoustic environment; and,
- Mitigation measures that may be employed to reduce or eliminate acoustic/vibration impacts are identified.

10.2 Methodology

The following documentation was used in the assessment of acoustics within this EIAR:

- Institute of Environmental Management and Assessment (IEMA) 'Guidelines for Environmental Noise Impact Assessment', 2014 (Institute of Environmental Management & Assessment, 2014);
- ISO 1996-1:2016 Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures (International Standards Organisation (ISO), 2003);
- ISO 1996-2:2017 Acoustics – Description, measurement and assessment of environmental noise- Part 2 Determination of environmental noise levels (International Standards Organisation (ISO), 2007);
- BS 5228-1+A1:2014 : Code of Practice for noise and vibration control on construction and open sites- Part 1: Noise (BSI, 2009) and Part 2 Vibration (BSI, 2009);
- BS 4142:2014+A1: 2019 'Methods for rating and assessing industrial and commercial sound 2014' (British Standard, 2019);
- ISO 4866:2010 Mechanical vibration and shock vibration of fixed structures guidelines for the measurement of vibrations and evaluation of their effects on structures (ISO, 2010);
- BS 7385-2(1993) : 1993 Evaluation and measurement for vibration in buildings - guide to damage levels from ground borne vibration (British Standards Institution, 1993);
- Design Manual for Urban Roads and Streets – 2019 (Department of Transport, Tourism and Sport and the Department of Housing, Planning and Local Government, 2019); and
- Draft Noise Action Plan 2019 – 2023, Kilkenny County Council (Kilkenny County Council, 2018).

10.2.1 Competent Person

The assessment was directed and reviewed by a Principal MOR Consultant who is a full member of the Institute of Acoustics (MIOA) and a member of the Association of Acoustic Consultants of Ireland (AACI) with over 14 years' experience in environmental and acoustic consultancy.

10.2.2 Sensitive Receptors

A key aspect of noise assessment is understanding the type and location of, NSLs, relevant to the proposed development. The EPA define NSLs (EPA, 2016d) as:

> *"Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels."*

A review of the surrounding landscape and building uses was conducted to identify NSLs. To ensure the assessment retains clarity, NSLs have been grouped where suitable, to represent several properties of a similar distance and orientation from the Site, these are described in Table 10-1 and shown in Figure 10-1.

Table 10-1: Identification of NSLs

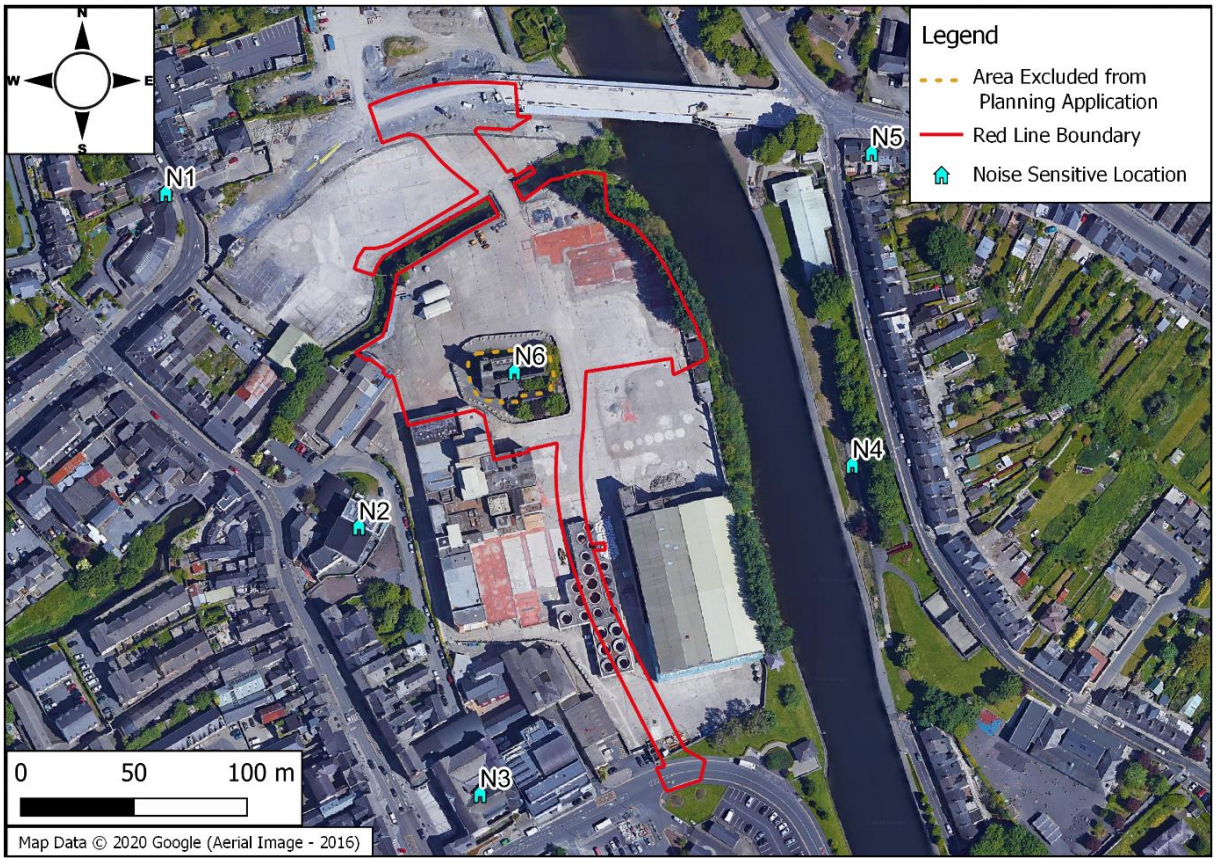
ID	Location Relevant to Site	Distance to Site Boundary (m)
NSL 01	Youth Hostel, apartments, commercial units. Vicar Street	90
NSL 02	Watergate Theatre, apartments, commercial units. Parliament Street	50
NSL 03	Kilkenny District Court. Apartments, commercial units. Parliament Street & Bateman Quay.	80
NSL 04	Pedestrian & cycle path east of River Nore, residential homes along Michael Street (R 887).	120
NSL 05	Recreational building & residential homes. R 887 & St Canice's Place (R 887).	110
NSL 06	St. Francis Abbey (operational phase only)	Adjacent boundary

In addition, as identified in Chapter 12 (Cultural Heritage), the following historic monuments adjoining the Site are deemed culturally significant and vibration sensitive, and therefore require additional assessment regarding vibration impact. For further details on these structures please refer to Chapter 12. These structures are outlined in Table 10-2 and presented in Figure 10-2 below.

Table 10-2: Identification of Historic Monuments (Vibration Sensitive)

ID	Historic Monument
V1	St Francis Abbey
V2	Breagagh Bridge Abutment
V3	Evans Turret
V4	Kilkenny City Walls

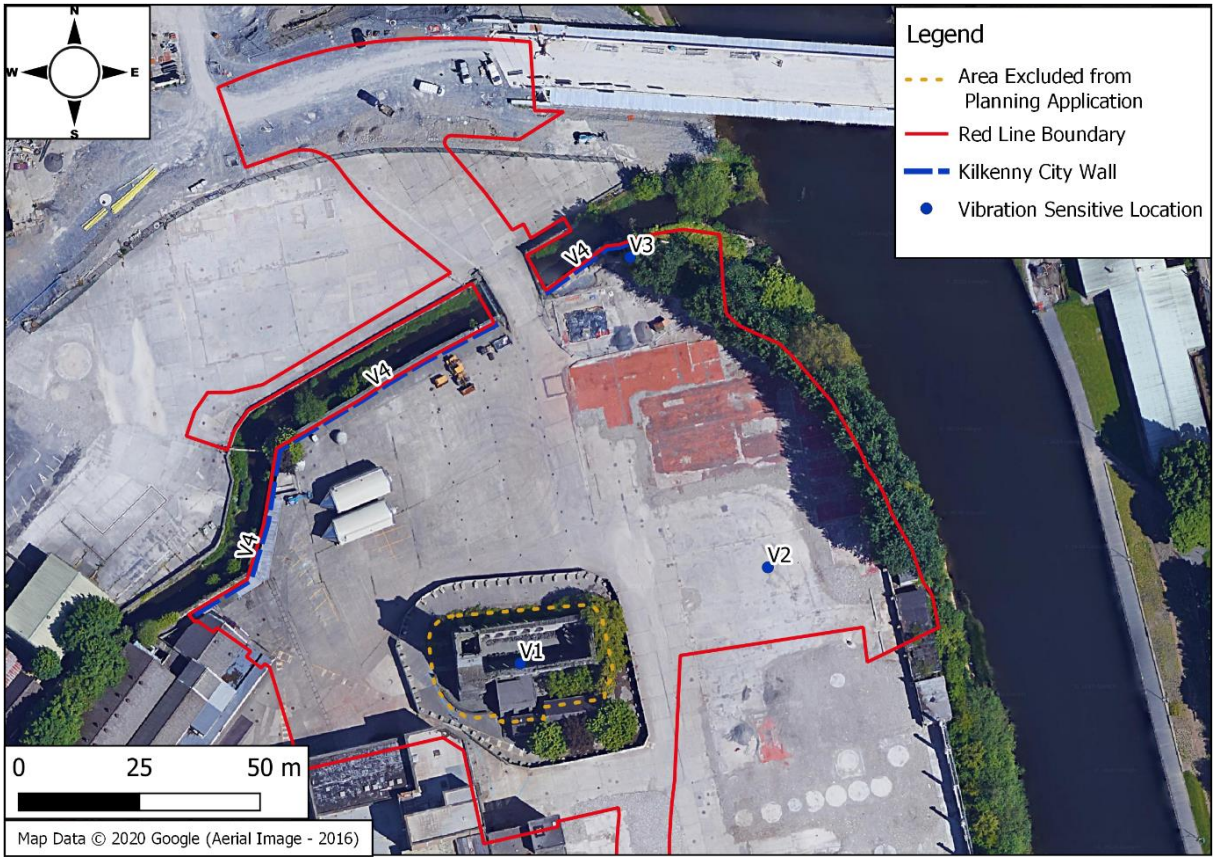
Figure 10-1: Identification of Acoustic Sensitive Locations



Due to the built-up nature of the urban environment, to ensure this assessment is clearly presented, only distance to proxy locations on each boundary are provided. This assessment does include for all properties in the locality, but proxies are presented as they are the closest to the proposed development or are deemed to have specific acoustical requirements. Where other properties are present, these will be located further away from the proposed development and thereby will experience either a similar or a reduced impact due to distance attenuation of the sound emission.

In addition to the existing NSLs in the locality, this development will see the creation of a new pedestrian/cycle area and green space – which will thereby be deemed an NSL within the future local environment. Furthermore, the associated Masterplan for this area of the City, shows a vision for the creation of new buildings for office/commercial and residential uses. At this stage these future uses are not adequately developed to form a meaningful acoustic assessment, though their eventual presence locally has been considered in any future operational stage impacts from the proposed development.

Figure 10-2: Identification of Vibration Sensitive Locations



10.2.3 Field Assessment

A baseline noise survey was completed on the 25th March 2020 by MOR.

The following acoustic standards and guidance documents were utilised for this survey:

- ISO 1996-1:2016 Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures (ISO, 2016);
- ISO 1996-2:2017 Acoustics – Description, measurement and assessment of environmental noise – Part 2: Determination of sound pressure levels (ISO, 2017); and,
- ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO, 1996).

To ensure representative sampling was obtained, each daytime monitoring location was sampled three (3No.) times. The first measurement was spread over a 60-minute period in all cases, to account for general activities within the urban environment. The second and third measurement were taken for a duration of 30 minutes each, to enable a correlation during the various measurement periods to the initial monitoring event. The proposed development will not typically present any notable noise during the night, therefore night-time monitoring was not considered necessary.

At each monitoring event, the instrument was set-up to ensure suitable distance from reflective surfaces as per the ISO standards above. Plates outlining the monitoring locations are presented in Appendix 10.1.

10.2.3.1 Frequency Analysis

Real time 1/3 octave band frequency analysis was carried out at all monitoring locations during daytime monitoring periods. This data was utilised to assess objective tonality arising at each monitoring location.

Tones were objectively assessed in accordance with ISO 1996-2 (ISO, 2017), and BS4142 (British Standard, 2019) Annex C, which requires that for a tone to be identified as present, the time-average sound pressure level in the one-third octave band of interest must exceed the time-average sound pressure levels of both adjacent one-third-octave bands by some constant level difference.

The standard gives the level differences as follows:

- 15dB in the low-frequency one-third-octave bands (25Hz to 125 Hz);
- 8dB in the middle-frequency bands (160Hz to 400Hz); and,
- 5dB in high-frequency bands (500Hz to 10,000Hz).

In addition to the objective method outlined above, the on-site acoustician noted subjective tonality or defining characteristic arising in the locality during the survey.

10.2.3.2 Equipment

Noise measurements were carried out using the following sound level meters (SLM):

- NTi XL2 Audio Acoustic Hand-held Analyser SLM, a Type 1 SLM equipped with Frequency Analysis Software.

The monitoring equipment was field calibrated prior to and post the measurement period using a sound level calibrator:

- BRUEL & KJAER sound level calibrator type 4231.

Broadband noise levels were measured using the A-weighted network, and a fast sampling interval, unless otherwise stated. All values are relative to 20µPascals.

Laboratory calibration certificates for the SLM and the BK 4231 field calibrator are within Appendix 10.2.

The prevailing weather conditions at the time of measurement were noted and recorded in the monitoring report. A portable weather meter (Kestrel 2250) was used to record temperature and wind speed before, during and after the noise monitoring periods.

10.2.3.3 Weather Conditions

Weather conditions were suitable for all conducted monitoring events. Weather conditions during the day of the survey were Calm to Light Breeze[8] (wind speed 0 – 3.3 m/s) with mild to warm air temperatures (15°C). Ground conditions were dry.

On-site weather observations are supplemented by the closest Met Éireann weather station (Carlow Oakpark c.32km northeast) report, summarised in Table 10-3.

Table 10-3: Summary of Weather Conditions at Carlow Oakpark Synoptic Station

Date	Rainfall (mm)	Temp Max (°C)	Temp Min (°C)	Grass Min Temp (°C)	Mean Wind Speed (knots)	Maximum gusts (knots)
25/03/2020	0.0	15.0	4.2	-1.9	7.3	18

[8] Beaufort scale, refer to https://www.spc.noaa.gov/faq/tornado/beaufort.html

Hourly data generated by Met Éireann from Oakpark are shown in Appendix 10.3, these graphs show the hour by hour changes in the weather conditions at the Oakpark synoptic station during the day of survey.

10.2.4 Criteria Impact

10.2.4.1 Noise Criteria

The limits outlined in this chapter are taken from guidelines relevant to the proposed development and will be utilised to ensure on-site activities can be monitored and noise control implemented, if necessary.

The limits are in line with international criteria for the protection of human health from noise and human nuisance response to noise. These limits will therefore be applied as the criteria for assessing noise impact from the proposed development.

The World Health Organisation (WHO) Environmental Noise Guidelines 2018 supplies recommendations relating to road traffic noise. For average noise exposure, the Guideline Development Group (GDG) recommends reducing noise levels produced by road traffic below 53 dBA L_{den}, as road traffic noise above this level is associated with adverse health effects.

For night noise exposure, the GDG recommends reducing noise levels produced by road traffic during night-time below 45 dBA L_{night}, as road traffic noise above this level is associated with adverse effects on sleep and therefore health.

The GDG recommends that policymakers implement suitable measures to reduce noise exposure above the guideline values from road traffic in the population. For specific interventions, the GDG recommends reducing noise both at the source and on the route between the source and the affected population by changes in infrastructure.

10.2.4.2 Vibration Criteria

Vibration will only occur during the construction works and will be confined to the activities required to develop on-site trenches for underground services and concrete slab removal. The main criterion for vibration is the potential for impact to cosmetically or structurally damage property, e.g. cracks in plaster. Although vibration may be detected by people at values significantly lower than, those in Table 10-4: Transient Vibration Guide Values for Cosmetic Damage, the impacts are deemed only temporary (felt during specific construction work), and thereby transient in overall nature.

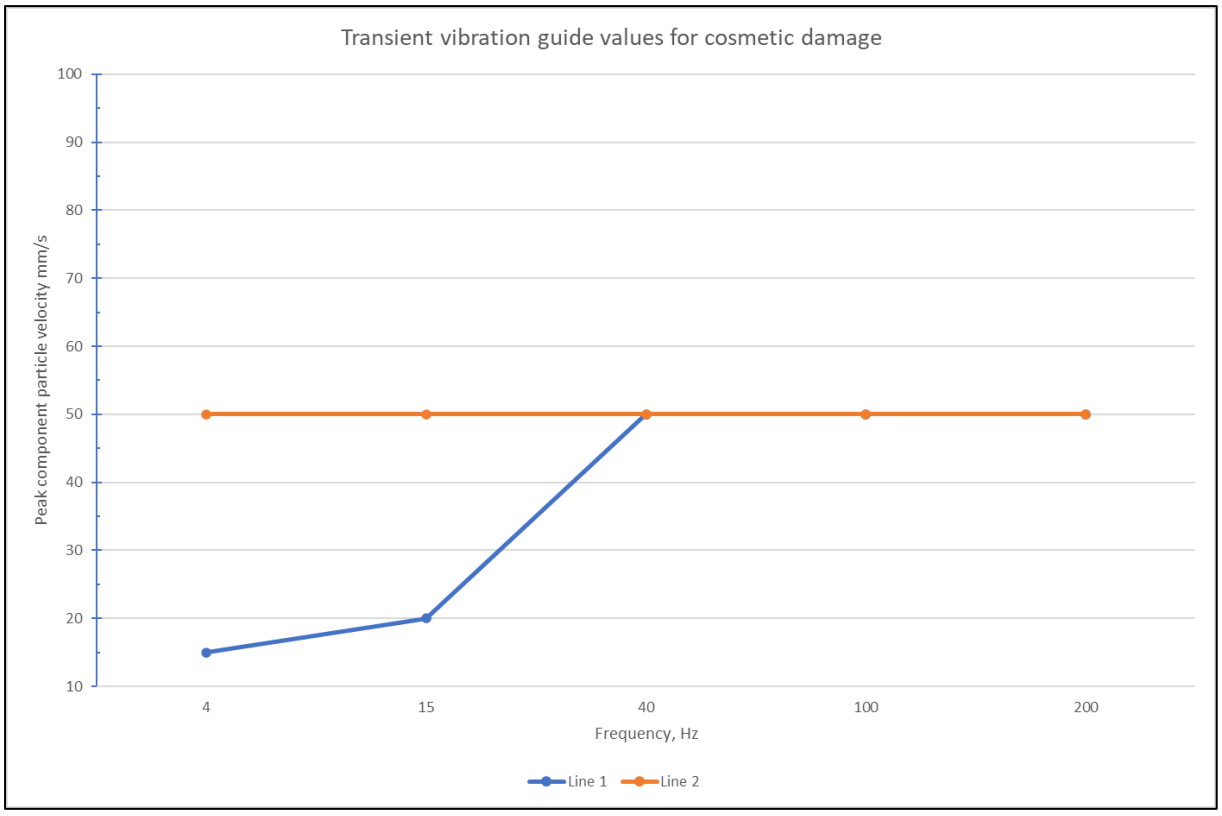
This assessment utilises the following criteria outlined in Table 10-4 and Figure 10-3 as derived from BS7385-2 (British Standards Institution, 1993).

Table 10-4: Transient Vibration Guide Values for Cosmetic Damage

Line (see Figure 10-2)	**Type of building**	**Peak component particle velocity in frequency range of predominant pulse**	
		4 Hz to 15 Hz	**15 Hz and above**
1	Reinforced or framed Structures Industrial and heavy Commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz Increasing to 50 mm/s at 40 Hz and above
NOTE 1 Values referred to are at the base of the building.			

Line **(see Figure 10-2)**	**Type of building**	**Peak component particle velocity in frequency range of predominant pulse**	
		4 Hz to 15 Hz	**15 Hz and above**
NOTE 2 For line 2, at frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) should not be exceeded.			

Figure 10-3: Transient Vibration Guide Values for Cosmetic Damage



Minor damage is possible at vibration magnitudes which are greater than twice those given in Table 10-3 above, and major damage to a building structure may occur at values greater than four times the tabulated values. A building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive.

For structures that are of great intrinsic value and are particularly sensitive to vibration, transient vibration should not exceed 4 mm/s at low frequencies. Allowable levels increase to 8 mm/s at 50Hz and 10mm/s at 100Hz and above.

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

10.3 The Receiving Environment

The Site is positioned within the heart of Kilkenny City, situated between Bateman Quay in the south and St Canice's Place in the north.

The Site adjoins the banks of the River Nore to the east and River Breagagh to the north. The Site contains a number of historic features which include Evans Turret and St Francis well. The Site surrounds, but does not include the historic St. Francis Abbey. Buildings on-site,

relating to the past use as a brewery, have been removed and do not form part of this assessment.

To the north of St Canice's Place lies the Bishops Meadows walk which forms part of the River Nore Linear Park trail a recreational outdoor area for the City. Further details on the Site context are outlined in Chapter 1.

10.3.1 Baseline Ambient Sound Assessment

A Quiet Area is a defined criterion for areas with low intrusion of human activities and have been specified within the Environmental Noise Directive and subsequent S.I. Noise Regulations as areas that should be identified within each Local Authority area for special consideration.

The draft Noise Action Plan 2019 for Kilkenny (Kilkenny County Council, 2018) notes a target of 2023 to propose designations within their jurisdiction to the EPA and relevant Minister for confirmation. Section 7.1.2.1 of the draft noise action plan does imply that public open paces may be considered within the future submission, such as:

- Recreational areas;
- Playing fields;
- Playgrounds;
- Public parks and gardens;
- Beaches;
- Nature reserves;
- Cemeteries;
- River banks; and,
- Canals.

Currently the Site does not encompass any of the above features. The proposed development will comprise of a public space including aspects of recreational space, playground, public parks and a river-bank walk will be provided.

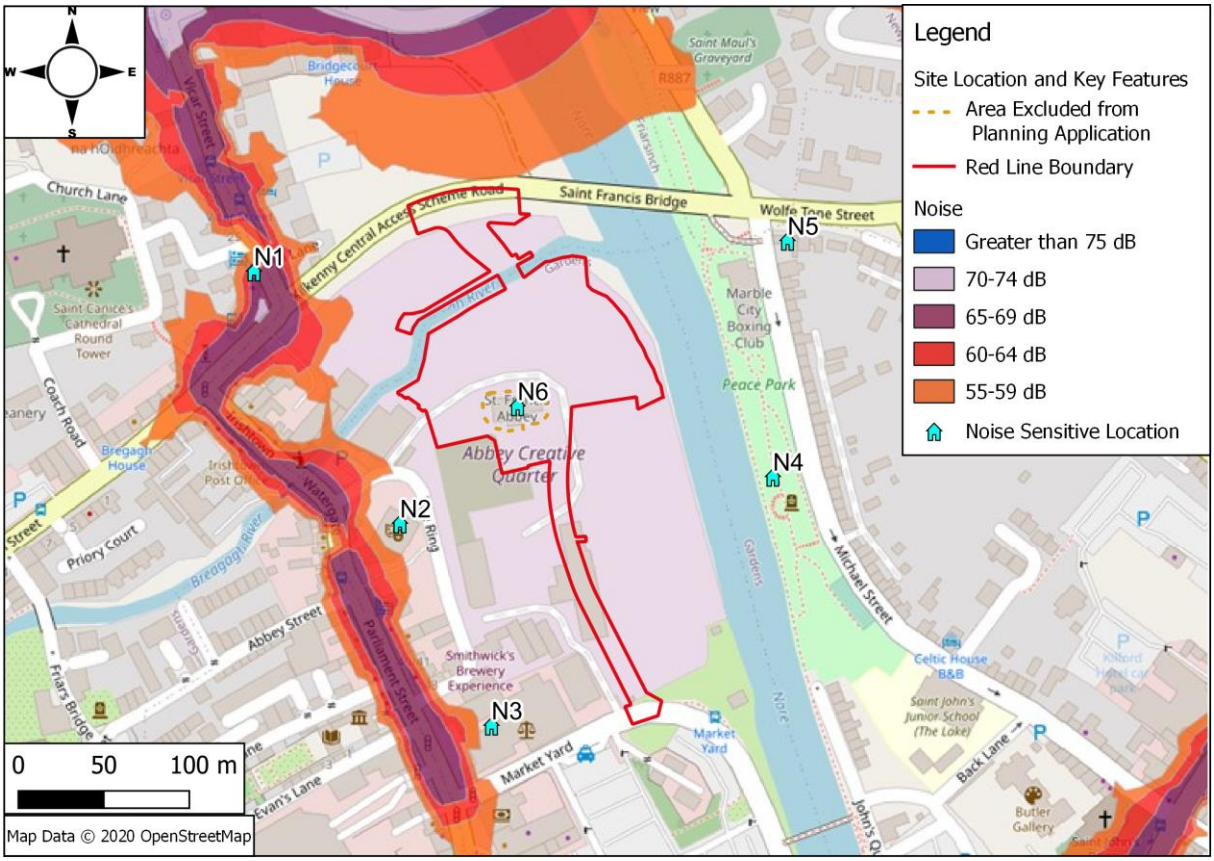
10.3.1.1 Strategic Noise Mapping

A desk-based review of available information from the EPA and Kilkenny County Council was conducted to assess the existing acoustic environment.

The R693 which enters Kilkenny City from the north is qualified for Strategic Noise Mapping under the Environmental Noise Directive (END), as transposed into Irish Law under S.I. No. 549 of 2018 Environmental Noise Regulations (Government of Ireland, 2018). The R693 (Vicar Street) extends south, adjoining St Canice's Place (and St Francis Bridge) before extending further south along Parliament Street which runs parallel to the western boundary of the Site.

The Strategic Noise Mapping for the R693 is shown in Figure 10-4 below. The noise contours show the outer L_{den} 24-hour weighted value of 55dBA c.30m from the Site boundary at its closest point indicating traffic noise is a major influence at and in the vicinity of the Site.

Figure 10-4: Strategic Noise Mapping, L_{den} Parameter.



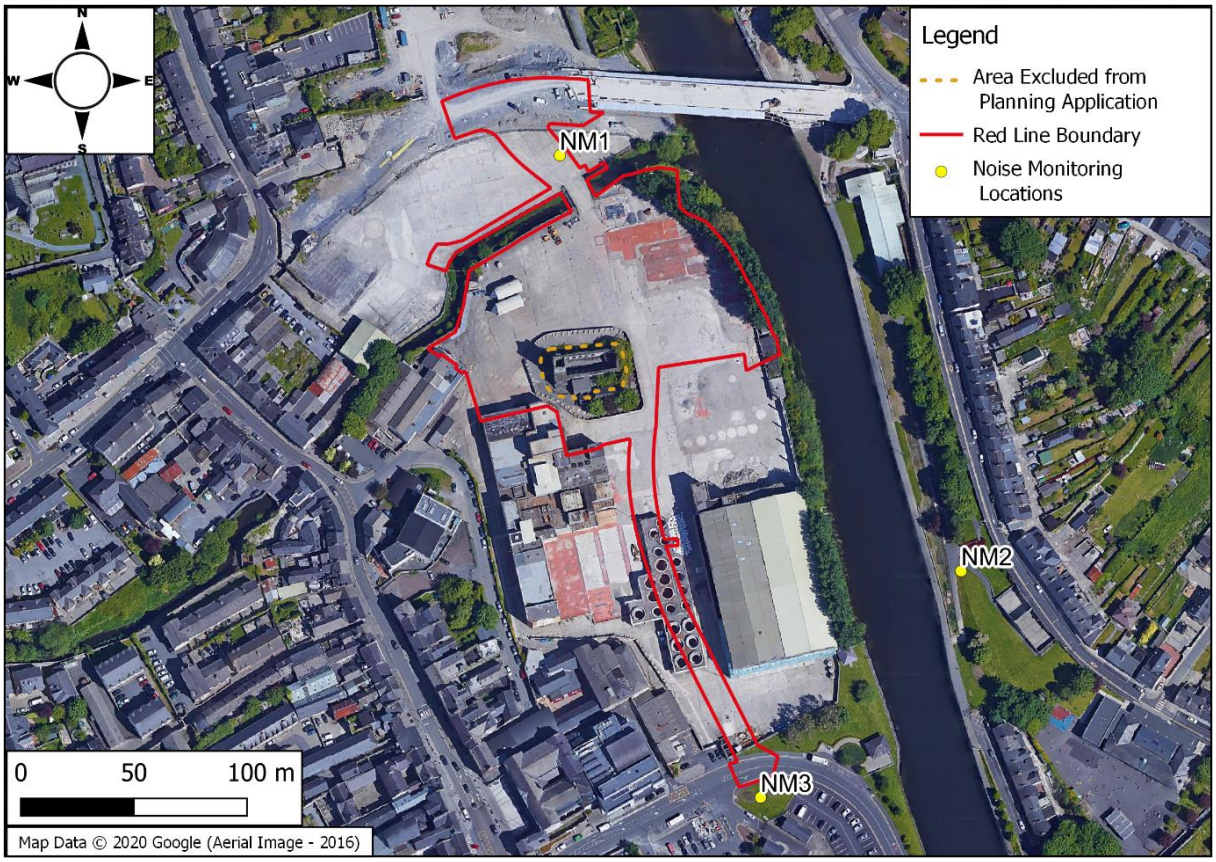
10.3.2 Baseline Ambient Acoustic Environment Survey

10.3.2.1 Baseline Monitoring Locations

NSLs were identified in the locality and are described in Table 10-1 and shown in Figure 10-1 in Section 10.2.2 above.

Figure 10-5 shows the Noise Monitoring (NM) locations utilised by MOR in conducting baseline noise characterisation. The locations were selected by MOR's Senior Acoustician to enable a comprehensive data collection of ambient sound within the locality. The monitoring programme considered the local landscape, the proposed layout and design of the proposed development.

Figure 10-5: Noise Monitoring (NM) Locations



Monitoring locations (refer to Figure 10-5) are identified as tie-in, or as proxy locations to NSLs in Table 10-5. NSL proxy locations are deemed to be representative of the likely sounds audible at NSLs, arising from the proposed future development of the Site.

Table 10-5: Monitoring Locations

Monitoring Point	Description of Location	ITM Easting	ITM Northing	Boundary or NSL
NM1	Proxy for dwellings to the east of the Site boundary (NSL01 and NSL 07).	650402	656397	NSL proxy
NM2	Proxy for dwellings to the southeast of the Site boundary (NSL02).	650642	656345	NSL proxy
NM3	Proxy for dwellings (NSL03) along the local road to the southwest of the boundary.	650579	656149	NSL proxy

10.3.3 Baseline Results

The summary of the monitoring results for the daytime monitoring events are presented in Table 10-6.

Table 10-6: Baseline Monitoring 25th March 2020 Results

Location	Duration	Start Date and Time	L_{Aeq}	L_{AF10}	L_{AF90}	L_{AFmax}
NM1	01:00:00	25/03/2020 09:51:30	54	57	47	80
	00:30:00	25/03/2020 15:37:48	52	55	46	68
	00:30:00	25/03/2020 16:57:34	50	52	43	74
NM2	01:00:00	25/03/2020 11:10:00	57	60	49	84
	00:30:00	25/03/2020 13:47:46	57	60	46	73
	00:30:00	25/03/2020 17:30:44	55	58	45	83
NM3	01:00:00	25/03/2020 12:15:36	51	52	46	80
	00:30:00	25/03/2020 13:15:48	53	56	46	74
	00:30:00	25/03/2020 18:00:50	54	57	45	75

Recorded values are notably quieter than would be typical for an urban environment. This was likely associated with reduce traffic movements and business activities during the Covid-19 pandemic and related restrictions in Ireland.

Although difficult to directly compare in acoustic terms, the drop off in traffic can be seen in the comparison of vehicles passing the TII traffic counter north of Kilkenny City on the N77. The average annual daily traffic (AADT) over typical year and for a Wednesday in March for 2020 and the previous two years are shown below:

- 24-hour traffic Wednesday 25/03/2020: 7,627;
- 24-hour traffic Wednesday 27/03/2019: 12,582; and,
- 24-hour traffic Wednesday 25/03/2018: 12,029

The reduction is c.39% on comparable days, which would equate in a c.4-5 dBA reduction in road traffic noise, with a likely similar loss in footfall and associated activity within the City. Therefore, the acoustic data collated in Table 10-6 is deemed highly conservative to the typical noise environment within the locality, with 'typical' noise, associated with general urban activities and road traffic likely to provide 10dB increase on measured values. This would be in-line with historical noise measurements along St Canice's Place where daytime averaged noise values were given at L_{day}[9] 65dBA to 67dBA (MOR, 2011).

10.4 Characteristics and Predicted Impact of Proposed Development

The potential impacts from the proposed development were assessed under the following headings:

- Construction Phase noise;
- Construction Phase vibration; and,
- Operational Phase noise.

10.4.1 Site Characterisation

The proposed development will present a mixed recreational and pedestrian/cycleway along the River Nore, and ultimately a throughway from the Bateman Quay to St. Canice's Place for pedestrians and cyclists.

[9] L_{day} is the 12-hour averaged daytime L_{Aeq}, or $L_{Aeq,12\ hour}$, taken from 07:00 to 19:00 hours.

The proposed development will bring the historic St. Francis Abbey into an open and public space, and defines a public meeting space, which will be available for gatherings such as market stalls, busking space and other small City Centre events (refer Chapter 1 for more details).

The works will require sub surface activities during construction for the installation of road infrastructure, such as drainage and utilities. Furthermore, some Site works will require the removal, regrading and re-establishment of the concrete surface, to develop the desired elevation changes on the finished design. This will bring potential for vibration construction works into proximity to the following noted historical structures:

- St Francis Abbey;
- Breagagh Bridge Abutment;
- Evans Turret; and,
- Kilkenny City Walls.

Following construction, the area will be utilised as a public space, with occasional limited access for service and delivery vehicles. Therefore, vibration is not deemed an operational stage impact.

10.4.1.1 Construction stage noise

The proposed works will involve works on the following key areas:

- Removal of concrete slab;
- Regrading of ground;
- Installation of services and utilities;
- Installation of concrete slab;
- Development of new street;
- Development of paving and pathways/cycleways;
- Development of landscaped areas; and,
- Installation of planting, furniture, key features.

10.4.1.2 Construction Stage Vibration

The proposed works will be in proximity to historical monuments deemed to be key sensitive structures which include the following:

- St Francis Abbey;
- Breagagh Bridge Abutment;
- Evans Turret; and,
- Kilkenny City Walls.

Refer to Chapter 12 for further details with regard to these structures. This proximity will require consideration to ensure any risk is fully assessed.

10.4.1.3 Operational Stage Noise

With limited vehicles permitted within the proposed development, the acoustic character of the locality will be pedestrian in nature, with planting, seating and varied ground elevations, promoting a sense of space and relaxation for those using the space. The primary activity spaces are designed along the eastern portion – fitness area and playgrounds, and to the north of the existing Abbey. It is reasonable to assume under normal activities, these activity areas, including the fitness area and playgrounds, will operate during daytime hours only. Outside these hours the main thoroughfare would remain open.

10.4.2 Construction Phase Noise

Impact from the construction phase will depend on the number and type of equipment used during the development. Construction noise sources will typically result in a temporary impact on the noise levels in the vicinity of the Site.

There are no statutory guidelines in the Republic of Ireland relating to noise limits for construction activities. Construction noise in Ireland is generally controlled by planning authorities through the limiting of working hours. Regardless, the National Roads Authority (NRA) report entitled "*Guidelines for the treatment of noise and vibration in national road schemes*" (2004) has outlined recommended noise levels for construction noise during road projects. Although these refer to road projects, they have been developed in line with typical construction noise limits on general construction projects such as BS5228 Part 1 2009 +A1:2014 (BSI, 2009).

This standard identifies a methodology (the ABC method, section E.3.2 of the standard) for assigning construction noise limits at NSRs based upon the existing ambient noise levels. An excerpt detailing the ABC method is shown in Table 10-7. This method requires an understanding of the receiving environmental at NSRs to allocate suitable construction noise limits.

Table 10-7: BS5228 ABC Method for Assessing Construction Noise Impact

Assessment category and threshold value period (L_{Aeq})	**Threshold value, in decibels (dB)**		
	Category A[A)]	**Category B[B)]**	**Category C[C)]**
Night-time (23:00-07:00)	45	50	55
Evening and weekends [D)]	55	60	65
Daytime (07:00-19:00) and Saturday (07:00-13:00)	65	70	75
Note 1 A significant effect has been deemed to occur if the total L_{Aeq} noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.			
Note 2 If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total L_{Aeq} noise level for the period increases by more than 3dB due to construction activity.			
Note 3 Applied to all residential receptors only.			
A) Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.			
B) Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.			
C) Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.			
D) 19:00-23:00 weekdays, 13:00-23:00 Saturday and 07:00-23:00 Sunday.			

[1] Construction activities at these times, other than that required in respect of emergency works, will normally require the explicit permission of the relevant local authority.

Predicted noise levels have been estimated using the methodology described in BS5228 (BSI, 2009).

Predictions were based on typical equipment used during various construction stages. Predictions were based on a $L_{Aeq,1hour}$ value with all machinery listed below operating for a 1-hour period. This may be considered a worst-case scenario as machinery may operate for

shorter durations within any hour and all listed plant is unlikely to operate simultaneously for protracted periods of time, from the same location.

Limits for construction noise, are outlined in Table 10-7 above. Construction noise limits consider that construction activities will be restricted to daytime hours (07:00 -19:00) Monday to Friday and 09:00-16:00 on Saturday, to further minimise potential nuisance. Where emergency works are needed outside these hours, the more restrictive noise limits, outlined in Table 10-7 will apply.

Tables 10-8. 10-9 and 10-10 show the calculated noise arising from typical construction plant at 30m, 50m and 100m distances for Site preparation, road build-up and landscaping / Site development.

Table 10-8: Estimated Construction Noise Sources Site Preparation

BS5228 Calculations	**Estimated Construction noise levels at varying distances (dB $L_{Aeq,T}$)**		
Plant -Road development	**30m**	**50m**	**100m**
C.5.1 Backhoe mounted hydraulic breaker	78	74	68
C.1.10 Tracked excavator dumping rubble into trailer	75	71	65
C.5.40 Electric water pump	58	54	48
C.2.34 Lorry 4 axle movement on Site	70	66	60
C.4.70 Petrol hand-held circular saw	81	77	71
Cumulative	**84**	**80**	**74**

Table 10-9: Estimated Construction Noise Sources During Road Build-up

BS5228 Calculations	**Estimated Construction noise levels at varying distances (dB $L_{Aeq\ T}$)**		
Plant -Road build-up	**30m**	**50m**	**100m**
C.5.34 Wheeled excavator	62	56	50
C.5.19 Road roller	71	66	60
C.5.30 Asphalt paver (+ tipper lorry)	66	61	55
C.2.37 Roller (rolling fill)	70	65	59
Cumulative	**74**	**69**	**63**

Table 10-10: Estimated Construction Noise Sources Landscaping and Site development

BS5228 Calculations	**Estimated Construction noise levels at varying distances (dB $L_{Aeq\ T}$)**		
Plant - Site works & Landscaping	**30m**	**50m**	**100m**
C.2.5 Tracked excavator	66	62	56
C.2.6 Tracked excavator (idling)	53	49	43
C.2.34 Lorry 4 axle movement on Site	70	66	60
C.2.46 Water pump	52	48	42
C.4.10 Wheeled Excavator	56	52	46
C.4.11 Wheeled Excavator (idle)	51	47	41
C.4.53 Lorry with lifting boom	67	63	57
C.4.90 Road sweeper	66	62	56
C.4.91 Dust suppression unit trailer	68	64	58
Cumulative	**75**	**71**	**65**

Utilising the baseline survey shown in Table 10-6 and the calculated deviation from normal road traffic noise outlined in 10.3.3, the local sensitive receptors are deemed Category A under the BS5228 methodology. The following construction stage limits are therefore applicable:

Monday to Friday 07:00 to 19:00 Saturday 09:00 to 16:00	$L_{Aeq,1\ hour}$ 65dB
Monday to Friday 19:00 to 23:00 Saturday 16:00 to 23:00 Sunday 07:00 to 23:00	$L_{Aeq,1\ hour}$ 55dB
Night-time 23:00 to 07:00	$L_{Aeq,1\ hour}$ 45dB

The above timings are derived from BS5228 and covers both typical construction hours as outlined for this project and emergency works that may arise during a construction project.

During the construction works, without management of the noise source or work methods a significant noise impact on local NSLs is likely during peak noise events – such as the removal of concrete and the movement of trucks within the Site.

10.4.3 Construction Stage Vibration

The peak particle velocity (PPV) is the simplest indicator of both perceptibility and the risk of damage to structures. BS 7385-1 and BS 7385-2 provide guidance on measurement, evaluation of effects on buildings, and damage levels, and are based upon use of the PPV.

For damage to structures, it is preferable to undertake measurements externally at the foundations.

Several factors are likely to affect the acceptability of vibration arising from construction sites and the degree of control necessary. These include:

- Site location;
- Existing ambient vibration levels;
- Duration of site operations;
- Hours of work;
- Attitude to the site operator;
- Vibration characteristics; and,
- Effect on buildings.

Vibration activities during construction will primarily arise from the following works on the Site:

- Excavation of trenches through the existing concrete and made ground;
- Breaking of the concrete slab for development of new ground heights and installation of trees and other features;
- Levelling and compaction of road subsurface and surface; and
- The movement of HGVs on-site.

These works will be within the Site and separated from northern receptors by the River Breagagh and from eastern receptors by the River Nore. Receptors to the south and west will be confined to those in closest proximity to on-site vibration source. No piling is proposed for the project, and the above sources will be similar in acoustic character to normal road maintenance works in terms of vibration transmission to local receptors.

10.4.4 Operational Phase

Table 10-11: IEMA Guidelines – Noise Impact Scale below details the noise impact scale from the 'Guidelines for Noise Impact Assessment' by the Institute of Environmental Management and Assessment (IEMA) (Institute of Environmental Management & Assessment, 2014) applicable to all development where noise effects are likely to occur. These sound level changes illustrate important points of reference relating to the human ear's perception of sound.

Table 10-11: IEMA Guidelines – Noise Impact Scale

Sound Level Change L_{PAeqT} T=16hour day or 8hour night	**Short-Term Impact Classification**	**Long-Term Impact Classification**
≥0dB <1dB	Negligible	**Negligible**
≥1dB <3dB	Minor	
≥3dB <5dB	Moderate	**Minor**
≥5dB <10dB	Major	**Moderate**
≥10dB		**Major**

The general operational phase of the proposed development is the provision of an Urban Park and Street that will be for pedestrians. The proposed development will generate noise from the following features:

- Movement of people along /through the street;
- Use of fitness equipment;
- Use of playgrounds – children shouting; and,
- Tourism associated with visiting historic features of the City;

Events within the open space are catered for, and can thereby be deemed likely to occur, though any events will need to be permitted by the Local Authority, as and when specific aspects of the events are proposed. These events will therefore be subject to their own assessments.

The acoustic character of the proposed development will be similar to the spaces around Kilkenny Castle and the vehicle restricted/ pedestrian areas of the City such as St. Kieran's Street.

Overall, the proposed development will open up a part of the City from it's former industrial usage to the public, and this will result in the arrival of anthropogenic sounds to this locality. This impact will be on a very local scale, and not readily discernible from the existing or future NSLs as the character of this street will be significantly quieter than existing traffic to the north, west and south.

A negligible long-term acoustic impact will therefore be associated with the operation phase of the proposed development.

10.5 Proposed Mitigation Measures and / or Factors

10.5.1 Noise - Construction

During the construction stage works, noise emissions will need to be controlled to prevent noise nuisance. Although works will be relatively short in duration, the potential for significant noise impact is predicted to be present should noise mitigation measures not be implemented.

During works requiring plant with high sound pressure, enclosure or acoustic shielding will be needed. This includes for any cutting and lifting of the concrete slab on-site and may also include crushing and screening activities. Furthermore, the placement of concrete and other site materials requiring transit will be done ensuring the minimal drop height, to reduce noise associated with loading.

The Contractor will need to provide a detailed CEMP for agreement with the KCC Planning Department, this will include details on acoustic mitigation including:

- Management of deliveries and vehicles to minimise vehicles idling on-site;
- Commitments that all plant and equipment will be compliant with SI 241/2006, as amended, for noise rating of construction plant;
- Construction hours will be restricted for activities requiring the operation of noisy plant (i.e. activities likely to result in noise nuisance at NSLs);
- Mechanical plant and equipment used for the purpose of the works will be fitted with effective exhaust silencers and will be maintained in good working order;
- Careful selection of quiet plant and machinery to undertake the required work, where available;
- All major compressors will be 'sound reduced' models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use;
- Any ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers;
- Machines in intermittent use will be shut down when not in use;
- Ancillary plant such as generators, compressors and pumps will be placed behind existing physical barriers, and the direction of noise emissions from plant including exhausts or engines will be placed away from sensitive locations. Where possible, in potentially sensitive areas, acoustic barriers of enclosures will be utilised around noisy plant and equipment;
- Handling of all materials will take place in a manner which minimises noise emissions;
- Audible warning systems will be switched to the minimum setting required by the Health & Safety Executive or the Health & Safety Authority; and,
- The Contractor will adhere to the codes and practices for minimising noise emissions from construction works, including those provided in BS5228:2009, where applicable.

To minimise the likelihood of complaints, Kilkenny County Council and affected residents will be kept informed of the works to be carried out and of any proposals for work outside normal hours by the appointed contractor. A complaints procedure will be operated by the Contractor throughout the construction phase, as part of the CEMP.

10.5.2 Vibration - Construction

The proposed construction works will be limited to standard hours, as outlined in Chapter 3, thereby restricting potential vibrational impacts to daytime hours. The construction programme is predicted to occur over a period of c.14 months, of which only short durations throughout will result in any notable vibrational activities.

The impact on buildings, will need to be controlled to ensure building damage is prevented to adjoining structures primarily to the west and south and historical structures in proximity. BS5228-2 recommendations are for the prevention of onset of cosmetic damage to buildings, as outlined in Table 10-3 above.

In relation to the historical monuments (St Francis Abbey, St Francis Well, Evans Turret & City Walls), all works are to be carried out in such a way to ensure ground-borne vibration levels are kept below a threshold level recommendation following best practice guidance. A vibration cut-off threshold of 4 mm/s peak particle velocity (PPV) is required in line with Eurocode 3 Part 5 for transient vibrations close to ruins or buildings of architectural merit. All monitoring will be

in accordance with BS 5228: 2009 (BSI, 2009). A fully automated real time monitoring system must be employed with the contractor, client and a member of the design team receiving constant notifications. A warning notification will be sent to all members if a vibration trigger value of 3mm/s PPV is recorded.

In the event the vibration trigger value of 3mm/s PPV is reached, work practices will be reviewed and altered accordingly. If the vibration limit of 4mm/s PPV is reached, all construction activities on-site must cease until such time as a design team review takes place. Groundworks in areas within proximity of monuments will be supervised by archaeologists (refer to Chapter 12).

Vibration monitoring will be used to control the proposed works, ensure compliance with the proposed control limit and to protect the historic monuments. Vibrations movements will be actively measured during the works with a predetermined plan of action ready to be put in place will actual measurements vary from the expected levels. A Site representative will be present during the works to ensure the vibration levels are maintained within specified limits.

As part of the initial on-site construction stage, vibration monitoring will be established on protected structures. An assessment will be conducted to characterise proposed work methods on-site to determine the likely transmission of vibration levels to the historic monuments. The detailed requirements for monitoring and actions to be implemented in-line with onset of vibration trigger values, will be included in the CEMP completed for the construction phase activities.

This document will outline detailed procedures for undertaking the work, assign responsibility for the work and will outline detailed procedures for notification of local residents and dealing with any complaints. The plan will also include for detailed vibration monitoring to be undertaken during any such work. The intention throughout any construction programme will be to minimise the effects of site vibration where it might occur whilst having due regard to the practicability and economic implications of any proposed control or mitigation measures.

Elements of the works preparation that may contribute to reducing the vibration impact include:

- Arranging the project design to minimise the number of operations likely to be particularly disturbing;
- When a number of site operators will be working on one site, overall site operations will be coordinated with access traffic routes placed away from sensitive receptors;
- The most appropriate plant will be selected in order that limits are not exceeded;
- In terms of control of vibration, the most general means of control are substituting plant with less intrusive plant and relocating or isolating stationary plant using resilient mountings; and,
- Removal of the concrete slab will not be undertaken by hydraulic breaker in the vicinity of protected structures. Instead the slab will be cut into sections and lifted to minimise vibration impacts.

10.5.3 Noise - Operational

No acoustic mitigation (noise or vibration) will be required for the operational stage of the proposed development. However, events within the park will need to be permitted by the Local Authority and specific measures maybe imposed in relation to these events on a case-by-case basis.

10.6 Interactions with other Environmental Attributes

The acoustic impact has the potential to be impacted positively or negatively, and to influence the impact upon, several environmental issues including:

- Chapter 5 (Population and Human Health); and,

- Chapter 6 (Biodiversity);
- Chapter 12 (Cultural Heritage); and,
- Chapter 14 (Material assets – Traffic).

10.7 Residual Impacts

Construction stage acoustic impacts will be short duration (c.14 months), and upon completion, will have no further impact on the local environment.

Mitigation measures have been outlined to control noise and vibration during the construction stage, to minimise the potential for impact. Following implementation of the mitigation measures, a short term, localised minor impact is likely.

The operational stage acoustic impact associated with the proposed development will open to the general public a former industrial land holding, current construction compound and replace it with a green space. The design is such that it will provide the public, both local and visitor, with an area protected from the vehicular city traffic noise, through the provision of trees and water features, including the River Nore, provide an acoustic environment conductive to recreation and relaxation. As such the operational/long-term impact from the proposed development will be significant positive.

10.8 Cumulative and In-combination Impacts

Impact from the demolition of the Maturation Building will depend on the number and types of equipment used during the works. With the exception of a hydraulic breaker, it is considered unlikely that the construction equipment which may be used to demolish the Maturation Building would differ significantly from those outlined in Section 10.4.2.

The completion of these works with no mitigation measures applied, in combination with the proposed development, has the potential to contribute to greater noise and vibration emissions in the area. In addition, works might occur in closer proximity to receptors in the vicinity of the southern portion of the Site. If these works do occur concurrently, to reduce the associated risks, the Site manager of the construction phase for the proposed development will be required to liaise with their counterpart for the Maturation Building demolition works to ensure plant with high sound pressure or with high vibration transmissibility are completed on a phased basis and with appropriate mitigation procedures in place. This approach will ensure that that a short term, localised minor impact is likely.

There is also potential for interaction between noise and road traffic. The road traffic impact related to the proposed development has been assessed in Chapter 14.

Noise is typically observed as a human noise nuisance or human health impact. The monitoring of existing activities, the nature of the development to attract people into this existing brownfield area, and the development of the landholding for community and tourism purposes will provide an ambience of likely positive social interaction.

It is recognised that other adjoining streets will provide a similar and thereby cumulative impact, but it is fundamental that the proposed street will be restricted in relation to road traffic, which is the dominant and over bearing noise character of these exiting routes. The pedestrian nature of this proposed street will provide an escape, benefitted by the intervening buildings between the route and existing vehicular routes.

Although the proposed development on its own will not have any significant impact on the acoustic environment and vibration of structures, the cumulative impact of future Masterplan structures (including the Mayfair Building, Brewhouse Building, Riverside Gardens) has the potential to have a significant impact on these aspects. However, it is not foreseen that this will be the case as the cumulative impact of any future Masterplan developments on the local environment (e.g. noise and vibrations) will be considered by the planning authority when

assessing any future related planning applications. Additionally, the proposed park will provide potentially quieter areas than existing surrounding streetscapes for future residents and other users of the potential future Masterplan developments.

10.9 Monitoring

Construction phase monitoring will be required for both noise and vibration. The monitoring locations will include proximity NSLs (noise) and the historic monuments identified in Table 10-2 (vibration).

The scope, duration and reporting of these works will be sufficient to characterise the various work elements and the duration of the construction period to ensure noise and vibration are controlled. The acoustic monitoring programme will form part of the CEMP.

10.10 Difficulties Encountered in Compiling this Information

It should be noted that baseline noise monitoring took place during the period of Covid-19 restrictions. Traffic was therefore reduced within the City at the time of monitoring. However, this has therefore resulted in a more conservative impact assessment when compared with this reduced baseline ambient noise monitoring data (refer to section 10.3.3).

11 LANDSCAPE AND VISUAL

11.1 Introduction

This chapter of the EIAR provides a description and assessment of the likely impact of the proposed development on the landscape and visual environments. It summarises the impact of the proposed development on the landscape character and visual amenity of the Site and on the contiguous urban landscape and its environs. It describes the landscape character of the Site and its hinterland, together with the visibility of the Site from significant viewpoints in the locality. It includes an outline of the methodology utilised to assess the impacts and descriptions of the receiving environment (baseline) and of the impacts of the development. Mitigation measures introduced to ameliorate or offset impacts are outlined and considered in section 11.5 and the resultant predicted (residual) impacts are assessed.

For an overall Site context refer to section 1.2 and Figure 1-2 in Chapter 1.

This chapter should be read with specific reference to the selection of photomontages produced by 3rd Eye, which are included in Appendix 11.1.

11.2 Methodology

This Landscape and Visual Impact Assessment (LVIA) takes account of the existing landscape's capacity to accommodate the proposed development and assesses the landscape and visual impacts upon the public realm within the environs of the Site and upon the broader existing urban landscape.

LVIA includes consideration of two main aspects:

1) **Landscape Character Impact** – an appraisal of effects on the character of the landscape arising from the insertion of the proposed development into the existing urban landscape context. This 'landscape' aspect is relatively subjective and can be described broadly as the human, social and cultural experience of one's surroundings. These combined impacts will elicit responses whose significance will be partially dependent on how people perceive a particular landscape and how much the changes will matter in relation to other senses as experienced and valued by those concerned. Despite the very large part played by our visual experience in forming our views on landscape, one's perception and memory also play an important part if the changes brought about in landscape character are to be fully understood. It follows therefore that different people doing different things will experience the surrounding landscape in different ways. Such sensitivities and variations in response, including where and when they are likely to occur, are taken into consideration in the assessment.

2) **Visual Impact** – an assessment of the effects of the proposed development on the visual environment and visual amenity as evidenced by the comparison of baseline (existing) images and photomontages illustrating the proposed development in context. This second aspect is somewhat less subjective in that direct 'before and after' comparisons can be made. Visual impact occurs by means of visual intrusion and/or visual obstruction and the distance between subject and viewpoint has a bearing on the scale of such impact.

The standard evaluation methodology used in the preparation of the Landscape and Visual Impact Assessment (LVIA) for Environmental Impact Assessment (EIA) is utilised. The evaluation methodology is therefore based on the current Environmental Protection Agency (EPA) Guidelines (Ref. Chapter 1, Section 1.6) and the 'Guidelines for Landscape and Visual Impact Assessment', prepared by the Landscape Institute and the Institute of Environmental Assessment, published by Routledge, 3rd Edition 2013.

This Landscape and Visual Impact Assessment involved:

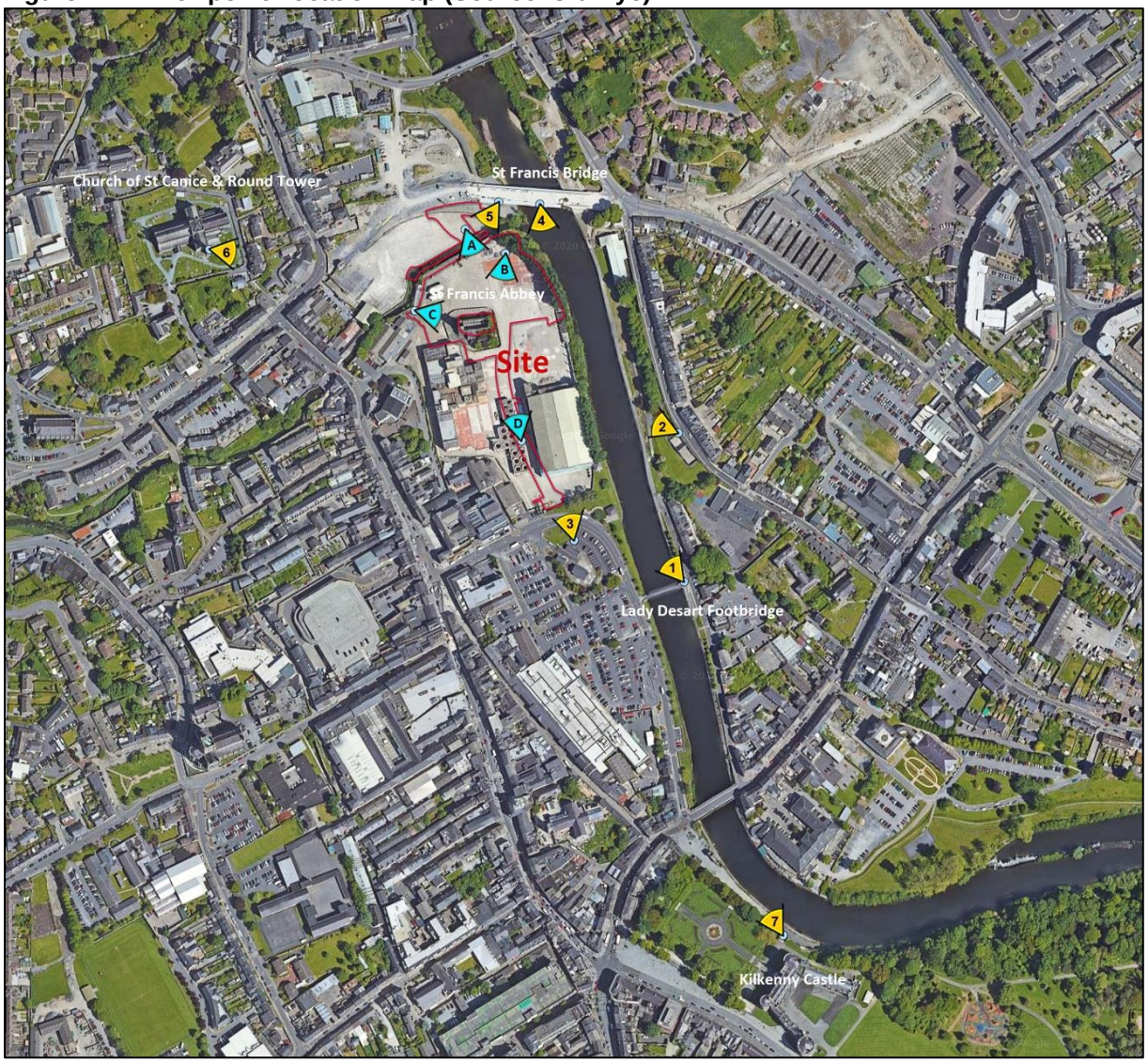
- Visiting the Site and preparing a photographic record of the main landscape features including landscape elements, features and characteristics;
- Undertaking a desk study of the Site and its environs in relation to its local and broader landscape significance using the photographic record, studying aerial photography and Ordnance Survey mapping;
- Establishing and describing the receiving environment in terms of the existing landscape and its visual amenity;
- Assessing the nature, scale and quality of the proposed development through examination of the design team's drawings, illustrations and descriptions of the proposed scheme;
- Assessing potential viewpoints, selecting those which are considered most important and most representative in terms of visual impact; and,
- Assessing the landscape and visual impacts of the proposed development with reference to the photomontages contained in Appendix 11.1 of this assessment.

11.2.1 Selection of Views

In the context of the scale of the proposed development, a broad exploration of the area around the Site was undertaken in order to select viewpoint locations for the preparation of photomontages to illustrate the proposed development in the context of the existing (baseline) views. In accordance with the guidelines, views from the public domain were given priority, particularly those from main thoroughfares and public places. The viewpoints chosen are considered to be the most important and representative, having regard to the requirement to examine the likely significant impacts. A location map of the final selected viewpoints is illustrated in Figure 11-1 (below).

The guidance on viewpoint selection and baseline photography requires that the proposed development is considered in context and that photomontages used to illustrate the proposed development include sufficient landscape context for proper assessment. A total of seven views meeting these criteria were selected to accurately represent the likely visual impact from a variety of viewpoints and directions around the Site. Given the scale and extent of the Site itself, a further four selected viewpoints are located within the Site development boundary. This was considered necessary in order to fully illustrate the nature of the development and the context within which it will sit. However, whilst these four views accurately represent the proposed development and are useful illustrations, they cannot be considered to be 'verified views' since the relevant 'proposed' illustrations no longer retain enough of the existing visual context to be able to confirm their accuracy. For this reason, whilst these four 'internal' views (A-D) are included in the assessment and are assessed relative to the baseline, they cannot be afforded the same importance in the assessment as the verified views (1-7).

Figure 11-1: Viewpoint Location Map (Source: 3rd Eye)



11.2.2 Photomontage Methodology

The primary method adopted for LVIA relies largely on a comparative visual technique, whereby accurate photomontages, incorporating the proposed development are compared to the existing corresponding baseline photograph so that an assessment of impact can be made. These 'before' and 'after' images are prepared for a number of selected viewpoints. The specific detailed methodology employed by 3rd Eye in producing photomontages for this project is described in their original A3 photomontage document (Appendix 11.1).

In this case, the circumstances surrounding the proposed development of this Site are relatively complex with a range of adjacent development schemes; under construction, approved, proposed or planned in the broader context of the Abbey Quarter Masterplan as discussed in section 1.6.2 of this EIAR. Those adjacent schemes currently under construction are considered to form part of the receiving environment for the subject scheme – there is sufficient detail available for these schemes to include them accurately in a baseline model.

Approved schemes whose construction has not yet commenced, any proposed schemes within the planning system and the potential future planned building developments within the Abbey Quarter Masterplan are considered in the context of cumulative effects. At this point

there are varying levels of detail available for these schemes - they are therefore represented within the photomontages as appropriate to their design development to date as follows:

- For the Mayfair Building redevelopment, full design detail is available from the Part 8 planning application and subsequent detailed design. This was therefore modelled in detail; and,
- For potential future Abbey Quarter developments, design criteria, including scale, height and plot utilisation is provided in the Abbey Quarter Urban Design Code. The exact design of these buildings cannot be known at this time. These buildings have therefore been represented as semi-translucent blocks in the photomontages.

In view of the nature of the proposed scheme (i.e., essentially, a public park), where its developing maturity is an important aspect of its visual impact, photomontages are also prepared illustrating the scheme in 25 years as well as at year 0, upon completion of the works on-site.

In order to provide a comprehensive assessment, for each of the selected viewpoints, the following series of images/photomontages (suffixed a-e) are therefore provided.

For the verified views 1-7 (only);

a. 'Existing view' – this is an image of the existing Site in its current state;
b. 'Baseline' – this is the existing view but also includes modelled and rendered representation of the adjacent schemes currently under construction (this is the 'receiving environment');
c. 'Proposed view (at year 0)' – this is the proposed development scheme overlaid on the baseline image;
d. 'Proposed view (at year 25)' – this is the proposed view + 25yrs maturity; and,
e. 'Proposed view (at year 25), including the future Abbey Creative Quarter buildings' – this is the proposed view at year 25 + the future Abbey Creative Quarter buildings, represented by semi-opaque grey blocks.

For the four 'internal' visualisations (A-D), only the following images are included:

a. 'Approximate existing view' – this is a view of the existing Site condition from the approx. location of the viewpoint, which cannot be verified as exact or accurate due to existing Site conditions (e.g. presence of material storage mounds, construction equipment and temporary construction compound);
b. 'Baseline';
c. 'Proposed view (at year 25); and,
d. 'Proposed view (at year 25) including the future Abbey Creative Quarter buildings'.

11.2.3 Methodology and Criteria for the Rating of Impacts

An assessment was made in respect of the significance, scale and magnitude of predicted impacts which is set against an assessment of the quality/sensitivity of the impact. For each view, the scale/magnitude of impact is related to the quantum of change within the field of view and to the nature and sensitivity of such change in respect of the receptors, in the context of the existing (receiving) environment. Therefore, whilst the significance or scale of impact may range from 'imperceptible' to 'profound' and these may in part be related to distance and proximity, it should be remembered that the nature of the change and the sensitivities of the viewers also play a part in this aspect of assessment for each view.

This latter issue of sensitivity can however create emotive responses that often have little or no regard for the appropriateness and/or design of the proposal; however, the assessment needs to be considered in that context. In such cases, issues of appropriateness and design quality become more influential in the assessment of the impact of the designed scheme. The

subtleties of design and detail in such circumstances are important in mitigating potentially negative impacts and ultimately, in determining appropriateness. It should also be remembered that the impact of the proposed development is assessed in terms of its current context rather than any historic context. Such considerations are taken into account within Chapter 12, Archaeology and Cultural Heritage.

The quality of impact can be assessed as 'positive' or 'negative' depending on whether the change is considered to improve or reduce the quality of the landscape character or visual environment. The quality of impact may also be assessed as 'neutral' if the quality of the environment is unaffected. The assessment of quality in particular, needs to consider and weigh-up a range of issues and potentially conflicting standpoints. The nature of the proposed change, its context, appropriateness, quality of design and the sensitivities of the viewers are all important considerations for this aspect of Landscape and Visual Impact Assessment.

The duration of impact is a third aspect of assessment to be considered and impacts may range from temporary to permanent. In this case, the proposed development has a design life probably exceeding 60 years and so its impact is likely to be long term to permanent. The temporary/short term impacts during the construction of the proposed development are also considered in this assessment.

The appropriate significance criteria for this LVIA are based on those suggested in the current Environmental Protection Agency (EPA) Guidelines (Ref. Chapter 1, Section 1.6). For this Chapter they may be described as follows:

Degree or magnitude of effects (significance)

- Imperceptible / Not Significant: The development proposal is either distant or adequately screened by existing landform, vegetation or built environment;
- Slight Effects: The development proposal forms only a small element in the overall panorama / field of view, or there is substantial intervening screening by the existing landform, topography and/or vegetation. The view or character of the landscape is noticeably changed but without affecting its sensitivities;
- Moderate Impact: An appreciable segment of the existing view is affected by the proposed development or the development creates visual intrusion in the foreground. The view or the character of the landscape is altered but in a manner that is consistent with existing and emerging baseline trends;
- Significant Effects: Effects which, by their character, magnitude, duration or intensity alter a sensitive aspect of the environment;
- Very Significant Effects: Effects which, by their character, magnitude, duration or intensity alter most of a sensitive aspect of the environment; and,
- Profound Effects: Effects which obliterate sensitive characteristics.

Quality of effects

The quality of potential visual and landscape effects is assessed according to EPA guidelines as follows:

- Positive Effects: Changes which improve the quality of the landscape/view;
- Neutral Effects: Changes which do not affect the quality of the landscape/view; and,
- Negative Effects: Changes which reduce the quality of the visual environment or adversely affect the character of the landscape.

Duration of effects

Effects arising from a proposed development may also be considered in terms of duration as described in the EPA Guidelines:

- Temporary: Effects lasting less than one year;

- Short-term: Effects lasting one to seven years;
- Medium-term: Effects lasting seven to fifteen years;
- Long-term: Effects lasting fifteen to sixty years; and,
- Permanent: Effects lasting over sixty years.

11.3 The Receiving Environment

This section sets out the locations and context of the proposed development in terms of its landscape character and value and its visual context. It also discusses its position in the wider landscape context of the surrounding areas of Kilkenny City.

11.3.1 Location and context

The Site is a part of the former Smithwicks brewery site in Kilkenny City, on the western bank of the River Nore, occupying approx. 1.44Ha of the overall 4.64 Ha former brewery Site. It comprises a narrow curving strip stretching from Bateman's Quay at its southern end up as far as St. Francis Abbey where the Site widens, stretching from Horse Barrack Lane, near Parliament Street (at its western edge) over to the top of the river bank to the east. The Breagagh River forms the northern boundary, save for a connection via the existing bridge over the river to link up with St. Canice's Place just west of the new St. Francis Bridge, at the northern tip of the Site.

The recent history of the Site following the closure of the brewery is described in Chapter 1 (Section 1.2.1). Kilkenny County Council agreed to purchase the Site in 2012 and subsequently moved to provide for the future planning and development of this substantial Site in the City Centre (refer to Chapter 1, Section 1.2.2 Master Plan).

The Abbey Quarter Masterplan (2016) is a key instrument in guiding the future development of the Site and it provides a template for the creation of a new quarter in the City, allowing for the provision of a range of development, in a fully integrated manner. Its key objectives are:

- The integration of the former Smithwick's Brewery Site and riverside into the medieval City;
- The redevelopment and regeneration of the former Smithwick's Brewery Site as a modern, vibrant and permeable complement to the medieval core of Kilkenny City which will consolidate the City's role as a regional hub;
- The creation of a quayside which addresses the River Nore;
- The establishment of a mixed-use Quarter which enhances the life of the City in economic, commercial and social terms;
- Development of Kilkenny as a location for creative industries, research and development, incubation clusters, university faculties & cultural institutions;
- Establishment of 'Green City' Kilkenny as a model for Irish and European cities and communities; and,
- Allowance for the Government 'Smarter Travel' initiative published in 2009 and the 'Mobility Management Plan' adopted for Kilkenny City.

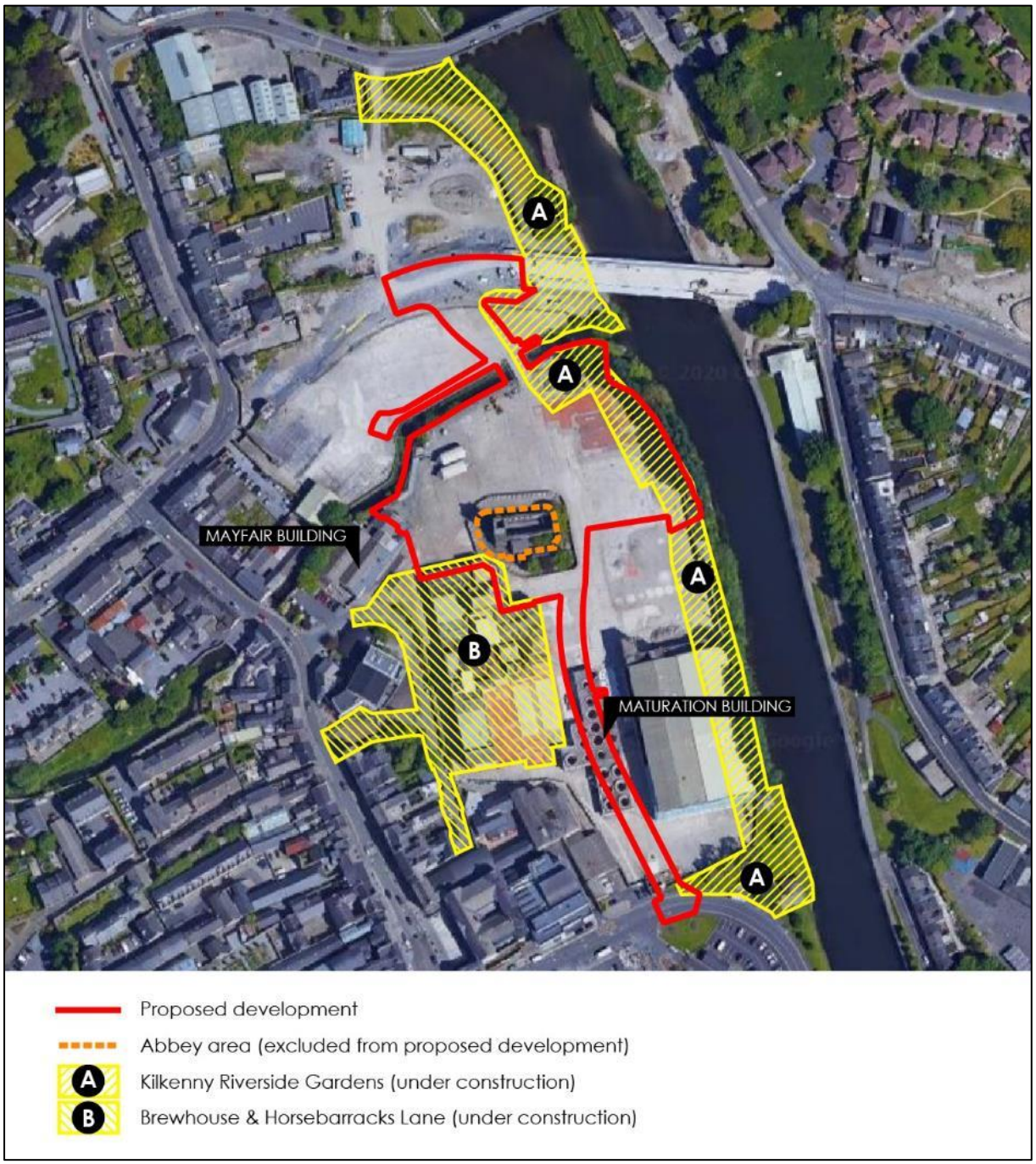
The planning and design of the various adjacent developments, whether currently under construction, in the planning system or being conceived at present, are all required to refer to the Masterplan and to the guidance provided in the Abbey Quarter Urban Design Code for the Masterplan area approved by the elected members of Kilkenny County Council in January 2018. This Code provides planning guidance and direction in areas such as land uses and mix of land uses, built form and the nature and use of new and refurbished public spaces in the Abbey Quarter.

The Brewery Site was largely cleared of buildings in 2016, however a number of buildings related to the brewery remain. These include; the Brewhouse building complex on the western flank of the Site, which together with Horse Barrack Lane is currently undergoing

redevelopment for education, research and development and/or office use and; the former brewery Maturation building located towards the southern end of the Site which received Part VII approval in 2019 for its demolition, which is scheduled in the near future under separate contract. The other remaining notable buildings within the Site confines (but excluded from the proposed development Site area) are St. Francis' Abbey in the centre of the Site and Evans Turret (with remnants of the City Wall) in the north-east corner - dating from the 13th Century, these are National Monuments and consequently, they are Protected Structures. The demolition and substantial clearance of the Site removed the brewery buildings down to the level of the existing concrete slab which had provided a level capping surface on which to construct the buildings and had also provided associated heavy duty industrial yard spaces for the delivery, storage and collection of raw materials and finished product. The larger part of the Site is still capped by this thick concrete slab.

Currently, in addition to the Brewhouse/Horse Barrack Lane scheme, the Riverside Gardens project is also under construction to the east of the Site. This will provide a riverside garden and walkway linking up Bateman's Quay to the south and Green Street (at Green's Bridge) at its northern end. It will also link along its western edge with the public realm envisaged for the future planned building developments within the Abbey Quarter. Given that the construction of these two schemes, either side of the proposed development Site, is well underway, they are considered for the purposes of this LVIA to be part of the 'receiving environment'. The location of the two schemes and their relationship with the proposed development Site are outlined in Figure 11-2 (below).

Figure 11-2: Proposed Development Site Boundary and the Adjacent Schemes under Construction



Parts of the proposed development Site and the areas between it and the current construction sites are currently in use as site compounds and storage areas for construction materials etc. (see Figure 11-3, below). As such they present challenges in the representation of the receiving environment and the proposed scheme as expressed through the photomontages.

To the west of the Site, in the link leading from Parliament Street to St. Francis Abbey, the redevelopment of the Mayfair building for use as the new Kilkenny City Library was approved by the elected members of Kilkenny County Council in accordance with the provisions of Part VIII of the Planning & Development Regulations 2001, as amended. Construction has not as yet commenced. This building, along with future proposed buildings in the Abbey Quarter area (as guided by the requirements of the Urban Design Code) and the demolition of the

Maturation building will be considered within this Landscape and Visual Impact Assessment under 'cumulative effects'.

Figure 11-3: Aerial View (March 2020) (Source: Reddy Architecture+Urbanism)

Figure 11-3 shows an aerial view of Site conditions, looking northwards with the Brewhouse to the left, the Riverside Gardens scheme to the right (both under construction) and the Abbey in the centre

The River Nore is a designated Special Protection Area (SPA) and also lies within the River Barrow and Nore Special Area of Conservation (SAC) – the boundaries of these extend up the riverbank, adjacent to the eastern edge of the Site. A number of Protected structures lie within and adjacent to the Site.

11.3.2 Historic Context

Kilkenny is an ancient City characterised by beautifully restored old buildings, winding laneways and nationally important landmark monuments such as Kilkenny Castle and St Canice's Cathedral. It is widely regarded as Ireland's most intact and legible medieval town. The proposed development Site is located within the Abbey Quarter Masterplan area which is located at the heart of the medieval core of the City, forming part of the Zone of Archaeological Potential of the Historic Town. The Archaeology and Cultural Heritage of the Site is comprehensively described in Chapter 12 of this EIAR, to which reference should be made in order to fully comprehend the historic significance of the existing landscape and how it has come to be.

The archaeology and history of the Site represent at least seven hundred years of development, redesign, alteration, re-use and adaptation, reflecting the changing fortunes of the monastery and later developments on the Site such as the Horse Barracks and St Francis' Abbey Brewery. It is a unique urban historic area.

The remaining monuments are testament to an unusually complete survival of a nationally significant complex of medieval buildings and structures within an urban environment. The abbey is the only example of a Franciscan monastery in a cityscape set within an open space, albeit one which has altered significantly over the intervening years, refer to Figure 11-4. The location of these medieval structures within what was once a traditional brewery Site, in single ownership, has helped protect them over the years but has also kept them separate from the

rest of the historic building stock of the City. As a result, they have become somewhat forgotten both locally and at a national level.

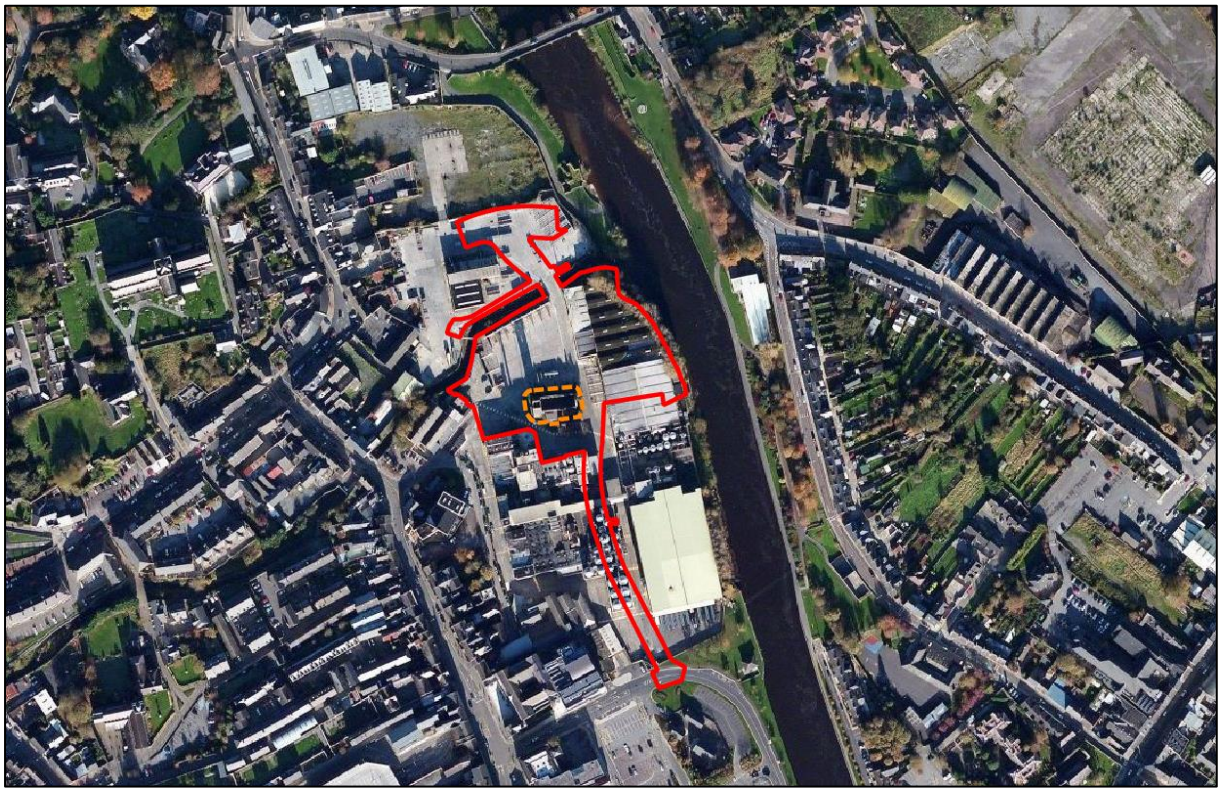
Figure 11-4: East Window of St. Francis' Abbey (Source: Mitchell + Associates)

11.3.3 Physical setting

Embraced by the River Nore to the east and the River Breagagh to the north, the Site is flat, low lying and prior to the Kilkenny Flood Relief Scheme (2005), was prone to flooding. Typical levels on the Site vary between 44.2 and 45.2 mAOD with the lowest part of the Site around the remains of St, Francis Abbey. The land rises gently heading westwards up towards the historic City core along Parliament Street and High Street.

Having been in private ownership as an industrial brewery until recently, this substantial part of the City has been largely inaccessible and public routes have had to skirt around it, refer to Figure 11-5 for context.

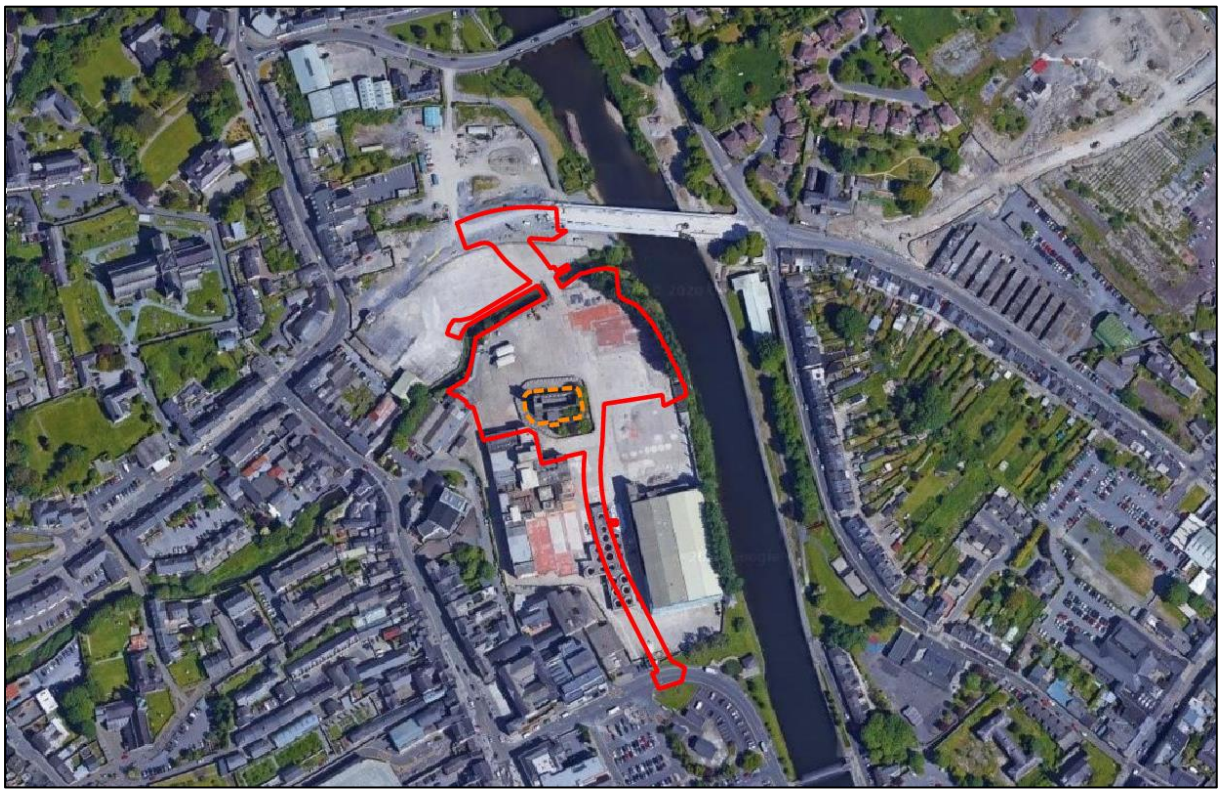
Figure 11-5: The Former Brewery Site Prior to Demolitions (Source: Bing maps)



The recent constructions of St. Francis' Bridge as part of the Kilkenny Central Access Scheme, and the Lady Dysart pedestrian bridge across the River Nore, to the north and south of the proposed development Site respectively, have since significantly reduced the impact of the river as a barrier to movement in the City, refer to Figure 11-6. Until their construction access over the river was limited to Green's bridge to the north and John's bridge to the south.

Given its former industrial use, existing vegetation on or around the Site is somewhat limited, with the most significant being that occupying the bank of the River Nore, to the east of the Site. This is largely scrub vegetation and poplars originally planted to screen the brewery and which are now regenerating, having been cut down in recent years. The channel of the River Breagagh and its edges are also sparsely lined with aquatic and marginal species. Just to the east and south of the Abbey, several trees including a weeping willow have been maturing over several decades and are inappropriately close to the historic monument.

Figure 11-6: The Former Brewery Site After Demolitions and After Construction of St. Francis' Bridge and Lady Dysart Bridge (Source: Google maps)



11.4 Characteristics and Predicted Impact of Proposed Development

11.4.1 Introduction

A comprehensive description of the design for the proposed scheme together with an outline of the design rationale is provided in Chapter 3. Please refer also to the design layout drawings, sections and associated design statements and reports included with the planning application. The scheme comprises: a proposed Urban Park; a new Street linking the Park with the existing fabric of the City and the provision of all required demolitions, services, drainage, lighting, paving, planting, site furnishings etc, see Figure 11-7 below.

Figure 11-7: The Proposed Scheme (Source: Mitchell + Associates)

11.4.2 Design Objectives

The design objectives of the proposed scheme have been developed and refined from the Abbey Quarter Masterplan – these are expanded upon in the Landscape Design Statement prepared by Mitchell+Associates, which accompanies the planning application and broadly include:

- The creation of an inclusive Urban Park for Kilkenny City with a range of facilities, public lighting, green spaces and planting;
- Allowance for the inclusion of facilities for flexible recreation, social interaction and active play, whilst remaining sensitive to the historic context of the Site;
- Appropriate expression of the archaeological elements and past activities carried out in the space, including reference to the former brewery use of the Site;
- Accommodating drainage of the Site, ensuring minimal impact on the adjacent SPA and SAC at the River Nore – this will include surface grading, referencing future Finished Floor Levels at +45.40mOD and the existing level of St. Francis Abbey at +44.20mOD;
- Connection of the new public facilities in the Park to the urban fabric of the City by creating a shared pedestrian and cyclist priority street through the Site;
- The provision of appropriate linkage and designed relationships with the adjacent schemes under construction and currently proposed;
- The provision of appropriate visual connection between the important Protected Structures within the Site and key vantage points outside it;
- Provision of mains services for the development sites neighbouring the Urban Park and Street;
- Facilitation of limited vehicle access for the future development sites neighbouring the Urban Park and Street for deliveries and maintenance etc;
- Creation of a meeting point between individual projects adjacent to the proposed development i.e. Riverside Gardens, Horse Barrack Lane and Brewhouse, Mayfair and future Masterplan developments; and,
- Provision of space to accommodate events, weekly/seasonal markets and the like.

The scheme is described in detail in Chapter 3, Section 3.2.1 The Park and Section 3.2.2 The Street. Services for the scheme including lighting and drainage, are described in Chapter 3, Section 3.2.3 Services. The scheme is a proposal of high-quality design, using high quality materials which will achieve the design objectives as set out above.

11.4.3 Predicted impact - Construction Phase

Potential visual impacts during the construction phase are related to temporary works, site activity, and vehicular movement within and around the Site. Vehicular movement may increase in the immediate area, and temporary vertical elements such as site fencing/hoarding, gates, site accommodation, plant and machinery etc., will be required and put in place. Whilst this is already the case due to the current schemes on-site, these should be completed by the time the subject scheme would be due to commence construction. It is appropriate therefore to describe the predicted impacts as more of a continuation than an intensification of the current works on-site. The construction work proposed is nevertheless, still fairly extensive in area.

It is currently estimated that the works could commence in 2022 with an estimated Site programme of approx. 14 months depending on the construction phasing. On this basis, all construction impacts would therefore be temporary to short-term and may include the following:

- Site preparation works and operations;
- Site excavations and earthworks;

- Site infrastructure and vehicular access;
- Construction traffic, dust and other emissions;
- Temporary fencing/hoardings;
- Temporary site lighting; and,
- Temporary site buildings (including office accommodation).

Given the nature and location of the Site, the day-to-day, commonly-voiced sensitivities in respect of construction impacts are likely to be with adjacent properties to the west of the Site, however these are somewhat buffered by the Brewhouse scheme - though in due course the occupants of that facility will in turn, be sensitive to construction activities on the Site. Key sensitivities however reside in relation to the River Nore and its SPA/SAC status. Mitigation measures to prevent significant negative impacts in this regard will be incorporated within the Construction and Environmental Management Plan (CEMP) for the proposed development. Construction impacts of the proposed scheme, relative to the current conditions are therefore predicted to be negative but slight.

11.4.4 Predicted impact - Operational Phase

The proposed development represents a next stage in the future development of the Abbey Quarter on lands acquired by the Council for public use. This shift of emphasis, from private to public ownership is in itself a major positive benefit to the City and the community it serves. As outlined in section 11.2 (Introduction to the Methodology for this LVIA), the term 'landscape' may be defined as "the human, social and cultural experience of one's surroundings". The proposed scheme creates the conditions in conjunction with its allied projects, whereby one can in fact access and experience this Site. The quality of one's surroundings is likely to be altered through the development of the proposed scheme in the following ways:

- The Site is currently closed to the public with no connection to the rest of the City and no safe routes through it – the proposed scheme provides full access to the Park, via the Street and pedestrian/cycle links with the core of the City. In addition, public gatherings for events will now be facilitated, promoting a sense of community and social cohesion;
- There is currently no public access to the National Monuments within the Site or to the river (though the latter is partially accommodated within the Riverside Gardens scheme, currently under construction) – the proposed scheme will provide opportunities for the public to get much closer to the Abbey, Evans Turret and the City wall, bringing it within the City's medieval 'collection' as expressed through initiatives such as the 'Medieval Mile' project. The opportunity is taken to express the historical context of the Site and to realise its significance at a national level. Access to and association with the river is also more comprehensively provided through the creation of the Park and the direct links into the Site from Parliament Street;
- The existing environment is a poor quality, derelict industrial backwater, dominated by grey concrete – the proposed development will provide a high quality, attractive and richly varied series of recreational spaces. As such, the proposed scheme clearly supports other opportunities for appropriate development in the Abbey Quarter and in the City as a whole - it creates a positive context for such development;
- Whereas the Site currently presents potential hazard and danger to the public, the proposed development by providing safe space to breathe, offers significant health benefits for the City; and,
- There is little the existing Site can offer by way of visual amenity. Worse though, it is a very poor backdrop to the National Monuments which are lost within the existing derelict and hard industrial space. The setting of the National monuments is greatly enhanced within the design and prospects from key locations are specifically created within the design framework for the scheme.

Overall, it would be expected that the proposed scheme as designed will provide significant positive long-term landscape impact for the City and its people, if not for the nation as a whole.

In respect of predicted visual impacts, given the proposed physical changes on the Site and its transformation from a concrete-dominated construction site to a public park, one would expect visual improvements to accompany the development. This is particularly so for internal views within the Site. However, the views into the Site from without are surprisingly limited due to; the riverbank planting which substantially screens views from the east; the Brewhouse and other adjacent buildings screening views in from the west and; the existing partial occlusion of views by fencing walls etc, from the south and north. It is expected that the development will create positive impacts on the view from the top of the Round Tower at St. Canice's Cathedral, but will make little impact from other Protected Structures such as Kilkenny Castle which is well to the south and has limited vantage points from which the Site can be seen.

The existing Site has very limited lighting, which is mostly related to construction site security, so is currently perceived as a dark space. The proposed development as a public park, demands an increased level of lighting to ensure public safety and will no doubt create a change in perception – one that is appropriate to its proposed use.

11.5 Proposed Mitigation Measures and / or Factors

11.5.1 Construction Phase

The construction site including a site compound with site offices, site security fencing and other temporary works will be visible from a range of places outside the Site during the construction phase. The provision of site hoarding along strategic portions of the Site boundary will substantially address some of the potential negative effects of construction operations at ground level during the construction stage. This is notwithstanding the existing construction operations on the Site and adjacent sites, which should be substantially complete by the time construction of the proposed scheme is due to start. Nevertheless, the normal range of temporary construction plant, machinery and facilities (and of course, the emerging scheme) will become apparent from some vantage points along neighbouring roads and buildings around the Site. Tall cranes and scaffolding, normally required for the construction of buildings should not be required to construct the scheme and the site facilities and equipment likely to be employed are lower scaled and more akin to that required for constructing roads etc. These are in any case, generally viewed as a temporary and unavoidable feature of construction, not least in urban settings.

Mitigation measures proposed during the construction stage of the development, revolve primarily around the implementation of appropriate site management procedures during the construction works – such as the control of lighting, storage of materials, placement of compounds, control of vehicular access, and effective dust and dirt control measures, etc. The Construction and Environmental Management Plan for the project (to be prepared by the Contractor in advance of commencement), will set out the basic measures to be employed in order to mitigate potential negative effects during construction. This is a working document which is refined and added to as the project proceeds. The Preliminary Construction and Environmental Management Plan, accompanying this application sets out the main aspects of construction and site management to be included in the Contractor's Plan developed for the scheme construction.

11.5.2 Operational Phase

The designed scheme seeks to harmonise and integrate the development within its specific historic context and the broader urban environment, whilst creating a recreational facility that is attractive and stimulating in its own right. The design rationale and detail employed seeks to mitigate potential negative effects on the landscape character and visual amenity of the area by:

- Establishing an integrated relationship between the proposed development and the broader urban landscape beyond, incorporating aspects of historic, current and emerging trends in terms of form, scale, texturing, colour and materials;
- The insertion, positioning and detail of the various elements of the scheme, in order to create a unified and harmonious whole and assist in appropriate visual assimilation within the fabric of the City;
- Rationalisation of all services elements and any other potential visual clutter and its incorporation underground, in ducts (as far as practically possible) in order to prevent disruption of surface finishes in the near future;
- Simplification, rationalisation and legibility of the proposed routes and ground pattern;
- Use of appropriate materials - the proposed external surfaces are finished in materials complimentary to the historic, traditional and the prevalent materials already featuring in the area;
- The provision of significant public open space incorporating green spaces, meeting places and play spaces which are designed to meet the modern needs of the local community, whilst being respectful of the historic significance of the Site.
- The provision of public uses within the development, in order to facilitate public access and permeability and to assist in activating public spaces. The creation of a considered and animated relationship between the buildings and the adjacent proposed external public spaces, will be important in creating a vital and successful new addition to the fabric of the City.
- Pedestrian and cycle facilities and linkage are proposed as an integral feature through the proposed scheme.

11.6 Interactions with other Environmental Attributes

Landscape and visual impacts have the potential to be impacted positively or negatively under several environmental issues including:

- The improvement in both the visual amenity of the Site has the potential to positively impact on the mental health and wellbeing of those living locally in Kilkenny City and from farther afield as discussed in Chapter 5 (Population and Human Health);
- The change in landscape from a concrete slab to a greener, softer landscape has the potential to provide additional habitats for flora and fauna in the area as discussed in Chapter 6 (Biodiversity);
- The change in the landscape from an open disused industrial Site to a public park amenity space has the potential to have positive interactions with land use in the area as discussed in Chapter 7 (Land and Soils); and,
- The scheme has specifically been designed to complement and enhance the rich heritage of the Site from both a landscape and visual context as assessed in Chapter 12 (Archaeology and Cultural Heritage).

11.7 Residual Impacts

11.7.1 Introduction

The proposed development will impact on the urban landscape to varying degrees in terms of its perceived nature and scale. These effects are tempered and conditioned by sensitivities associated with the receptor. The duration of such impacts is however determined by the life of the proposed development. In this case the development has an expected life probably exceeding 60 years Impacts on landscape character are therefore deemed to be of long-term to permanent duration in this instance.

In assessing the landscape character impacts, there are three main inter-related aspects to be addressed in considering the development proposals, namely:

- The perceived character of the area, how it is affected by the proposal and how well it integrates;
- Effects of the proposed development on social and cultural amenity (outlined in section 11.3.1); and,
- The proposed views of the development, relative to the existing Site and context (outlined in section 11.3.2) and the associated impact on visual amenity.

These impacts have been considered, including all mitigating measures and factors are therefore addressed in this section as residual impacts.

11.7.2 Impact on the Landscape Character, Social and Cultural Amenity

Whilst the term 'landscape character' is generally held to involve more than simply appearances, there is little doubt that a place's visual qualities contribute most to its character and this may be so particularly for visitors to the area, whose experience is generally a relatively fleeting one. One might surmise that the current character of the Site may be perceived largely by local people and visitors alike as a somewhat derelict site which is both inaccessible and unappealing. The proposed development will radically alter that perception as it will be an accessible and inclusive public space which will appeal on the basis of its function as a public park but also due to its integration with the National Monuments within the Site and their linkages with the other historic attractions of the City.

Given the existing Site's current appearance, it might be expected that the completion of almost any proposed development on this urban Site would be perceived to improve the appearance of the Site and improve its relationship with its immediate neighbours and the area immediately around it, simply as a consequence of completing the work. However, the final development will be judged ultimately on its finished appearance and the impact of time, public use and the elements upon it.

The proposed development is, however, well-researched and will provide an attractive high-quality public facility within the heart of the City. The overall scheme is designed in a manner which is respectful of its historical and broad urban context and of the design details and fabric that sustain it. In terms of its effects on landscape character and social and cultural amenity, it will provide **significant and positive** effects which will be of **long-term** duration.

11.7.3 Visual Impact

The assessment of visual effects likely to occur as a result of the proposed development is determined through the direct comparison of 'before' and 'after' photomontages – this is therefore, perhaps, a little less subjective than the assessment of effects on landscape character. This too is inevitably influenced to some extent by the standpoint and sensitivity of the viewer (the receptor). Photomontages for 11 selected viewpoints have been prepared - these illustrate the visual effects of the proposed development on the surrounding visual environment. As outlined in Section 11.2.1 Selection of views, of these 11 photomontages, seven of them (Views 1-7) are verified views and are the primary views assessed. The four internal views (Views A-D), whilst accurately modelled, inserted and rendered, are not verified views in that the relevant 'proposed' illustrations no longer retain enough of the existing visual context to be able to confirm their accuracy. All eleven views are submitted in the A3 document prepared by 3rd Eye (Appendix 11.1).

The existing view and baseline from each viewpoint are shown together with a range of images, as described in Section 11.2.2 Photomontage Methodology, illustrating the proposed development as seen from the same viewpoint.

Because the expected life of the proposed development is probably in excess of 60 years, the duration of predicted visual effects is assessed as long-term to permanent, as is the case for the assessed landscape character impacts.

The assessment of visual impacts through the use of comparative photomontages serves to identify impacts upon the visual environment. The photomontages are important in illustrating the impact of the proposed scheme from the selected viewpoints. In this instance, they also serve to support and illustrate an aspect of the landscape character impact. It is quite difficult to distil purely visual effects from landscape character effects, therefore the assessment text invariably links landscape character to the visual environment/amenity and vice versa and seeks to explain the effect of one upon the other.

It is important to remember that while photomontages are a useful tool in illustrating comparative visual impact, they are recognised as having their limitations and potential dangers. The guidelines for their use in assessment clearly advocate their use in the context of a Site visit to the viewpoint locations and point out that photomontages alone should not be expected to capture or reflect the complexity underlying the visual experience (refer to the GLVIA, 3rd Edition and the Landscape Institute's Advice Note 01/11).

11.7.3.1 Assessment of views

Photomontages were prepared for 11 locations from a range of viewpoints. For each view, the significance/magnitude and quality/sensitivity of the impact are assessed and summarised as follows.

Views 1-7 (verified views)

View 1a – Existing View

This is the existing view from the steps up to the Lady Desart pedestrian bridge on the east bank of the River Nore looking north-westwards. Beyond the river, the white hoarding for the current Riverside Gardens works is prominent. Beyond this the tea houses and St. Francis Abbey can be seen just right of centre in the background. The crane (centre of view) is evidence of the current Brewhouse construction works adjacent to the Site. The recently constructed courthouse buildings (left of view) are strikingly different from its generally low-key neighbours, though it is the River and its floodwalls which are the dominating element in the view.

View 1b – Baseline

This view represents the Site in the context of the completed Riverside Gardens and Brewhouse schemes (the Brewhouse is the white building beyond the tea house in the centre of view) – this is the baseline (receiving environment) against which the proposed development is assessed. This is an improvement on the existing view brought about by the removal of the white Riverside Gardens hoarding, the crane etc, and it signals a return to an accessible riverside and a more verdant landscape created by the tree planting in the Riverside Gardens scheme.

View 1c - Proposed view (at year 0)

The only visible difference in the view is at the southern end of the 'street' section of the proposed development to the left of the two mature trees in the centre of view. The difference is very small in scale within the overall view and is primarily evidenced by a newly planted tree – no other parts of the proposed development are discernible.

The impact of the proposed development in this view is assessed as **slight and neutral**.

View 1d - Proposed view (at year 25)

There is no significant difference in this view over the 25 year period (i.e. since year 0 – View 1c). The visible tree at the southern end of the 'street section' has matured somewhat but this makes little difference in the overall view. Impact is still assessed as **slight** and **neutral**.

View 1e - Proposed view (at year 25), including future Abbey Quarter buildings

This illustrates the potential cumulative effect of the future planned buildings within the Abbey Quarter masterplan area and does not represent the subject scheme, rather it is possible future context. Whilst the future planned buildings clearly make an impact in the view the proposed development itself makes little visual impact in that context.

View 2a – Existing View

This is a view from Michael Street on the east side of the River Nore looking west across the river to the Site. The structural skeleton of the Brewhouse forms the main backdrop, with St. Canice's Cathedral and Round Tower beyond to the right of view. The northernmost of the two tea houses forms a visual focus just above the river in the left of view, with the recent white courthouse building above and beyond it. Beyond the tea house and verdant far river bank, the Riverside Gardens (under construction) currently exhibits stockpiles of arisings and materials for use in its construction.

View 2b – Baseline

Once the Brewhouse and Riverside Gardens developments are complete, the baseline for the assessment of the proposed development is in place. The continuous black hoarding to the rear of the Riverside Gardens scheme, forms the eastern (foreground) boundary of the planned future development included in the Abbey Quarter masterplan. The tree planting carried out as part of the Riverside Gardens scheme enhances the screening effect of the existing river bank vegetation. The Brewhouse development now forms the backdrop to the proposed development.

View 2c - Proposed view (at year 0)

The 'street' section of the proposed development is just about visible beyond the Riverside Gardens' black hoarding (running from left to right across the view). The 'park' section to the right of view is barely discernible. Overall, the proposed development occupies very little of the field of view and makes little discernible difference to the baseline view (View 2b).

The impact of the proposed development in this view is **slight and neutral**.

View 2d - Proposed view (at year 25)

Because there is so little of the proposed development visible in the view an additional 25 years maturity makes little further difference to the assessment of impact created by the scheme – it is still **slight** and **neutra**l.

View 2e - Proposed view (at year 25), including future Abbey Quarter buildings

The planned future buildings in the Abbey Quarter, represented by semi-transparent 'ghost' buildings, will have the effect of concealing the proposed development from this viewpoint, though its presence is implied by the pedestrian connections between blocks linking with the Riverside Gardens scheme in front of it, beyond the river.

View 3a – Existing View

This view is taken from the green space at the northern end of the car park at Bateman's Quay, looking north. The proposed development Site lies beyond the hoarding for the Riverside Gardens construction scheme to the right and the former brewery buildings to the left. The majority of the view is taken up by stockpiles and the paraphernalia of construction.

View 3b – Baseline

The baseline view includes representation of the Riverside Gardens entrance area in the right foreground and the Brewhouse development (white building) to the left of view. The Abbey is

still partially screened by the Brewhouse and by the existing trees immediately south of it. This is the receiving environment for the proposed development.

View 3c - Proposed view (at year 0)

The removal of the hoarding for the Brewhouse site opens up the view into the Site and the southern street section of the proposed development assists in visually leading the eye into the Site and focusing more on the Abbey. The removal of the three trees on the south side of the Abbey increases its visual exposure and accentuates its historic credentials. The proposed development now provides a clear public access way up to the Abbey and into the park section to the North. The impact from this viewpoint will be **moderate and positive**.

View 3d - Proposed view (at year 25)

The additional maturity of the trees lining the street section further accentuates its function as an access route to the Abbey and the park beyond. The planned future buildings would be expected to have materialised within 25 years after the delivery of the proposed scheme so this is assumed to be an unlikely scenario.

View 3e - Proposed view (at year 25), including future Abbey Quarter buildings

With the addition of the future planned buildings, the 'street' now fulfils the greater function of access for deliveries and maintenance to the buildings, rather than simply an access to the park. Visually it makes more sense than the earlier 'proposed' views. Again, the street alignment leading to the Abbey beyond, provides a visual focus in the distance.

View 4a – Existing View

This view is taken from the pedestrian footpath on the southern edge of St. Francis' Bridge looking southwards. The River Nore and its riverbank vegetation dominate the view. Beyond this, to the right of view, the bell tower of the Abbey stands out with the ongoing Brewhouse development behind. To the left of view, Kilkenny Castle is visible in the distance along the line of the river. The trappings of construction operations relating to both the Brewhouse and the Riverside Gardens schemes are just visible beyond the riverbank vegetation.

View 4b – Baseline

The Brewhouse and Riverside Gardens schemes are illustrated as complete on-site, with the associated storage compounds, parking areas and crane removed. The area is assumed in the view as having been cleared to facilitate future development. This is the receiving environment for the proposed development.

View 4c - Proposed view (at year 0)

Upon completion, the park section of the proposed development becomes visible, primarily to the right of view, with paths, lawns and planting of trees, shrubs etc, and offers a softer and more appropriate setting for the Abbey. Left of centre, through a gap in the existing riverbank planting, a play area is now visible against the bare background of cleared plots for planned future development. Impact from this viewpoint will be **moderate and positive**.

View 4d - Proposed view (at year 25)

With an additional 25 years growth, the park planting has matured, though the Abbey is still clearly visible as a landmark within this view.

View 4e - Proposed view (at year 25), including future Abbey Quarter buildings

This view illustrates the planned future buildings, as per the building heights and footprints outlined in the Abbey Quarter Urban Design Code. The proposed development in the context of this cumulative element, creates no greater or lesser impact than if the planned future

buildings had not happened. The future buildings do however perhaps, provide a subtle (but greater) rationale for the visible park section of the proposed development.

View 5a – Existing View

This view is from a location at the western end of St. Francis' Bridge (just west of View 4), looking south-westwards. The view is dominated by the stockpiles, site car parking, site accommodation, crane etc, all related to the Riverside Gardens and Brewhouse construction sites, now overlying the former brewery site. The River Breagagh flows to the left within the canalised channel running diagonally in the view. Just beyond it, Evans Turret sits amongst riverside vegetation in the left of view. The Abbey stands clearly visible against the structure of the Brewhouse and is prominent on the skyline in the centre of view, alongside the tower of St.Mary's Cathedral in the background.

View 5b – Baseline

Upon completion of the Riverside Gardens scheme, a skateboard park occupies the foreground, the margins of the River Breagagh are rationalised and simplified, the construction compounds etc have been cleared and the Brewhouse development presents cleaner and simpler lines behind the Abbey. This is the receiving environment for the proposed development.

View 5c - Proposed view (at year 0)

The 'park' section of the proposed development is clearly visible, providing an appropriate open space setting for the adjacent centrepiece National Monuments (the Abbey and City walls including Evans Turret). The rather 'industrial' bridge over the River Breagagh now appropriately dressed, offers a welcoming entrance to the park and the subtle public lighting offers extended safe use of the area for the public, into the evenings. Impact from this viewpoint will be **significant and positive**.

View 5d - Proposed view (at year 25)

Following 25 years of growth, the park planting has matured but the views to the National Monuments are still retained.

View 5e - Proposed view (at year 25), including future Abbey Quarter buildings

The future buildings planned within the Abbey Quarter Masterplan are illustrated as semi-transparent blocks and are intended to be located on the extreme right of view and to the left of view in the background. These cumulative elements have little effect in altering the impact of the proposed development other than perhaps providing a complementary rationale and an appropriate built setting for the park.

View 6a – Existing View

This is a view from the top of the round tower at St. Canice's Cathedral looking eastwards. Whilst this is not a fully and freely accessible public place, it nevertheless is a rather sensitive location and a popular viewpoint, particularly for tourists getting a broad overview of the City. To the right of the recently constructed St. Francis' Bridge, the former brewery site (largely cleared concrete surfacing) has the River Breagagh cutting through it, with the Abbey, a distinctive centrepiece. The Brewhouse development currently under construction, is clearly visible to the right of the Abbey.

View 6b – Baseline

Following the completion of the Brewhouse and Riverside Gardens schemes, the park and street sections of the Site are cleared of the paraphernalia of construction. The completed schemes provide a simplified context for the Abbey and City walls. This is the receiving environment against which the impact of the proposed development is assessed.

View 6c - Proposed view (at year 0)

The 'park' section of the proposed development is clearly visible and its layout, relating to the expression of historical elements (some of which are no longer visible above ground), is also discernible from this elevated viewpoint. The 'street' section is largely blocked by the Brewhouse, in this view.

The impact of the proposed development is assessed as **significant and positive** in this view.

View 6d - Proposed view (at year 25)

An additional 25 years maturity in the park planting, enhances the Abbey as the centrepiece of the park and enhances its own appeal as a park and green space.

View 6e - Proposed view (at year 25), including future Abbey Quarter buildings

The cumulative effect of the buildings planned in the future delivery of the Abbey Quarter masterplan is to partially block the very open and clear views of the park previously afforded. However, the Abbey in its park context, with its associated open spaces is still clearly visible from this viewpoint.

View 7a – Existing View

This is a rather distant view from the grounds of Kilkenny Castle looking north along the River Nore. John's Bridge sits dominant in the foreground and the proposed development Site is marked in the distance between the crane for the current Brewhouse development and the white hoarding of the Riverside Gardens construction site at the river's edge.

View 7b – Baseline

Upon completion of the Brewhouse and Riverside Gardens schemes, including removal of the construction plant etc, the view is less disjointed and somewhat simpler and greener. This is the receiving environment for the proposed development.

View 7c - Proposed view (at year 0)

The proposed development has the effect of slightly increasing the verdant qualities in the view however the change is barely discernible in the full context of the view.

The impact of the proposed development in this view is assessed as **slight and neutral**.

View 7d - Proposed view (at year 25)

There is little discernible difference between this view 25 years on and the newly completed scheme.

View 7e - Proposed view (at year 25), including future Abbey Quarter buildings

The planned buildings forming part of the future Abbey Quarter masterplan development represent potential cumulative effects to be considered and may themselves make some impact in this view, blocking sight of small parts of the park. However, the impact of the proposed development is, in itself, undiminished.

Views A-D (internal, non-verified views)

The internal Site views A-D are prepared to further illustrate the impact of the proposed development on the existing Site of the former brewery within which sit the historic National Monuments of St. Francis' Abbey and a portion of the City Walls, including Evans Turret. These views, despite being from within the proposed development Site and as a consequence, not being 'verifiable', nevertheless provide a useful additional illustration of the proposed scheme and in particular, aspects of the design which are intended to enhance the setting of the National Monuments. These views are taken from parts of the Site which, while not accessible to the public now, will be in the future. These views cannot strictly meet the criteria

and protocols set out for the preparation of photomontages used for Landscape and Visual Impact Assessment (LVIA) purposes, however they are accurately modelled, placed and rendered - as such they do form an important part of the information available for consultation throughout the process of assessing the scheme. In each case, the existing view (suffixed 'a') is from a similar viewpoint as the others in the set – these viewpoints have to be approximated due to the changing nature of and operations on the existing adjacent construction sites.

View A

The sequence of views clearly illustrates how the Site will appear through the various stages of the planned development as set out in the Abbey Quarter Masterplan - in this case, as seen from the existing bridge across the River Breagagh, looking south.

The proposed development offers significant improvements over the existing Site in respect of public access, public facility and amenity and a greatly improved setting for the Abbey. The impact of the proposed development in this view is **significant and positive**.

View B

The same is true for this view, which is located just inside the Site, close to viewpoint A, but across the bridge, at its southern end. The viewpoint is located within the 'Orchard' sitting area section of the park and the view again looks southwards. Again, it clearly offers great improvements over the existing condition. The impact of the proposed development in this view is **significant** and **positive**.

View C

This view is taken from the north-west corner of the Site, adjacent to the Mayfair building and looking eastwards. The Abbey is centred in the view with the Brewhouse to the right. The proposed scheme provides interpretive elements and spaces referencing and reflecting the Site archaeology as an integral part of the park design. It is clearly a great improvement over the existing condition. The impact of the proposed development in this view is **significant and positive**.

View D

This view is taken from within the street section of the proposed development looking northwards towards the Abbey and the proposed park area. The white finished Brewhouse redevelopment dominates in the left of view, however the proposed development of the street creates an appropriate context for it and provides for access to the future planned buildings, which will also in turn, provide the clear rationale for the street itself. The park in the distance acts as a lure along the 'street' section, encouraging safe pedestrian and cyclist movement through the scheme and in due course, through the completed Abbey Quarter area. The impact of the proposed development in this view is **significant and positive**.

11.8 Cumulative and In-combination Impacts

Current guidelines suggest that a determination should be made as to whether cumulative effects are likely to occur – these are outlined in the current GLVIA guidelines (3rd edition) as 'additional effects caused by the proposed development when considered in conjunction with other proposed developments of the same or different types'. It has become accepted practice that such a determination generally needs to be made as to whether any likely pending or permitted development of a similar nature will have any bearing on the assessment of the proposed development and this is subject to the assessor's judgement in the matter.

The photomontage images suffixed 'e' for each viewpoint, illustrate the planned future buildings as outlined in the Abbey Quarter Masterplan and the approved scheme for the Mayfair building, which are considered to be relevant to any assessment of cumulative effects

for the proposed development. These are assessed in the context of each verified view (Views 1-7) and for each of the internal views A-D.

Because these future schemes along with the proposed development are born out of the same masterplan for the Abbey Quarter, there are the potential for future in-combination and cumulative impacts. It is intended that they will be complementary, one to the other.

These pending and permitted schemes will affect the impact created by the proposed development, usually in this case, by blocking or masking views of the proposed development at a later stage, when they are constructed. In most cases, the future schemes, pending or permitted, will provide a kind of retrospective rationale for the proposed urban park and street scheme. The specific cumulative effects for each view are discussed in section 11.7.3.1 above. However, given that there is to date, no application for any additional future Masterplan developments, other than the Riverside Gardens, Brewhouse and Mayfair Buildings, a detailed assessment of these structures cannot be undertaken at this the time of writing. The landscape and visual impact of any such future developments will be considered by the planning authority when making decisions on related planning applications.

11.9 Monitoring

11.9.1 Construction Phase

The success of the proposed development is dependent on the proposals being properly executed as approved. Detailed agreement on finishes and materials to be employed needs to be ensured through the provision of, and on-going adherence to, reference samples provided on-site for the duration of the construction works and defects period. The proposed soft landscape works will need to be maintained and managed especially over the initial period after planting, during the final stages of the construction phase, in order to ensure their successful establishment and the intended integration of the development into the existing context.

The proposed use of larger scale trees requires particularly strict adherence to properly conceived and executed design and supervision by suitably qualified and experienced professionals. It also requires the development of maintenance regimes and appropriate management plans during this establishment period and for use during the operational phase, in order to ensure the survival of these larger scale trees over a minimum period of 4 years after planting and their ensured future vigour in perpetuity.

11.9.2 Operational Phase

The success of the proposed development is dependent on the proposals being properly executed as approved and on an appropriate set of landscape maintenance and management plans which will set out procedures and responses to potential systems failures. In addition, the positive management of the public spaces to ensure on-going and appropriate social patronage and viability is essential.

11.10 Reinstatement

Not applicable.

11.11 Difficulties Encountered in Compiling this Information

No difficulties were encountered in compiling this chapter.

12 CULTURAL HERITAGE

12.1 Introduction

This chapter describes the predicted impacts of the proposed development on archaeology and cultural heritage and the measures to mitigate these impacts. The chapter was prepared by Archaeological Management Solutions Ltd (AMS) and Mr. Rob Goodbody. This chapter should be read with reference to the following appendices:

- Appendix 12.1: Legal Framework and Key Sources – Archaeology;
- Appendix 12.2: Legal Framework and Key Sources – Architectural Heritage;
- Appendix 12.3: Archaeological and Historical Background;
- Appendix 12.4: Overview of Historical Maps;
- Appendix 12.5: Details of Previous Archaeological Excavations;
- Appendix 12.6: Artefacts Catalogued in the National Museum of Ireland (NMI);
- Appendix 12.7: Catalogue of Archaeological Sites; and,
- Appendix 12.8: Catalogue of Architectural Heritage Sites.

12.2 Methodology

12.2.1 Overview

The methodology used in the preparation of this assessment was informed by the EPA's draft 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, EPA. 2017. Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, 2017) along with other relevant guidance. This chapter focuses on the likely archaeological and architectural (built) heritage impacts of the proposed development. The emphasis of the archaeological study was on subsurface remains, while the architectural assessment focused on the structures that are still standing.

In its 'Framework and Principles for the Protection of the Archaeological Heritage' (Duchas, 1999, p. 9), the then Department of Arts, Heritage, Gaeltacht and the Islands defined archaeology and its importance in the following terms:

Archaeology is the study of past societies through the material remains left by those societies and the evidence of their environment. The archaeological heritage consists of such material remains (whether in the form of sites and monuments or artefacts in the sense of movable objects) and environmental evidence.

Architectural heritage comprises structures, buildings, traditional and designed, and groups of buildings including streetscapes and urban vistas, which are of historical, archaeological, artistic, engineering, scientific, social or technical interest, together with their setting, attendant grounds, fixtures, fittings and contents. Architectural heritage and archaeology together form the 'built heritage'. For the purpose of this assessment there was an overlap between these aspects of the historic environment in that several significant architectural heritage sites are also significant archaeological sites, most notably St Francis' Abbey, the City Wall, St Canice's Cathedral and Kilkenny Castle. Where a building or other structure has been destroyed it no longer has architectural significance, though it may leave traces that fall within the ambit of the archaeological assessment. It may also have had an importance that remains through the historical record. However, for a structure to have architectural significance it need not survive intact, and ruins or even fragments of buildings may be of architectural heritage importance.

12.2.2 Consultation

Extensive consultations have taken place with the National Monuments Service (NMS) in relation to the proposed development. This included a meeting at the Site, to discuss both the Conservation Plan for St. Francis' Abbey and the proposed development. This consultation

assisted in establishing some of the key heritage led design principals for the proposed development. A copy of a letter received from the NMS is presented in Appendix 1.3.

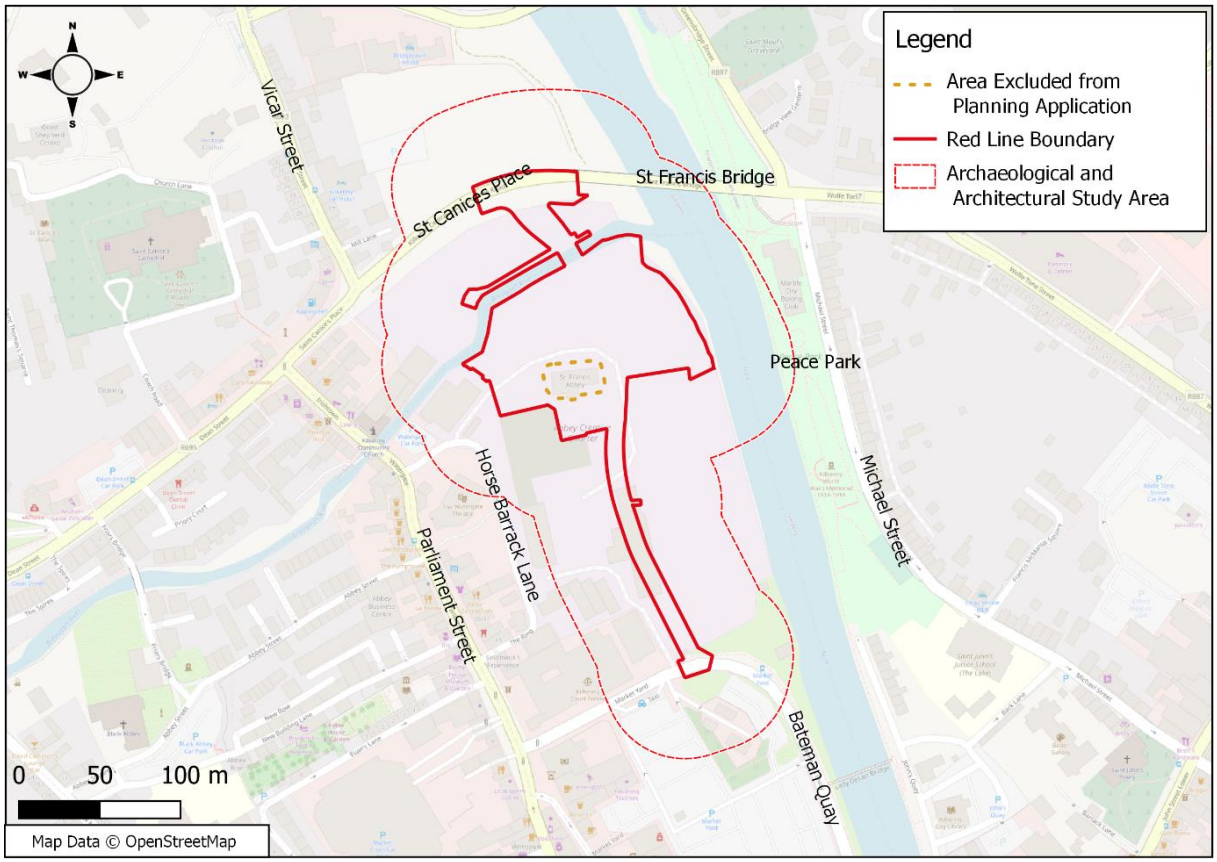
12.2.3 Defining the Study Area

There is no predefined distance from a proposed development for an assessment of potential impacts on archaeological or architectural heritage. In this instance, it is considered reasonable that a 50m distance from the boundary be taken for the assessment of archaeology and architectural heritage as the proposal involves works at or near to ground level, with the result that there will not likely be any significant effect on subsurface archaeology or the character of structures of architectural heritage significance beyond that distance. However, the assessment has considered potential effects beyond 50m of the development where they have significance in the cityscape, are linked to structures within 50m of the Site and/or their visibility from the proposed development.

The proposed development covers an area of 1.44 hectares, and the archaeological and architectural heritage assessment area comprises 6.90 hectares.[10] This study area extends from Green's Weir on the River Nore in the north to Bateman Quay and the Market Yard in the south, and from Peace Park on the east bank of the River Nore to The Ring in the west. It includes or touches on properties fronting onto Vicar Street, Saint Francis' Bridge and Saint Francis Street (the Kilkenny Central Access Scheme), Saint Canice's Place, Irishtown, Michael Street, Watergate Street, The Ring, Parliament Street, Market Yard and Bateman Quay. The River Nore runs north to south along the east side of this study area, and includes the confluence of the River Breagagh which runs from west to east through the northern part of the study area (Figure 12-1).

[10] The extent of the study area is from ITM 650382, 656105 in the SW to 650638,656518in the NE; the central point of the study area is ITM 650511,656311.

Figure 12-1: The Archaeology and Architectural Heritage Study Area



12.2.4 Site Identification

All known archaeological and architectural heritage sites were identified, mapped and described for the study area using a customised Geographical Information System (GIS).[11] This GIS was used to plot the proposed development in relation to recorded archaeological and architectural heritage sites, including sites listed on the Sites and Monuments Record (SMR), Record of Monuments and Places (RMP), National Inventory of Architectural Heritage (NIAH) and the Record of Protected Structures (RPS). Architectural Conservation Areas (ACA's) and features identified on the Urban Archaeological Survey were also included.

For the purpose of the assessment, archaeological heritage assets have been given specific numbers with the prefix 'AR' (short for 'archaeology') and architectural or built heritage assets have specific numbers with the prefix 'BH' (built heritage). Where there is an overlap between archaeological and built heritage, upstanding buildings have been given a BH number with the relevant archaeological details included in the site description. The upstanding remains of St Francis' Abbey, for example, is listed as an architectural heritage (BH) asset [BH-04]; this building contains within it five architectural and funerary monuments each listed separately in the SMR, all of which are included in the description of the architectural heritage (Appendix 12.8). The subsurface archaeological elements of St Francis' Abbey have been assigned the reference number AR-03 and are described in the archaeological catalogue (Appendix 12.7).

The study includes archaeological sites and buildings which are entirely or partly within the study area. Some sites and buildings, such as the Bull Inn, the Court House and Watergate Theatre are so large as to extend beyond the 50m study area; similarly, the gated entrance to E. Smithwick and Sons Limited brewery is located outside study area, but is a component part

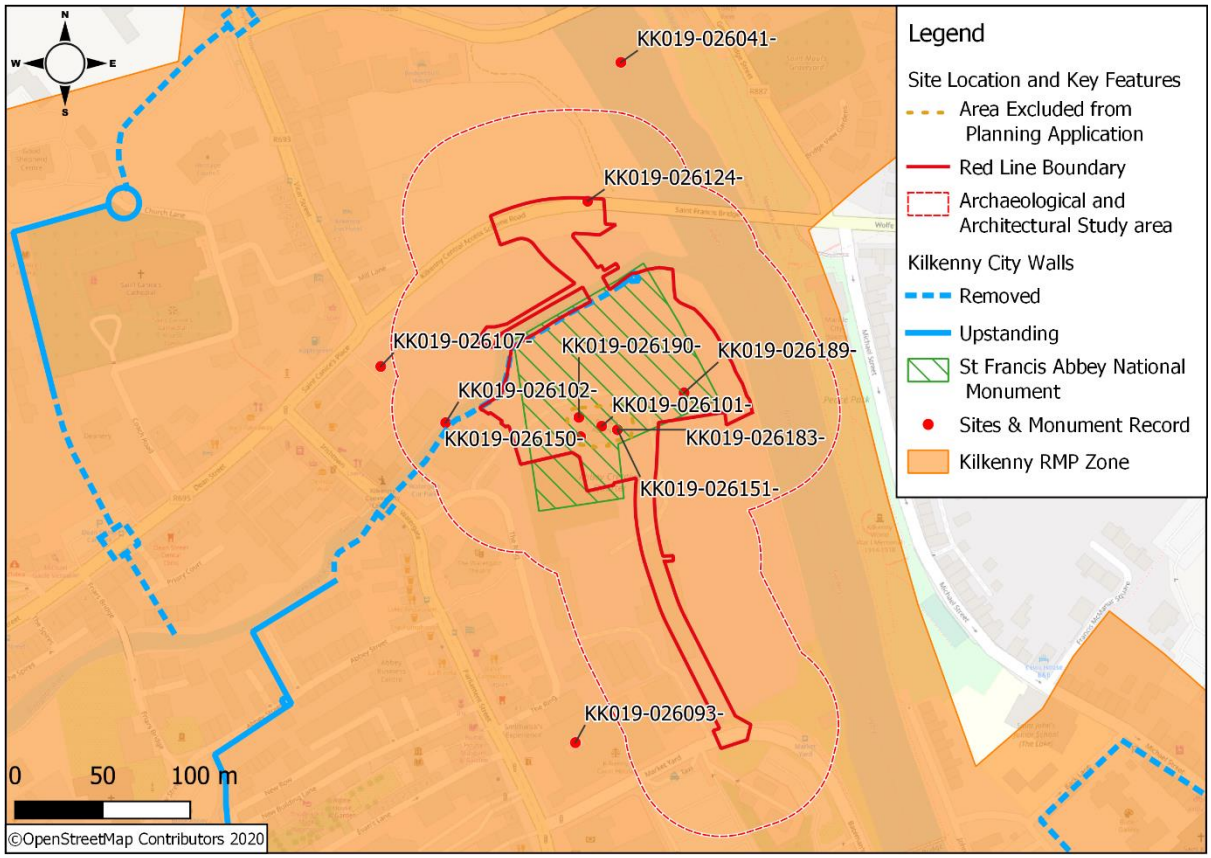
[11] The GIS was created using open-source GIS software QGIS (version 3.10).

of the upstanding remains of the nineteenth-century St Francis' Abbey Brewery and so is included in the analysis.

The study also included areas of archaeological potential identified in excavations such as subsurface deposits [AR-17], buildings [AR-18] and the river environments of the Nore and Breagagh.

The recorded archaeological sites within c.50m of the proposed development are described in detail in Appendix 12.7. Architectural heritage sites are outlined in Appendix 12.8. (Figure 12-2).

Figure 12-2: Recorded Archaeological and Architectural Heritage in the Study Area



12.2.5 The Archaeological Assessment

The archaeological assessment consulted the following sources:

- The Record of Monuments and Places (RMP) and Sites and Monuments Record (SMR);
- The list of National Monuments in State Care: Ownership and Guardianship (DCHLG & NMS, 2009);
- The list of Preservation Orders held by the National Monuments Service (DCHG and NMS, 2019);
- Topographical Files held by the Antiquities Division of the National Museum of Ireland (NMI);
- The Urban Archaeological Survey of County Kilkenny (Farrelly, O'Reilly, & Loughran, 1993);
- The Excavations Bulletins (1970–2010) and the Database of Irish Excavation Reports (DCHG & Wordwell, Excavations Bulletins, 2020);

- Kilkenny Archaeological Project (KKAP) Reports and database (Ó Drisceoil, Bradley, Jennings, McCullough, & Healy, 2008);
- River Nore Reports (Devine, Jennings, Lenehan , Muyllaert, & O Drisceoil, 2009);
- An Industrial Archaeology Survey of County Kilkenny (Hammond, 1990);
- The online Historic Environment viewer maintained by NMS (DCHG & NMS, Historic Environment Viewer, 2020);
- The online Heritage Maps maintained by The Heritage Council (Heritage Council, 2020) which includes the KKAP database and links to excavation reports;
- The online National Library of Ireland database (National Library of Ireland, 2020);
- Griffith's Valuation (Ask About Ireland, 2003);
- The Cambridge University Collection of Aerial Photographs (CUCAP) (CUCAP, 2020);
- Britain from Above collection of historical aerial photographs (Historic Environment Scotland, 2020);
- The Historic Town Atlas for Kilkenny City (Bradley, 2020), also available online (Royal Irish Academy, 2019);
- Historical Ordnance Survey of Ireland maps and aerial photographs (OSI, 2020) and town plans (UCD, 2020); and,
- Satellite images from Bing and Google.

The assessment was informed by archaeological, architectural heritage and historical assessments for the development of the Abbey Quarter Masterplan area which have been ongoing since 2014. These have included archaeological test excavations, a geophysical survey, a survey of the built heritage of the City Wall and archaeological monitoring of the development of the Brewhouse Building, the Mayfair Building and the River Garden Project, each within the Abbey Quarter Masterplan area and adjacent to the proposed development. In addition, the assessment consulted previous archaeological excavations recorded in the Kilkenny Archaeological Project (KKAP) and the results of more recent excavations within the proposed development area (summarised in Appendix 12.5). The previous archaeological and historical assessments consulted include:

- The archaeological assessment for the Abbey Creative Quarter Masterplan (Courtney Deery Heritage Consultancy, Abbey Quarter Masterplan Area Archaeological Strategy for Kilkenny City Council (Appendix C Abbey Quarter Masterplan), 2014);
- The archaeological assessment for the Riverside Gardens Project (Courtney Deery Heritage Consultancy, Proposed Riverside Garden Kilkenny City, Kilkenny Archaeological Impact Assessment, 2015);
- The historical assessment of the Mayfair Building (Ó Drisceoil, Archaeological Assessment: The Mayfair Ballroom, Horse Barrack Lane, Kilkenny, 2014);
- Strategies for archaeological test excavation in the Abbey Quarter Masterplan area prepared by AMS for Kilkenny County Council (AMS, Archaeological Assessment Strategy for the Implementation of the Abbey Creative Quarter Masterplan: Public Realm B., 2016) (AMS, Archaeological Assessment Strategy for the Implementation of the Abbey Creative Quarter Masterplan: Public Realm C, 2016);
- Ground Penetrating Radar (GPR) survey within the Abbey Quarter Masterplan area in 2016 (Nicholls, 2017). This survey was to be carried out in two phases: Phase 1 being sample surveys of four areas of the former Diageo brewery amounting to 0.39 Ha, designed to assess the ground suitability for a further Phase 2 GPR survey of the whole Diageo brewery site. Following the Phase 1 sample survey Nicholls recommended against proceeding with a Phase 2 full survey because the large number of modern services and concrete building foundations masked any potential archaeology. One of these subsurface features was determined to be a concrete chamber over the site of St Francis' Well;

- Archaeological assessments and surveys of the City Wall behind the Mayfair Building (AMS, Preliminary Archaeological Assessment of Kilkenny City Wall: Mayfair Boundary Wall with the River Breagagh., 2017) (AMS, Final Report on the Archaeological Assessment of Kilkenny City Wall: Mayfair Boundary Wall with the River Breagagh., 2018);
- Archaeological test excavations in the area of the Riverside Garden development (Murphy, 2017);
- Archaeological test excavations in the former Diageo brewery site, including within the footprint of the proposed development (ACSU & Stirland, Archaeological Test Trenching of the Abbey Creative Quarter, Co. Kilkenny: Public Realm B: Consent C853/E4950., 2018) (ACSU & Stirland, Archaeological Test Trenching of the Abbey Creative Quarter, Co. Kilkenny: Public Realm C: Consent C853/E4950., 2018);
- The results of archaeological monitoring for the development of the Brewhouse building (Flynn, Archaeological Test Trenching Report: Brewhouse Redevelopment Abbey Creative Quarter, Kilkenny City. Ministerial Consent No. C773/ E4766. Report date Feb 2018., 2018) (Flynn, Preliminary Report on Archaeological Excavation and Preservation in situ of Archaeology, at Brewhouse Redevelopment, Kilkenny City. Ministerial Consent No. C773; Archaeological Registration E4766. Report date Nov 2019., 2019);
- The buildings assessment (Courtney Deery Heritage Consultancy, Building Assessment Report Maturation Building, St. Francis' Abbey Brewery Site, Kilkenny, Co. Kilkenny, 2019) and archaeological assessment (AMS, Archaeological Impact Assessment of the Demolition of the Maturation Building, Abbey Quarter, Kilkenny., 2019) of the Maturation Building;
- Archaeological excavations at the Mayfair Building in advance of the development (AMS, Interim Report on Archaeological Excavations in Advance of Construction of the ESB Substation and Switching Room, Mayfair Building, Abbey Creative Quarter, Kilkenny City. Consent C789; E4822., 2019);
- Archaeological monitoring of the construction of the ESB substation at the Mayfair Building (Flynn, Report on Archaeological Monitoring of Construction of the ESB Substation and Switching Room, Mayfair Building, Abbey Creative Quarter, Kilkenny City. Consent C789/ Excavation E4822., 2019);
- Archaeological monitoring of geotechnical investigations north and east of St Francis' Abbey (AMS, Archaeological Monitoring of Geotechnical Investigations north and east of St Francis' Abbey, Kilkenny, January 2020. Consent Number C000853/ E4950., 2020); and,
- Archaeological monitoring of geotechnical investigations around the Mayfair Building (AMS, Mayfair Building Site, Kilkenny City: Archaeological Monitoring of Geotechnical Investigations January 2020. Consent Number C000798, E04822., 2020).

In addition, Mr. Colm Flynn is currently (to July 2020) archaeologically monitoring the development of the Riverside Gardens Project (Ministerial Consent C853/ E4950), whilst AMS is monitoring the redevelopment of the Mayfair Building (Ministerial Consent C798/ E4822).

Having identified archaeological sites, monuments and areas of archaeological interest within the study area from the sources above, a significance rating was assigned to each for the purposes of the assessment. National Monuments legislation does not differentiate between archaeological sites on the basis of importance, apart from the special recognition of National Monuments, as defined in the National Monuments Act (1930–2004) (see Appendix 12.1). However, the assessment of the significance and sensitivity of each archaeological site was made on a four-point scale of 'Very High', 'High', 'Medium' and 'Low'. These assessments were based on professional judgement and experience, and informed by the categories of 'Context, Character, Significance and Sensitivity', as set out in the EPA guidelines (EPA, EPA.

2017. Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, 2017, p. 45). The assessment of significance also considers whether the archaeological site is identified in survey and archaeological excavations or recorded in historical sources, and whether it has been significantly disturbed in the past. The whole development is located within the City of Kilkenny's zone of archaeological potential as outline in the RMP. The two National Monuments in the proposed development – St Francis' Abbey and the City Wall – have been described as having very high significance to differentiate them from other sites of high significance.

The assessment of impacts on archaeological sites is based on likely effect on archaeology of the design for the proposed development during the construction and operational phases of the project, particularly enabling works, site investigations, demolition, bulk excavation, foundations, service installation, construction, conservation works and maintenance.

A detailed archaeological and historical background for the proposed development is given in Appendix 12.3; Appendix 12.4 contains a detailed description of cartographic.

12.2.6 The Architectural Assessment

The identification of buildings and structures of architectural heritage interest to be assessed for impact was based on desktop research and Site walkovers. The potential for any building or other structure on the Site or in its vicinity to have special architectural heritage significance was gauged through examination of the following sources:

- The Kilkenny City Development Plan 2014–2020 including the Record of Protected Structures (Kilkenny County Council, Kilkenny City & Environs Development Plan 2014-2020 Appendix 1: Record of Protected Structures., 2014) (Kilkenny County Council, Kilkenny County Council. 2018. Kilkenny City & Environs & Kilkenny County Record of Protected Structures - 18 Additions and 1 Deletion as ratified by Kilkenny County Council on 19th February 2018., 2018) ;
- National Inventory of Architectural Heritage (DCHG, Buildings of Ireland, 2020);
- Pre-Ordnance Survey map by John Rocque 1758;
- Ordnance Survey six-inch map of 1839;
- Ordnance Survey 1:1056 maps of 1871; and,
- Ordnance Survey 1:2500 map of 1900.

Site visits for the archaeological assessment were carried out from January to March and in June and July 2020. Site visits for the architectural heritage assessment were carried out on the 15th of February 2019. Any buildings on or close to the proposed development that were identified on the earlier Ordnance Survey maps were checked against the current Ordnance Survey maps to ascertain which were still present. The Site was then walked to identify those structures noted in the desktop survey to assess them for their architectural heritage quality. The possibility of finding structures of architectural heritage significance not identified from the desktop assessment was kept in mind during the site work, and any additional structures of potential architectural heritage interest were examined.

The architectural heritage assessment examined each structure or group of structures to assess whether it is of special interest as built heritage. This would include special interest for its architectural, historic, artistic, cultural, scientific, social or technical interest. This list of potential interests is derived from section 10(2)(f) of the *Planning and Development Act 2000*, which sets down the obligation of a planning authority to include objectives for the protection of structures in its development plan.

Where a structure or group of structures may be of special interest due to its age or other factors, an assessment of its architectural heritage significance is noted. In each of these cases the structure is given a number prefixed with 'BH' for Built Heritage. Where the assessment finds that a structure is not of special interest and is rated as 'Record Only' it is

not considered to be of sufficient architectural or built heritage significance that the potential effects of the proposal need to be determined. In these cases, the potential impacts are given as "n/a", signifying "not applicable" and no mitigation measures would be warranted other than to record the structure if it is to be demolished or removed.

In each case, the survey includes a brief description of the structure or group of structures and an approximate date of construction. In the case of the older structures the survey includes some background information about the structure to elaborate on the historical background given in Appendix 12.3. The survey commenced within the application Site and then progresses to those buildings outside the site that are within the immediate vicinity, following which buildings of very high significance that are readily seen from the application site are included. Detailed descriptions of the sites are contained in Appendix 12.8.

12.3 The Receiving Environment

12.3.1 Archaeology

Figure 12-2 shows the recorded archaeological sites within the study area

12.3.1.1 National Monuments

The proposed development Site encompasses two National Monuments. The first is St Francis' Abbey (Ref. no. 72) which includes the standing remains [BH-04] which are in the ownership of the State (surrounded by but separate from the proposed development), and the surrounding subsurface remains of the friary which extend into the proposed development area [AR-03].[12] The City Wall [BH-01] bounding the River Breagagh, including Evans Turret [BH-02], is also a National Monument under the National Policy on Town Defences (DoEHLG, 2008)(Appendix 12-8).

12.3.1.2 Preservation Orders

There are no active preservation orders within the proposed development area.

12.3.1.3 Record of Monuments and Places

The whole of the proposed development is located within the RMP constraints area/Zone of Archaeological Potential for Kilkenny City (RMP KK019-026----) (Figure 12-2).

12.3.1.4 Urban Archaeological Survey

The Urban Archaeological Survey (UAS) for Kilkenny City was completed in 1993 (Farrelly et al. 1993) and lists two sites within the proposed development: Evans Turret (UAS-7) [BH-02] and St Francis' Well (UAS-101) [AR-04]. St Francis' Abbey (UAS-101) [BH-04/AR-03] is surrounded by the proposed development, whilst a further four UAS sites are within the 50m study area: the mill stream (UAS-77) [AR-15] and Grace's Castle, later the Court House and prison (UAS-93) [AR-14], Cotteral's Bridge site (UAS-102) [BH-05] and a watermill (UAS-124) [AR-02] (Appendix 12-7).

12.3.1.5 Sites and Monuments Record

One site listed in the SMR lies within the footprint of the proposed development: St Francis' Well (KK019-026189-) [AR-04]. In addition, the proposed development surrounds five monuments within St Francis' Abbey: the upstanding remains of the friary (KK019-026101-) [BH-04], which also encloses a font (KK019-026150-) and inscribed stones (KK019-026151-, KK019-026183-and KK019-026190-). A further five sites listed in the SMR are within the 50m study area: a weir south of Green's Bridge on the River Nore (KK019-026041-) [AR-01], the site of Grace's Castle at the Court House on Parliament Street (KK019-026093-) [AR-14/BH-09], the site of Cotteral's Bridge on the River Breagagh (KK019-026102-) [BH-05], the Bull Inn

[12] https://www.archaeology.ie/national-monuments/search-by-county

(KK019-026107-) [AR-12] and Medieval/Early Modern house (KK019-026122-) [AR-13] on Vicar Street, and Chancellor's Mill, preserved beneath the recently developed St Francis' Street (KK019-026124-) [AR-02] (Appendix 12-7; Figure 12-2).

Table 12-1: Archaeological Sites within the Proposed Development

Site	Name	Street/ Townland	ITM	SMR	UAS	Nat. Mon.	Significance/ Sensitivity
AR-02	Chancellor's Mill (site)	St Francis' Street; Gardens Td. (St Canice's Parish)	650494, 656466	KK019-026124-	UAS-124	-	High
AR-03	St Francis' Abbey (subsurface)	Gardens Td. (St Mary's Pr.)	650478, 656336	KK019-026101-	-	Ref. 72	Very High
AR-04	St Francis' Well	Gardens Td. (St Mary's Pr.)	650552, 656358	KK019-026189-	UAS-101	Ref. 72	High
AR-05	St Francis' Abbey Graveyard (site)	Gardens Td. (St Mary's Pr.)	650456, 656354	-	-	Partly within Ref. 72	Very High
AR-06	Millrace (site)	Gardens Td. (St Mary's Pr.)	650349, 656253 to 650620, 656240	-	-	-	Medium
AR-08	Horse Barracks (site)	Gardens Td. (St Mary's Pr.)	650429, 656345	-	-	-	High
AR-09	St Francis' Abbey Brewery (site)	Gardens Td. (St Mary's Pr.)	650500, 656270	-	-	-	High
AR-10	Millrace (site)	Gardens Td. (St Mary's Pr.)	650532, 656259	-	-	-	Medium
AR-16	Meadows (site)	Gardens Td (St Canice's Pr.)	650481, 656434	-	-	-	Medium
AR-17	Gardens (site)	Gardens Td (St Mary's Pr.)	650529, 656339	-	-	Partly within Ref. 72	High
AR-18	Market Building (site)	Gardens Td (St Mary's Pr.)	650573, 656173	-	-	-	Low

Table 12-2: Archaeological Sites adjacent to the Proposed Development

Site	Name	Street/ Townland	ITM	SMR	UAS	Nat. Mon.	Significance/ Sensitivity	Distance
AR-01	Green's Bridge weir	Gardens Td (St Canice's Pr.); Friarsinch Td.	650513, 656545	KK019-026041-	UAS-41	-	High	c.30m to N
AR-07	Grey Freren Gate (possible site)	Gardens Td. (St Mary's Pr.)	650417, 656336	-	-	-	Medium	c.5m to W

Site	Name	Street/ Townland	ITM	SMR	UAS	Nat. Mon.	Significance/ Sensitivity	Distance
AR-11	Mill (site)	Parliament Street/ Horse Barrack Lane, Gardens Td. (St Mary's Pr.)	650441, 656252	-	-	-	High	c.50m to W
AR-12	Bull Inn	Vicar Street, Gardens Td. (St Canice Pr.)	650376, 656372	KK019-026107-	UAS-107	-	High	c.50m to N
AR-13	Vicar Street house	Vicar Street, Gardens Td. (St Canice Pr.)	650376, 656399	KK019-026122-	UAS-122	-	High	c.50m to N
AR-14	Gaol/ burials/ Grace's Castle (site)	Parliament Street, Gardens Td. (St Mary's Pr.)	650513, 656171	KK019-026093-	UAS-93	-	High	c.30m to W
AR-15	Mill race	Newpark Lower Td. to Gardens Td. (St. John's Pr)	650412, 657355 to 651245, 655916	-	UAS-77	-	High	c.45m to E
AR-19	River Nore	<5m	650578, 656402	-	-	-	Medium	<5m to E
AR-20	River Breagagh	<1m	650477, 656404	-	-	-	Medium	<1m surrounded by the proposed development

12.3.2 Architectural Heritage Assets

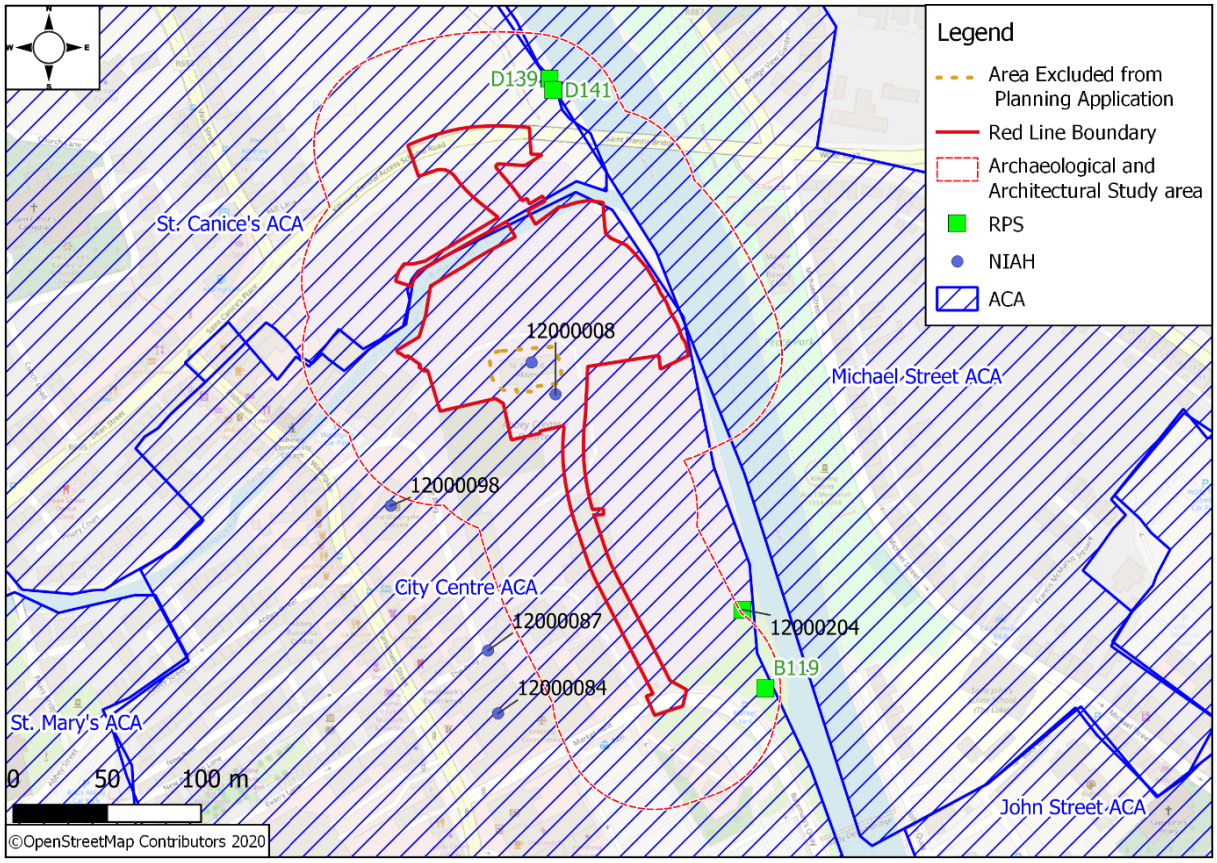
12.3.2.1 Record of Protected Structures

There are no Protected Structures within the application Site. However, there are two upstanding historic monuments within the Site – the City Wall [BH-01] and Evans Turret [BH-02], while the proposed development surrounds a third historic monument, the choir and bell tower of medieval St Francis's Abbey [BH-04]. A further early structure close to the Site is the abutment of a masonry-arched bridge [BH-05] which formerly crossed the River Breagagh. Nine buildings in the broader study area are included in the RPS (See Figure 12-3):

- Smithwick's Brewery and gate on Horse Barrack Lane (B86) [BH-06];
- Tea or pleasure house beside the River Nore at Bateman Quay (B119 [BH-08]);
- Tea or pleasure house beside River Nore north of Bateman Quay (B225 [BH-07]);
- The Court House on Parliament Street (B133) [BH-09]; and,
- Mill buildings beside the River Nore on the opposite side of the recently built St Francis' Bridge (D139 & D141) [BH-11].

St Canice's Cathedral and round tower (B17 & B18) [BH-12] and Kilkenny Castle (B197) [BH-13] are located outside the study area but are included in this analysis.

Figure 12-3 Recorded Architectural Heritage



12.3.2.2 National Inventory of Architectural Heritage

One building within the Site is included in the National Inventory of Architectural Heritage (NIAH); this is the Tasting House, which is the gothic building to the south of St Francis' Abbey (NIAH 12000008) [BH-03], mistakenly described in the NIAH as a nineteenth-century structure, but actually built in c.1980.

Some structures in the vicinity of the Site are included in the NIAH and these are noted in the building survey:

- The entrance gate to E. Smithwick and Sons, NIAH 12000087 [BH-06];
- The Courthouse on Parliament Street, NIAH 12000084 [BH-09];
- The Watergate Theatre, NIAH 12000098 [BH-10];
- The Tea House on Bateman Quay NIAH 12000204 [BH-08].[13]

In most cases the buildings included in the NIAH are also Protected Structures (Appendix 12-8; Figure 12-3).

12.3.2.3 Architectural Conservation Areas

The Site lies within two Architectural Conservation Areas (ACA's), the boundary between them lying along the River Breagagh. The northern part of the proposed development area lies within the St Canice's Architectural Conservation Area (ACA), while the larger part, to the

[13] Note the NIAH mapping has incorrectly identified this building as the second tea house further to the north [BH-07]

south of the Breagagh, lies within the City Centre ACA. The blue hatching on the map below depicts the ACAs, while the red line denotes the application Site.

Table 12-3 Architectural Heritage Assets within the Application Site

Site No./ Name	Street/ Townland	ITM	SMR	UAS	Nat. Mon.	RPS	NIAH	Special Interest	Rating
BH-01 – City Wall	Bishopsmeadows Td.; Collegepark Td.; Dukesmeadows Td. Gardens Td. (St Canice's Pr.); Gardens Td. (St Mary's Pr.); Gardens Td. (St John's Pr.); Gardens Td. (St Patrick's Pr.)	650432, 656348 to 650521, 656425	KK019-026001-	UAS-6	Yes	-	-	Architectural, archaeological, historical	National
BH-02 – Evans Turret	Gardens Td. (St Mary's Pr.)	650521, 656423	KK019-026001-	UAS-7	Yes	-	-	Architectural, archaeological, historical	National
BH-03 – Tasting Room	Gardens Td. (St Mary's Pr.)	650517, 656325	-	-	-	-	12000008	None	Record only. NIAH assigns it a Regional rating but had misunderstood the nature of the building.

Table 12-4 Architectural Heritage Assets adjacent to the Application Site

Site No./ Name	Street/ Townland	ITM	SMR	UAS	Nat. Mon.	RPS	NIAH	Special Interest	Rating	Distance
BH-04 – St Francis' Abbey	Gardens Td. (St Mary's Pr.)	650502, 656338	KK019-026101-	UAS-101	Ref. 72	-	-	Architectural, archaeological, historical	National	Immediately adjacent to and surrounded by Site
BH-05 – Cotteral's bridge (possible)	Gardens Td. (St Canice Pr.); Gardens Td. (St Mary's Pr.)	650413, 656340	KK019-026102-	UAS-102	-	-	-	Architectural, archaeological, technical	Regional	c.20m to W

Table 12-5: Architectural Heritage Assets in Close Proximity to the Site

Site No./ Name	Street/ Townland	ITM	SMR	UAS	Nat. Mon.	RPS	NIAH	Special Interest	Rating	Distance
BH-06 – E. Smithwick and Sons Limited	Horse Barrack Lane Gardens Td. (St Mary's Pr.)	650481, 656189	-	-	-	B86	12000087	Architectural, artistic	Regional	c.50m to W
BH-07 – Tea House	Bateman Quay, Gardens Td. (St Mary's Pr.)	650617, 656211	-	-	-	B225	-	Architectural	Regional	50m to E
BH-08 – Tea House	Bateman Quay, Gardens Td. (St Mary's Pr.)	650629, 656169	-	-	-	B119	12000204	Architectural	Regional	50m to E
BH-09 – Courthouse	Parliament Street, Gardens Td. (St Mary's Pr.)	650487, 656156	-	UAS-93	-	B133	12000084	Architectural, artistic, archaeological, historical and social	National	c.50m to W
BH-10 – Watergate Theatre	Parliament Street, Gardens Td. (St Mary's Pr.)	650429, 656266	KK019-026----	-	-	-	12000098	Architectural, cultural and social	Regional	45m to W
BH-11 – Walsh's Mill & Woollen Mills	Gardens Td. (St Canice Pr.)	650516, 656487	KK019-026----	-	-	D139 & D141	-	Technical, historical	Regional	25m to N

Table 12-6 Significant Buildings at a Greater Distance

Site Name	Street/ Townland	ITM	SMR	UAS	Nat. Mon.	RPS	NIAH	Architectural	Regional	Distance from Application Site:
BH-12 – St Canice's Cathedral and round tower	Gardens Td. (St Canice Pr.)	650243, 656423	KK019-026029-; KK019-026128-; KK019-026129-; KK019-026169-; KK019-026175-	UAS-29	Yes	B17 & B18	12005018; 12005019; 12005036	Architectural, artistic, archaeological, historical, social, technical	National	c.180m to NW
BH-13 – Kilkenny Castle	Dukesmeadow Td.	650794, 655734	-	UAS-78	Yes	B197	-	Architectural, artistic, archaeological, historical, social, technical	National	c.470m to S

12.4 Characteristics and Predicted Impact of Proposed Development

12.4.1 Construction Phase

12.4.1.1 Archaeological Sites within the Proposed Development

The proposed development construction impacts are summarised in Table 12-7 12-7; their locations are in Figure 12-4.

Chancellor's Mill site [AR-02] is preserved *in-situ* beneath St Francis' Street (Kilkenny Central Access Scheme), beneath c.1.5m of made ground. The proposed development works over this site will only consist of shallow surface treatments for the junction between St Francis' Street and the proposed development street. These impacts are assessed to be negligible, adverse and not significant.

An existing c.0.3m thick concrete surface and a layer of hardcore covers nearly the entire proposed development Site. The proposed development has been designed to keep the majority of this surface in place and build on top of this surface in order to protect the underlying archaeology during the construction phase of works.

At the subsurface remains of St Francis' Abbey [AR-03], there will be low subsurface impacts when the concrete slab is removed from part of the site of the friary, but these impacts will involve only removing the c.0.30m concrete surface, which is above the recorded levels of the archaeology (which are at minimum 0.86m below surface level). The significance of this impact is assessed as slight negative.

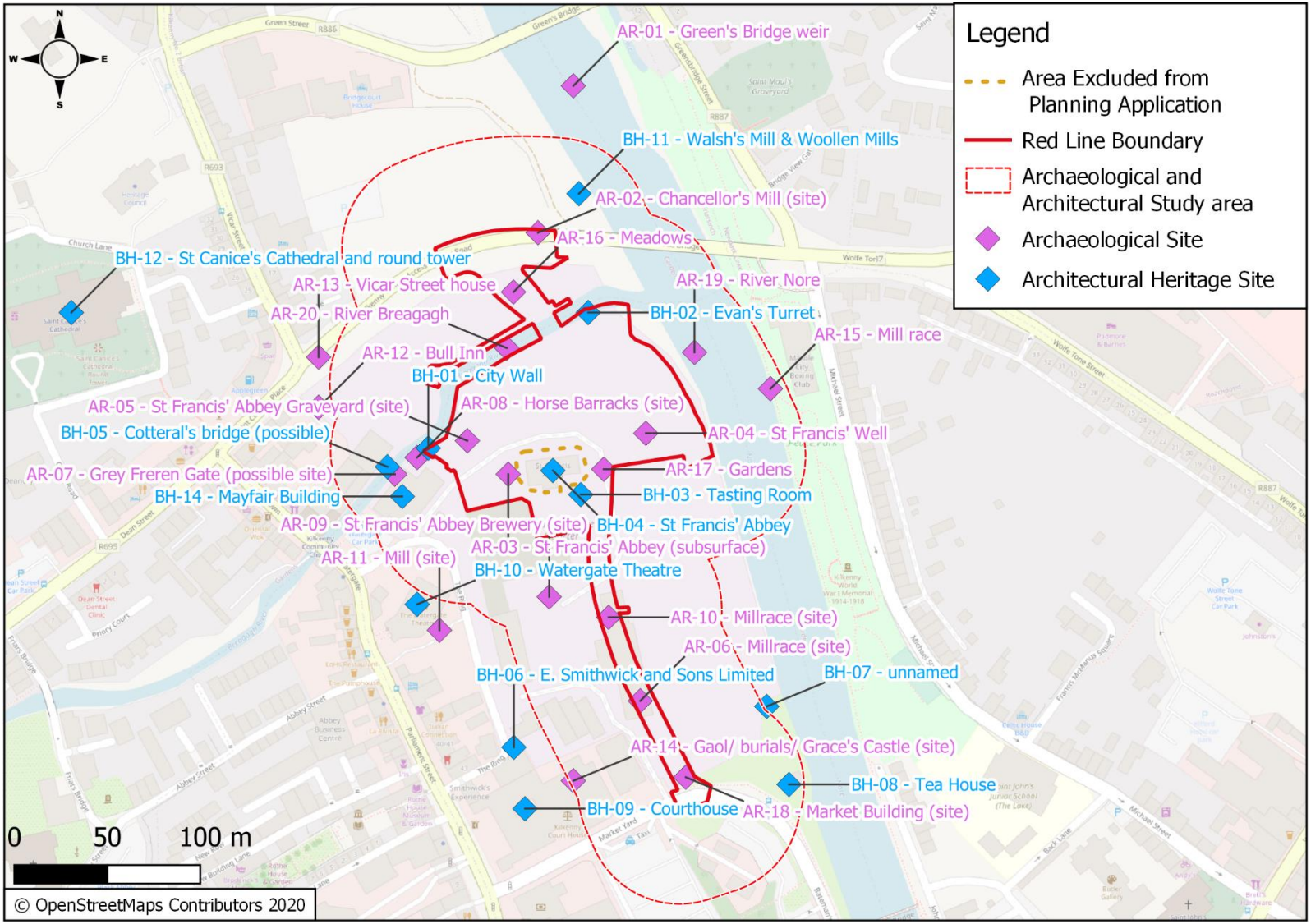
The site of St Francis' Well [AR-04] is encased in a deep, water-filled, underground concrete chamber. This chamber was inaccessible for inspection during the EIAR; a GPR survey in 2017 identified the extent of the concrete chamber (Nicholls, 2017); test excavations, which had included a trench across the site of the well (AMS, 2016)., found the chamber to be filled with at least 3m depth of water, after which the trench was not excavated (ACSU & Stirland, 2018). The project has been designed to preserve this chamber and the well in-situ. Therefore, the impact of construction on St Francis' Well will be negligible, as the works will be carried out on top of the existing concrete surface.

Renovation of an existing service line in proximity to the subsurface remains of St Francis' graveyard [AR-05] may also have a slight impact, involving cutting the existing concrete surface, removing the fill material and existing service line, and replacing it with an upgraded service and reconnecting to existing services. However, all service works will be carried out within the alignment of existing services and should therefore be low impact. The significance of this impact is assessed as slight negative.

Percolation holes will be cut through the existing concrete in the Abbey grassed area and elevated lawn over the subsurface remains of St Francis' Abbey [AR-03] and the graveyard [AR-05], but these will not impact deeper than the base of the modern concrete covering the site. The development of the Abbey Plaza and elevated lawn will take place above the level of the existing concrete surface, preserving the archaeology beneath *in situ* during the construction process. These impacts are assessed as slight negative.

Tree planting will be carried out over part of the Site; each tree will be in a hole 2m by 2m wide cut into the concrete, made 1.5m deep, with a root barrier. The proposed development has been designed to avoid impacting archaeology where possible. Therefore, trees are not located on the footprint of St Francis' Abbey subsurface [AR-03] or the Horse Barracks [AR-08] or graveyard [AR-05] and will not penetrate deep enough to impact archaeology where they are placed. These impacts are assessed as slight negative.

Figure 12-4 Archaeological and Architectural Heritage Sites



The development of the Abbey Plaza and elevated lawn in the area of St Francis' Abbey [AR-03] and the graveyard [AR-05] will take place above the level of the existing concrete surface, preserving the archaeology beneath *in situ* during the construction process.

The Horse Barracks site [AR-08] is being substantially preserved *in situ* beneath the redeveloped Mayfair Building; the upstanding remains of the Horse Barracks wall forms part of the proposed development Site's boundary wall with the River Breagagh, and is also therefore an element of the City Wall National Monument [BH-01] and assessed in Section 12.4.1.3. The subsurface elements of the Horse Barracks building will be preserved beneath the existing concrete slab. The predicted impact on the subsurface remains by construction are negligible as the existing concrete surface will be retained.

Construction of services in the proposed street will impact the subsurface remains of the two millraces [AR-06 and AR-10] (Figure 12-4; Appendix 12-7). However, both millraces have already been significantly disturbed when each was encased in a concrete culvert during the construction of the Maturation Building in the 1990s, and the proposed development's impact is over a small part of their overall length. These impacts are assessed as low, with slight significance of effects.

The proposed service trench within the street will impact the subsurface archaeological deposits in the meadows north of the River Breagagh [AR-16], which consists of mixed deposits with few finds, and the extent of the impacts is very small relative to the overall size of these deposits. These impacts are assessed as Low, with slight significance of effects.

The proposed service trench within the street will impact the area of gardens and boundary walls between St Francis' Abbey and the River Nore [AR-17]. These archaeological deposits are mixed, but have the potential to contain archaeological material, including organic timbers. These impacts are assessed as low, with slight significance of effects.

The proposed service trench within the street may impact on subsurface remains associated with the eighteenth and nineteenth-century St Francis' Brewery [AR09]. The service trench will only potentially impact a small part of the overall area of the subsurface remains, and only in an area where significant disturbance has already occurred with the development of the Maturation Building in the 1990s. These impacts are assessed as low, with slight significance of effects.

The proposed services on the street will also impact the remains of a mid-nineteenth-century market building [AR-18]. The service trench will impact a small area of the subsurface remains of the building foundations, resulting in its partial removal. these impacts are assessed as low, with slight significance of effects.

The proposed development construction phase will involve slight negative impacts to eight archaeological sites:

- St Francis's Abbey subsurface [AR-04];
- St Francis's Abbey graveyard [AR-05];
- the mill race sites [AR-06 & AR-10],
- St Francis's Abbey brewery site [AR-09];
- meadows [AR-16];
- gardens [AR-17]; and,
- Market Building site [AR-18].

The remaining construction impacts are predicted to be negative but not significant:

- Chancellor's Mill site [AR-02];
- St Francis' Well [AR-04; and,
- Horse Barracks [AR-08].

12.4.1.2 Archaeological Sites adjacent to the Proposed Development

There are no predicted construction impacts of the nine archaeological sites adjacent to the proposed development. Green's Bridge Weir [AR-01] is located at a distance and on the opposite side of St Francis' bridge (Figure 12-4; Appendix 12-7). The possible site of Grey Freren Gate [AR-07] is located outside the development and behind the Mayfair Building. The mill site [AR-11] is located outside the proposed development beneath the car park for the Watergate Theatre. The Bull Inn [AR-12] and house on Vicar Street [AR-13] are located c.50m from the proposed development, the closest impact being renovation of services. The archaeological remains of the gaol, burials and grace's castle [AR-14] have been excavated or are preserved beneath the new extension to the Court House. The mill race [AR-15] is preserved beneath Peace Park on the opposite bank of the River Nore from the proposed development; and all construction work will be carried out on dry land and will not impact the river channels of the Nore [AR-19] or Breagagh [AR-20].

The following Table 12-7 summarises the construction impacts on archaeological sites as set out in sections 12.4.1.1 and 12.4.1.2, according to the methodology set out in Section 1.6.

Table 12-7: Archaeological Impact Assessment (Construction Phase)

Site No.	Name	Distance from Application Site	Significance/ Sensitivity	Description of Impact	Quality of Effect	Probability of Effect	Duration of Effect	Significance of Effect
AR-01	Green's Bridge weir	c.30m	High	No Impact	Neutral	N/A	N/A	N/A
AR-02	Chancellor's Mill (site)	0m	High	Negligible	Negative/ adverse	Likely	Permanent	Not Significant
AR-03	St Francis' Abbey (subsurface)	0m	Very High	Low	Negative/ adverse	Likely	Permanent	Slight
AR-04	St Francis' Well	0m	High	Negligible	Negative/ adverse	Likely	Permanent	Not Significant
AR-05	St Francis' Abbey Graveyard (site)	0m	Very High	Low	Negative/ adverse	Likely	Permanent	Slight
AR-06	Millrace (site)	0m	Medium	Low	Negative/ adverse	Likely	Permanent	Slight
AR-07	Grey Freren Gate (possible site)	c.5m	Medium	No Impact	Neutral	N/A	N/A	N/A
AR-08	Horse Barracks	0m	High	Negligible	Negative/ adverse	Likely	Temporary	Not Significant
AR-09	St Francis' Abbey Brewery (site)	0m	High	Low	Negative/ adverse	Likely	Permanent	Slight
AR-10	Millrace (site)	0m	Medium	Low	Negative/ adverse	Likely	Permanent	Slight
AR-11	Mill (site)	c.50m	High	No Impact	Neutral	N/A	N/A	N/A
AR-12	Bull Inn	c.50m	High	No Impact	Neutral	N/A	N/A	N/A
AR-13	Vicar Street house	c.50m	High	No Impact	Neutral	N/A	N/A	N/A
AR-14	Gaol/ burials/ Grace's Castle (site)	c.30m	High	No Impact	Neutral	N/A	N/A	N/A
AR-15	Mill race	c.45m	High	No Impact	Neutral	N/A	N/A	N/A
AR-16	Meadows (site)	0m	Medium	Low	Negative/ adverse	Likely	Permanent	Slight
AR-17	Gardens (site)	0m	High	Low	Negative/ adverse	Likely	Permanent	Slight
AR-18	Market Building (site)	0m	Low	Low	Negative/ adverse	Likely	Permanent	Slight
AR-19	River Nore	<5m	Medium	No Impact	Neutral	N/A	N/A	N/A
AR-20	River Breagagh	<1m	Medium	No Impact	Neutral	N/A	N/A	N/A

12.4.1.3 Architectural Heritage within the Proposed Development

As was noted above, the three potential direct impacts on structures within the Site during the construction phase are vibration, impact of vehicles or machinery and undermining the foundations. The first of these is addressed in the chapter on noise and vibration where it is found that it is not likely that there would be damage arising through vibration during the construction works. Given the significance of the City Walls [BH-01] which includes the upstanding remains of the Horse Barrack's [AR-08], and Evans Turret [BH-02], it is proposed that those structures will be monitored for vibration during construction to ensure that acceptable limits are not exceeded. Possible impact from vehicles and machinery is to be controlled through the use of protective fencing set at a sufficient distance from the structure to ensure that no damage occurs through the erection and dismantling of the fencing. Where landscaping work is to be carried out in close proximity to the structures, fencing will need to be removed and strict procedures for carrying out work in these areas will be implemented to ensure that no damage occurs. No deep excavation is planned in close proximity to the City Wall or Evans Turret and hence undermining of foundations will not occur.

The potential visual impacts of the proposals are assessed in the Landscape and Visual Impact Assessment (Chapter 11), which includes photomontages (Appendix 11.1) to illustrate the proposed development in context. The proposed urban street will replace the existing route through the Site from its time in industrial use, with little change in the visual impact on built heritage, while the urban park will have a significant positive impact on the setting of those elements of built heritage that are in the vicinity, including the City Walls, Evans Turret and other structures.

BH-01 – City Walls

The proposal is to retain the existing concrete slab that runs alongside the southern side of the City Wall within the Site and to lay a layer of soil between 500 and 600mm deep over the slab prior to planting with ground cover. As discussed above, the City Walls are to be monitored to ensure that no damage arises through vibration during the construction phase. The walls will be protected during construction to ensure that no impact damage occurs and there will be no excavation in the vicinity of the walls. It is noted that there is an existing surface water drain running beneath the concrete slab and exiting to the Breagagh through the wall. This drain will be retained in use without any intervention into the fabric of the wall.

BH-02 – Evans Turret

At present the ground in the vicinity of Evans Turret is partly gravelled and partly bare earth. It is proposed that this area is to be planted with ground cover. The ground level will not be altered in the vicinity of the turret. As discussed above, Evans Turret is to be monitored to ensure that no damage arises through vibration during the construction phase. The turret will be protected during construction to ensure that no impact damage occurs and there will be no excavation in the vicinity. The turret is in a construction site at present and the proposed works will not result in any increased adverse indirect impact on its setting at construction phase.

BH-03 – Tasting House

The Tasting House is to be retained. The land in the vicinity is to be maintained at its existing level, while to the south it would be raised slightly. The present concrete slab is to be paved with granite in the vicinity of the building. The building is in a construction site at present and the proposed works will not result in any increased adverse indirect impact on its setting at construction phase. There will be no predicted direct impact at construction stage.

12.4.1.4 Architectural heritage adjacent to the proposed development

BH-04 – Abbey of St Francis

The abbey will be protected from damage and encroachment during construction by a hoarding. The land within the Site in the vicinity of the abbey is to be maintained at its existing level, while to the south it would be raised slightly. The present concrete slab is to be removed and replaced and then paved with granite in the vicinity of the abbey on the southern, eastern and western sides, while to the north the area is to be surfaced with compacted gravel. The proposed street is to run past the eastern side of the Abbey at a distance of c. 5 metres. The level of the street will not be significantly different to the present level and the new services will be on the eastern side of the street, at a distance of approximately 15 metres from the nearest point of the abbey building. The setting of the abbey will be affected during the construction stage but this will be temporary. There will be no predicted direct impact at construction stage. The Abbey is surrounded by a construction site at present and the proposed works will not result in any increased adverse impact on its setting at construction phase.

BH-05 – Bridge abutment or Cotterals' Bridge

The River Breagagh is separated from the main part of the application Site by the City Wall and hence is not visible from the majority of the Site. The bridge abutment is not visible from any part of the application Site and is at a sufficient distance that it would not be affected by the works. There will be no predicted direct or indirect impact on the character or setting of the bridge abutment during the construction stage.

12.4.1.5 Architectural heritage in close proximity to the proposed development

BH-06 – St Francis' Abbey Brewery and Gateway

There will be no predicted impact on St Francis' Abbey's nineteenth-century brewery and gateway.

BH-07 – Tea House

At a distance of approximately 50 metres from the proposed street, it is not anticipated that there will be any significant impact on either the character or the setting of the tea house during the construction stage. The distance from the urban park is such that there could be no direct or indirect impact. There will be no predicted direct or indirect impact on the character or setting of the tea house during the construction stage.

BH-08 – Tea house

At a distance of approximately 50 metres from the proposed street, it is not anticipated that there will be any significant impact on either the character or the setting of the tea house during the construction stage. The distance from the urban park is such that there could be no direct or indirect impact. There will be no predicted direct or indirect impact on the character or setting of the tea house during the construction stage.

BH-09 – Courthouse

The courthouse has its back toward the application Site, from which it is separated by a significant amount of other buildings. The Site is not visible from the courthouse. There will be no predicted direct or indirect impact on the character or setting of the courthouse during the construction stage.

BH-10 – Watergate Theatre

The Watergate Theatre has its back to the application Site and this north-eastern elevation of the theatre is blank and bland. The principal elevation of the theatre is the frontage to Parliament Street and the application Site is not visible from that location. There will be no predicted direct or indirect impact on the character or setting of the theatre during the construction stage.

BH-11 – Woollen Mill

The ruin of the woollen mill stands on the bank of the River Nore to the north of the application Site, immediately to the north of the causeway leading to St Francis Bridge. The raised causeway or embankment leading to the bridge blocks the view of the application Site from the mill. There will be no predicted direct or indirect impact on the character or setting of the former mill during the construction stage.

BH-15 – Mayfair Building

The Mayfair Building stands adjacent to the present access to the application Site from Parliament Street. There will be no predicted direct or indirect impact on the character or setting of the Mayfair Building arising from the poposal during the construction stage.

12.4.1.6 Significant buildings at a greater distance

BH-12 – St Canice's Cathedral and round tower

The application Site is not visible from within the cathedral and the view towards the Site from the surrounding graveyard is obstructed by buildings. The Site may be seen from the round tower, which is publicly accessible, and which is 180 metres from the nearest point of the application Site. The distance from the urban park is such that there could be no direct or indirect impact. There will be no predicted significant direct or indirect impact on the character or setting of the cathedral and round tower during the construction stage.

BH-13 – Kilkenny Castle

Given the distance between the castle and the proposed development, the works, while visible from some windows within the castle, would be seen in the urban context and would not have a perceptible impact on the character or setting of the castle. The distance from the urban park is such that there could be no significant direct or indirect impact.

12.4.2 Operational Phase

12.4.2.1 Archaeological Sites within the Proposed Development

The proposed development has been designed to preserve the archaeology *in situ* without impacting it. As a consequence, the development will have a neutral impact on 8 archaeological sites within the proposed development during the operational phase:

- AR-02 – Chancellor's Mill;
- AR-05 – St Francis' Abbey Graveyard;
- AR-06 – Millrace;
- AR-09 – St Francis' Abbey Brewery;
- AR-10 – Millrace;
- AR-16 – Meadows;
- AR-17 – Gardens; and,
- AR-18 – Market Building.

The proposed development will emphasise by design the significance of subsurface archaeology for sites. St Francis' Abbey [AR-03] nave, cloister garth and associated ranges will be outlined in the pavement; the transept will be expressed as a raised lawn area. The

Horse Barracks [AR-08] (where it extends into the proposed development area) will be outlined in pavement, to be laid over the existing concrete level. St Francis' Well [AR-04] site will be marked by a shallow pool, to be inserted above the existing concrete level. These will result in moderately positive impacts, resulting in a greater accessibility and appreciation of the subsurface archaeological remains which had previously been hidden.

The upstanding remains of the Horse Barracks [AR-08] form part of the City Wall [BH-01]; the operational phase of the proposed development will have a moderate positive impact on these remains by the conservation and ongoing maintenance of the upstanding remains of the building, by making them accessible to the public where they had previously been excluded, and therefore leading to a greater appreciation of the medieval built heritage and archaeology in the proposed development site.

12.4.2.2 Archaeological Sites adjacent to the Proposed Development

The operational phase impacts on the nine sites adjacent to the proposed development are neutral (Figure 12-4; Appendix 12-7):

- AR-01 – Green's Bridge weir;
- AR-07 – Grey Freren Gate (possible site);
- AR-11 – Mill (site);
- AR-12 – Bull Inn;
- AR-13 – Vicar Street house;
- AR-14 – Gaol/ burials/ Grace's Castle (site of);
- AR-15 – Millrace (site of);
- AR-19 – River Nore; and,
- AR-20 – River Breagagh.

These operational impacts are summarised in Table 12-8 according to the criteria set out in Section 1.6 of this report.

Table 12-8: Archaeological Impact Assessment (Operational Phase)

Site	Name	Distance from Application Site:	Significance/ Sensitivity	Description of Impact	Quality of Effect	Probability of Effect	Duration of Effect	Significance of Effect
AR-01	Green's Bridge weir	c.30m	High	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-02	Chancellor's Mill (site)	0m	High	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-03	St Francis' Abbey (subsurface)	0m	Very High	Medium	Positive	Likely	Permanent	Moderate
AR-04	St Francis' Well	0m	High	Medium	Positive	Likely	Permanent	Moderate
AR-05	St Francis' Abbey Graveyard (site)	0m	Very High	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-06	Millrace (site)	0m	Medium	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-07	Grey Freren Gate (possible site)	c.5m	Medium	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-08	Horse Barracks	0m	High	Medium	Positive	Likely	Permanent	Moderate
AR-09	St Francis' Abbey Brewery (site)	0m	High	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-10	Millrace (site)	0m	Medium	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-11	Mill (site)	c.50m	High	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-12	Bull Inn	c.50m	High	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-13	Vicar Street house	c.50m	High	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-14	Gaol/ burials/ Grace's Castle (site)	c.30m	High	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-15	Mill race	c.45m	High	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-16	Meadows (site)	0m	Medium	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-17	Gardens (site)	0m	High	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-18	Market Building (site)	0m	Low	No Impact	Neutral	Likely	Permanent	Imperceptible
AR-19	River Nore	<5m	Medium	Low	Neutral	Likely	Permanent	Imperceptible
AR-20	River Breagagh	<1m	Medium	Low	Neutral	Likely	Permanent	Imperceptible

12.4.2.3 Architectural Heritage within the Proposed Development

The operational impacts for architectural heritage within the application Site are as follows (refer to Table 12-9 for summary).

BH-01 – City Walls

At operational stage the wall will be separated from an adjacent footpath by a belt of ground planted with ground cover this will ensure that the wall remains visible while protecting it from close approach along most of its length. A small area alongside the wall at the western end is to be paved with cobbles. The ground level in the vicinity of the wall is to be raised by between 500 and 600mm, slightly reducing the visibility of the wall, though not to a significant extent.

As a result of the proposed works the setting of the City Wall will be improved over its present setting and this is also a major improvement on the industrial setting that pertained for many years until recently.

BH-02 – Evans Turret

At operational stage Evans Turret will be separated from an adjacent footpath by a belt of ground planted with ground cover this will ensure that the turret remains visible while protecting it from close approach.

As a result of the proposed works the setting of Evans Turret will be improved over its present setting and this is also a major improvement on the industrial setting that pertained for many years until recently. There will also be greater public accessibility to the walls resulting in improved appreciation of this element of the City's history. There will also be greater public accessibility to the turret resulting in improved appreciation of this element of the City's history.

BH-03 – Tasting House

At operational stage the setting of the building will be improved as a result of the proposed works and this is also a major improvement on the industrial setting that pertained since the Tasting House was built.

12.4.2.4 Architectural Heritage adjacent to the proposed development

The operational impacts for architectural heritage adjacent to the proposed development are as follows.

BH-04 – Abbey of St Francis

During the operational stage, the setting of the building will be improved a result of the proposed works and this is also a major improvement on the industrial setting that pertained for many years until recently. The abbey tower has been visible to the public but the tower and abbey have been inaccessible. While the abbey is outside the Site and no works to it are proposed, greater public accessibility close to the abbey will be a major benefit of the proposal with wider advantages for the City and public appreciation of the medieval built fabric.

BH-05 – Bridge abutment or Cotterals' Bridge

There will be no predicted impact on the character or setting of the bridge abutment at operational stage.

12.4.2.5 Architectural Heritage in close proximity to the proposed development

The operational impacts for architectural heritage in close proximity to the proposed development are as follows.

BH-06 – St Francis' Abbey Brewery and Gateway

There will be no predicted impact on the character or setting of the gateway or the nineteenth-century St Francis' Abbey brewery buildings at operational stage.

BH-07 and BH-08 – Tea houses

There will be no significant predicted impact on the character or setting of the tea house at operational stage as these will be set within the new Riverside Garden's due to be completed in the coming months.

BH-09 – Courthouse

There will be no predicted impact on the character or setting of the courthouse at operational stage.

BH-10 – Watergate Theatre

There will be no predicted impact on the character or setting of the theatre at operational stage.

BH-11 – Woollen Mill

There will be no predicted impact on the character or setting of the former mill at operational stage.

BH-14 – Mayfair building

There will be no predicted impact on the character or setting of the Mayfair building at operational stage

12.4.2.6 Significant Buildings at a Greater Distance

The operational impacts for architectural heritage at greater distance from the proposed development are as follows.

BH-12 - St Canice's Cathedral and round tower

There will be no predicted adverse impact on the character or setting of the cathedral and round tower at operational stage. The view from the round tower for many years included industrial buildings on the brewery site; the proposal will result in a positive impact on the view through the introduction of the urban park around St Francis's Abbey.

BH-13 - Kilkenny Castle

There will be no predicted adverse impact on the character or setting of Kilkenny Castle at operational stage. There may be some positive impact on the views from some of the windows in the castle, though this would be barely perceptible.

Table 12-9: Architectural Heritage Impact Assessment

Site	Location	Rating	Interest	Level of impact	Mitigation required
BH-01	City Wall	National	Architectural, archaeological, historical	No significant impact at construction stage; positive at operational stage	Yes
BH-02	Evans Turret	National	Architectural, archaeological, historical	No significant impact at construction stage; positive at operational stage	Yes
BH-03	Tasting house	Record only		No significant impact at construction stage;	No

Site	Location	Rating	Interest	Level of impact	Mitigation required
				positive at operational stage	
BH-04	St Francis's Abbey	National	Architectural, archaeological, historical	No significant impact at construction stage; positive at operational stage	Yes
BH-05	Bridge abutment	Regional	Architectural, archaeological, technical	None	No
BH-06	Brewery gateway	Regional	Architectural, artistic	None	No
BH-07	Tea house	Regional	Architectural	None	No
BH-08	Tea house	Regional	Architectural	None	No
BH-09	Courthouse	National	Architectural, artistic, archaeological, historical, social	None	No
BH-10	Watergate Theatre	Regional	Architectural, cultural, social	None	No
BH-11	Woollen mill	Regional	Technical, historical	None	No
BH-12	St Canice's Cathedral and round tower	National	Architectural, artistic, archaeological, historical, social, technical	None	No
BH-13	Kilkenny Castle	National	Architectural, artistic, archaeological, historical, social, technical	None	No
BH-14	Mayfair Building	Local	Social	None	No

12.5 Proposed Mitigation Measures and / or Factors

12.5.1 Mitigations for Archaeological Sites Construction Stage

Impacts to archaeology will be avoided, remedied and/or reduced through the following measures:

1) Archaeological monitoring of all ground works.
   Archaeological monitoring will be carried out following the consent of the Minister. For works outside the bounds of the St Francis' Abbey National Monument and the City Wall National Monument, this consent will be an excavation licence as specified in Section 26 of the *National Monuments Act 1930* (as amended). For archaeological monitoring within the bounds of St Francis' Abbey National Monument and in proximity to the City Wall National Monument, this consent will be a Ministerial Consent as specified in Section 14 of the *National Monuments Act 1930* (as amended). If archaeology is discovered during ground works, then ground works in that area will stop and the NMS will be informed. A methodology to mitigate the impact of the works will be submitted to the NMS for approval. Archaeological remains encountered will be avoided and preserved *in situ* where possible; if this is not

possible, then the remains will be preserved by record in accordance with the *Framework and Principles for Protection of the Archaeological Heritage* (Duchas, 1999).

2) A c.0.3m thick concrete surface and a layer of hardcore covers nearly the entire proposed development Site. The proposed development has been designed to keep the majority of this surface in place and build on top of the surface, to protect the underlying archaeology during the construction phase of works. In places where this concrete is removed for the excavation of services [AR-16 & AR-17], the renovation of existing service alignments in proximity to St Francis' Abbey [AR-03] and the graveyard [AR-05], and the replacement of concrete surfaces around St Francis' Abbey [AR-03], archaeological monitoring will ensure the impact is not deeper than removing the concrete surface. Archaeological monitoring will also ensure the construction contractors will not move, park or turn heavy machinery or loads in the exposed areas, to avoid compacting or damaging underlying subsurface remains. The removed concrete surface will be replaced with another surface to preserve the archaeology in-situ.
3) During the excavation of service lines, care will be taken to record the subsurface remains of the mid-nineteenth-century Market Building [AR-18], including its walls and any surfaces or associated features, and the results of this record will be presented in the monitoring report.
4) During the renovation of service lines in proximity to St Francis' Abbey [AR-03] and the graveyard [AR-05], care will be taken to:
    a. archaeologically monitor the excavation of the old service line;
    b. avoid impacting any underlying or surrounding archaeological remains, including burials, by keeping the impact within the existing alignment for the service being renovated; and
    c. recover any archaeological material which might have been redeposited in the service trench after it was first excavated. This material will be recovered, recorded and reported according to the methodology agreed with the NMS.
5) As with the architectural heritage sites (see below), mitigations for the Horse Barracks [AR-08] will include vibration monitors and protective fencing during the construction stage. Refer to Sections 10.5 and 10.9 of Chapter 10 Noise and Vibration for further details.

12.5.2 Architectural Heritage Sites within the Proposed Development

BH-01 – City Walls: mitigation is to include vibration monitoring and protective fencing during the construction stage as detailed in Chapter 10 (Noise and Vibration).

BH-02 – Evans Turret: mitigation is to include vibration monitoring and protective fencing during the construction stage as detailed in Chapter 10 (Noise and Vibration).

BH-03 – Tasting House: No mitigation required.

12.5.3 Architectural Heritage Sites adjacent to the Proposed Development

BH-04 – Abbey of St Francis: mitigation is to include vibration monitoring and protective fencing during the construction stage as detailed in Chapter 10 (Noise and Vibration).

BH-05 – Bridge abutment or Cotterals' bridge: No mitigation required.

12.5.4 Architectural Heritage Sites in close proximity to the Proposed Development

BH-06 – St Francis' Abbey Brewery and gateway: None

BH-07 – Tea house: No mitigation required.

BH-08 – Tea house: No mitigation required.

BH-09 – Courthouse: No mitigation required.

BH-10 – Watergate Theatre: No mitigation required.

BH-11 – Woollen Mill: No mitigation required.

BH-12 – St Canice's Cathedral and round tower: No mitigation required.

BH-13 – Kilkenny Castle: No mitigation required.

12.5.5 Conservation Plan for St Francis' Abbey

The area of St Francis' Abbey [BH-04] was excluded from this proposed development planning application as the area is under the control of the Minister/Office of Public Works. A conservation plan will be prepared for St Francis' Abbey [BH-04] which will inform the future management and conservation of the monument, and its relationship with the proposed development. This conservation plan will be prepared and undertaken in partnership between the OPW, NMS and KCC.

12.6 Interactions with other Environmental Attributes

Archaeology and cultural heritage have the potential to be impacted positively or negatively under several environmental issues including:

- The accessibility to and enjoyment of local history, built and cultural heritage has the potential to provide a new amenity for the people of Kilkenny and further afield. This in turn can positively impact on people's mental health as discussed in Chapter 5 (Population and Human Health);
- The undertaking of groundworks including earth movements as detailed in Chapter 7 (Land and Soils) has the potential to impact on underlying archaeology as assessed in this chapter;
- Vibration impacts and related monitoring and mitigations measures are detailed in Chapter 10 (Noise and Vibration) and,
- The landscape and visual context of both seen and unseen heritage structures is discussed further in Chapter 11 (Landscape and Visual).

12.7 Residual Impacts

The predicted residual impacts on archaeological sites and architectural heritage sites as a result of the proposed development are summarised below in Table 12-10 and Table 12-11 respectively. No impact is predicted for nine sites, and therefore these are not included here. A moderate positive residual impact is predicted for the Horse Barracks [AH-08] during the operational phase; otherwise no residual impacts are predicted for archaeology during operation.

Table 12-10: Residual Construction Impacts on Archaeological Sites

Site No./Name	Significance	Unmitigated significance of construction impact	Mitigation measures	Residual significance of construction impact
AR-02 (Chancellor's Mill site)	High	Not Significant	Archaeological Monitoring	Not Significant
AR-03 (St Francis' Abbey (subsurface)	Very High	Slight	Archaeological monitoring/ avoidance or resolution as required	Not Significant

Site No./Name	Significance	Unmitigated significance of construction impact	Mitigation measures	Residual significance of construction impact
AR-04 (St Francis' Well)	High	Not Significant	Archaeological Monitoring	Not Significant
AR-05 (St Francis' Abbey graveyard)	Very High	Slight	Archaeological monitoring/ avoidance or resolution as required	Not Significant
AR-06 (Millrace)	Medium	Not Significant	Archaeological monitoring/ avoidance or resolution as required	Not Significant
AR-08 (Horse Barracks)	High	Slight	Archaeological monitoring/Vibration monitors and protective fencing	Not Significant [residual moderate positive impact during operation]
AR-09 (St Francis' Abbey Brewery site)	High	Slight	Archaeological monitoring/ avoidance or resolution as required	Not Significant
AR-10 (Millrace)	Medium	Not Significant	Archaeological monitoring/ avoidance or resolution as required	Not Significant
AR-16 (Meadows site)	Medium	Not Significant	Archaeological monitoring/ avoidance or resolution as required	Negligible
AR-17 (Gardens site)	High	Slight	Archaeological monitoring/ avoidance or resolution as required	Negligible
AR-18 (Market Building site)	Low	Slight	Archaeological monitoring/ recording of subsurface features as required	Not Significant

Table 12-11: Residual Construction Impacts on Architectural Heritage Sites

Site No./Name	Significance	Unmitigated significance of construction impact	Mitigation measures	Residual significance of construction impact
BH-01 (City Wall)	National	Slight	Protective fencing and vibration monitoring	None
BH-02 (Evans Turrret)	National	Slight	Protective fencing and vibration monitoring	None
BH-03 (Tasting house)	Record only	None	None	None
BH-04 (St Francis's Abbey)	National	Slight	Protective fencing and vibration monitoring	None
BH-05 (Bridge abutment)	Regional	None	None	None
BH-06 (Brewery gateway)	Regional	None	None	None
BH-07 (Tea house)	Regional	None	None	None
BH-08 (Tea house)	Regional	None	None	None
BH-09 (Courthouse)	National	None	None	None
BH-10 (Watergate Theatre)	Regional	None	None	None
BH-11 (Woollen mill)	Regional	None	None	None
BH-12 (St Canice's Cathedral and round tower)	National	None	None	None
BH-13 (Kilkenny Castle)	National	None	None	None
BH-14 (Mayfair Building)	Local	Local	None	None

12.8 Cumulative and In-combination Impacts

The Abbey Quarter Urban Park and Street development will be carried out in proximity to several other projects within the Abbey Quarter Masterplan area:

- the Brewhouse Building (ongoing);
- the Mayfair Building (ongoing);
- The Riverside Gardens project (ongoing); and,
- Demolition of the Maturation Building.

The cumulative impacts of the proposed development and these projects on archaeology and cultural heritage are considered to be not significant.

The Abbey Quarter Urban Park and Street development will be carried out in proximity to these several other components of the Abbey Quarter Masterplan which will be subject to their own assessments as discussed in Section 2.2 (Chapter 2) of this document. The scale, form and scope of future projects within the Abbey Quarter Masterplan area are not know at this point.

Kilkenny County Council's Project Archaeologist will ensure that in all cases archaeological impacts will be fully assessed, and that appropriate mitigation – including preservation in-situ wherever possible – will be carried out to a uniform standard in consultation with the National Monuments Service. The potential cumulative impacts that are likely to arise from the development of the buildings on that part of the former Smithwick's Brewery that is not within the present application Site cannot be fully assessed at present as the details of the future development are not yet known. However, it is anticipated that the positive impacts on architectural heritage of the proposed urban park will not be outweighed by any future development of adjacent lands.

The cumulative operational impacts are considered moderately positive as a consequence of long-term conservation and enhanced public amenity of the built heritage.

12.9 Monitoring

Periodic monitoring of the works will be carried out by suitably qualified archaeologists and architectural heritage specialists nominated by KCC during construction and operational phases to ensure that all mitigation to avoid, reduce and offset adverse effects on archaeology and architectural heritage have been implemented and that the predictions of the EIAR in relation to cultural heritage were accurate.

12.10 Reinstatement

The concrete surface will be reinstated around the standing remains of St Francis' Abbey [BH-04], over the subsurface remains of the friary [AR-03], and along the proposed services on the street over the meadows [AR-16], gardens [AR-17], and the mill races [AR-06 & AR-10]. These reinstated surfaces will protect the underlying archaeology.

12.11 Difficulties Encountered in Compiling this Information

The restrictions due to Covid-19 from March to June 2020 prevented access to the Sites and Monuments Record in the Archive Unit of the National Monuments Service (NMS), and to various libraries and archives, all of which were closed during the pandemic. However, in most instances the relevant records had already been consulted prior to the Covid-19 restrictions coming into effect, and electronic copies of the relevant Sites and Monuments Records were kindly provided by the Archive Unit of the NMS. As a result, these restrictions did not prevent us carrying out our assessment.

Significant excavations were carried out at St Francis' Abbey National Monument in 1963 by Marcus Ó hEochaidhe for the Office of Public Works (OPW). The results of these excavations were not published, and the archive was not available to consult for this assessment. However, several photographs and a plan of the excavation are available and were consulted. A brief summary of the 1963 excavations were also published (Conlon, P. 1975. Notes on St Francis' Abbey., 1975) (Lanigan & Tyler, 1987).

Archaeological monitoring of the development of the Brewhouse building in 1970, 1971 and 1980 was carried out by David Sweetman. The archive from this monitoring is held by the NMS in Dublin, and was inaccessible due to the Covid-19 restrictions. However, the available information on Ó hEochaidhe's 1963 excavations and David Sweetman's archaeological monitoring archives were reviewed and summarised in Courtney Deery's archaeological assessment of the Abbey Quarter Masterplan (Courtney Deery Heritage Consultancy 2014, 60–64).

13 MATERIAL ASSETS – WASTE AND USE OF NATURAL RESOURCES

13.1 Introduction

This chapter of the EIAR examines the potential impact of the proposed development on waste infrastructure and natural resources. It also details mitigation measures where necessary.

13.2 Methodology

Various plans and reports were consulted in order to prepare this chapter, including:

- The Southern Waste Region Waste Management Plan (WMP) 2015-2021 (Southern Waste Region, 2015);
- The Southern Waste Region Annual Report 2017 (Southern Waste Region, 2018);
- The Construction & Demolition (C&D) Capacity Report complied for the Eastern-Midlands, Connacht-Ulster and Southern Regions (Eastern Midlands Region / Connacht Ulster Region / Southern Region, 2016); and,
- Essential Aggregates – Providing for Ireland's Needs to 2040 (Irish Concrete Federation, 2019).

13.2.1 IEMA - Materials and Waste in Environmental Impact Assessment

This chapter has been completed taking into account the "IEMA guide to: Materials and Waste in Environmental Impact Assessment " (IEMA, 2020). The sensitivity and magnitude assessments set out in the guidance for several elements have been applied to this assessment. A summary of the effect thresholds utilised in this assessment is provided in Table 13-1.

Table 13-1: Effect Thresholds Utilised for Waste and Use of Natural Resources

	Magnitude of Impact					
Sensitivity (or value) of receptor		**No change**	**Negligible**	**Minor**	**Moderate**	**Major**
	Very high	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

13.3 Material Assets: Natural Resources and Waste - Scoping

The following study areas were identified for this assessment:

- The Site in terms of materials and waste within the Site boundary;
- The national supply of key construction resources; and,
- The waste infrastructure in the Southern Waste Region.

A summary of the key effects identified during the construction and operational phase of the project are outlined in Table 13-2.

Table 13-2: Scoping of Effects - Construction / Operational Phase

Project Phase	Effect	Scoped in / out
Construction	Changes in demand for materials	In
	Changes in baseline waste arisings	In
	Changes in available landfill capacity	In
	Changes to an allocated mineral site	Out
Operational	Changes in availability of materials	Out
	Changes in baseline waste arisings	Limited assessment
	Changes in landfill capacity	Out

13.4 Receiving Environment

At a regional level, Kilkenny is grouped with counties Carlow, Clare, Cork, Kerry, Limerick, Tipperary, Waterford and Wexford to make up the Southern Waste Management Planning Region.

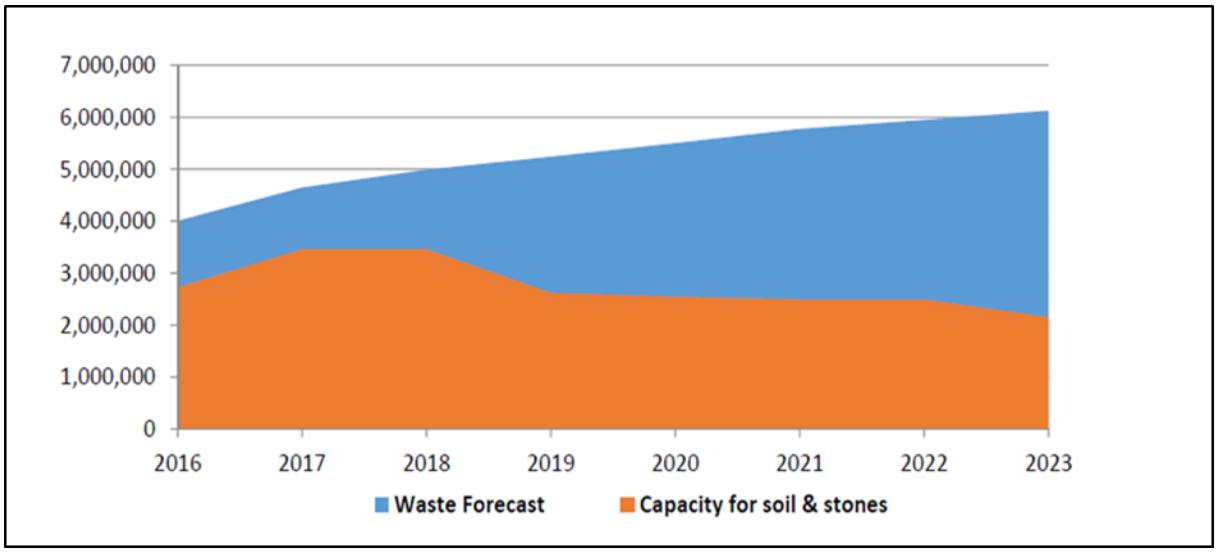
The Southern Regional WMP 2015-2021 aims to establish and maintain a framework which protects the health of the environment and citizens through the sustainable management of wastes generated in the region. The plan focuses on three (3No.) target areas covering:

- Waste generation prevention;
- Recycling; and,
- Landfilling.

A strong emphasis is placed on waste prevention and material reuse activities. There is also a focus on enhancing the collection of quality materials from waste to build on the progress made in recycling. Further efforts will be made in order to improve the recovery and generation of energy from waste treatment. Finally, the strategy will seek to further reduce the role of landfilling in favour of higher value recovery options.

The C&D Capacity Report highlights the shortage of suitable, licensed recovery and treatment facilities to meet current and forecasted growth in surplus material generated in the construction sector of the economy. Figure 13-1 below highlights the projected national shortage in C&D and soils recovery capacity versus increasing C&D and soil waste volumes for the period 2016 – 2023.

Figure 13-1: Forecast of National C&D and Soil Waste Volumes versus Treatment / Disposal Capacity (Regional Waste Authorities, 2016)



13.4.1 Existing National Waste and Recovery infrastructure overview

The 2017 annual report for the Southern Waste Region identified key figures for C&D waste in the region (Southern Waste Region, 2018). Refer to Table 13-3.

Table 13-3: C&D Waste Collected - Southern Waste Region

	Unit	2012	2013	2014	2015
Total C&D waste collected	Tonnes	970,319	772,770	832,478	1,020,363
Soil & stone waste collected	Tonnes	657,446	549,533	581,935	779,852
Contaminated soils collected	Tonnes	3,948	4,083	5,542	2,034

13.5 Availability of Key Materials

Kilkenny limestone

Kilkenny limestone is produced in three (3 No.) quarries in Ireland - two (2 No.) in Co. Kilkenny and one (1 No.) in Co. Carlow. These quarries have a combined annual extraction rate of 71,000m^3 (Kilkenny Limestone, 2020).

Concrete Surfacing

Over 2,000,000m^2 of concrete paving products were produced in Ireland during 2018 (Irish Concrete Federation, 2019).

Aggregates

Over 36,000,000 tonnes of aggregates were produced in Ireland during 2018 (Irish Concrete Federation, 2019).

13.6 Characteristics and Potential Impacts of the Proposed Development

13.6.1 Construction Phase

Due to the nature of construction projects, some natural resources will be used to provide key materials for the construction phase. A summary of the key materials, the corresponding

quantities that will be used and an assessment of the significance of the use of the key materials is provided in Table 13-4.

Table 13-4: Use of Key Materials and Assessment of Significance

Key Material	Volume / Quantity required for Construction of Proposed Development	Baseline Availability	Sensitivity Assessment	Magnitude Assessment	Justification for Magnitude Assessment	Significance
Kilkenny Limestone	c.500m^2 (c.15 m^3 depending on thickness)	C. 71,000m^3 per annum nationally	Low	Negligible	<0.1 % of annual production	Neutral
Granite	C. 4,055m^2	Not applicable	Low	Negligible	Considered negligible in terms of building materials utilised nationally	Neutral
Concrete surfacing	C. 6,165m^2	C. 2,000,000m^2 per annum nationally	Low	Negligible	C. 0.3% of national annual concrete paving production rate	Neutral
Aggregates	C. 5,127m^3	C. 36,000,000 tonnes per annum nationally	Negligible	Negligible	C. 0.03% of national annual aggregate production rate	Neutral
Topsoil	C. 1,552m^3	Not applicable	Negligible	Negligible	Considered negligible in terms of building materials utilised nationally	Neutral

Some waste will be generated during the construction phase. A summary of the waste types, the corresponding quantities that will be used and an assessment of the significance of the waste generation is provided in Table 13-5.

Table 13-5: Generation of Waste and Assessment of Significance

Waste Type	Estimated Volume / Quantity generated during Construction of Proposed Development	Baseline Availability	Sensitivity Assessment	Magnitude Assessment	Justification for Magnitude Assessment	Significance
Concrete	C. 763m^3 (C. 1,831 tonnes)	Precited landfill capacity for 2020 is c. 2,500,000 tonnes for C&D soil and stone waste during 2020 nationally.	High	Negligible	Estimated quantity of waste to be generated is C. 0.4% of predicted national waste capacity for 2020.	Slight
Soils	C. 4,300m^3 (C. 7,740 tonnes)					

Waste concrete generated on-site during the construction phase will be recycled or reused where possible or disposed off-site at an appropriate licenced or permitted waste facility. Excavated soil will be transported to an EPA licensed facility such as Walshestown or similar and disposed of in accordance with the Waste Management Act (as amended). A small amount of canteen and delivery waste (e.g. pallets / packaging) will also be generated during construction.

13.6.2 Operational Phase

During the operational phase, small quantities of domestic type waste will be generated from users of the proposed development. This waste will be collected in public bins which will be managed by KCC. This waste will require off-site recycling and disposal. It is anticipated that the proposed development will have a negligible impact on landfill void and regional waste management capacity during the operational phase.

13.7 Proposed Mitigation Measures and / or Factors

13.7.1 Construction Phase

General construction mitigation measures are outlined in Section 3.3. A CEMP will be prepared as part of the pre-construction development. As part of the CEMP, the following mitigation measures will be put in place during the construction phase of the proposed development:

- Materials required will be ordered only as needed to reduce excess materials leading to waste;
- Where excess materials do arise, where possible these will be returned to the supplier;
- All waste generated during the Construction Phase will be managed in accordance with the relevant waste management regulations;
- Existing concrete slab which will be removed in places will be reused as an aggregate for the construction of the proposed development, as much as is reasonably practical, in place of virgin materials;
- Any waste generated during the Construction Phase will be removed off-site using an appropriately permitted waste contractor;
- Waste generation on-site during construction works will be properly supervised with designated waste storage and segregation areas;

- Should hazardous waste be encountered during construction (such as contaminated soils), it will be segregated, contained, classified, transported and disposed of by appropriately permitted waste contractors in accordance with all relevant national and international waste legislation; and,
- Any potential liquid waste possible arising during construction, such as waste oil, will be stored in suitable containers in bunded areas and disposed of off-site by an appropriately permitted waste contractor at a suitable permitted waste facility; and,
- A Site-specific Construction Waste Management Plan will be developed and will comply with C&D Waste Management Guidelines (Commission European, 2016).

13.7.2 Operational Phase

As outlined above, small quantities of domestic type waste will be generated from users of the proposed development during the operational phase. Waste collection / removal contractors for the proposed development will operate in accordance with the Waste Management Act, 1996 (Irish Statute, 1996) and all subsequent regulations.

13.8 Interactions with other Environmental Attributes

The other environmental factors with which waste and the use of natural resources interact with include:

- Chapter 5 (Population and Human Health): Responsible disposal of domestic waste during the construction and operational phases will ensure that the impact on residents in the surrounding area is avoided. During the operational phase, the disposal of waste will be in accordance with the Waste Management Act, 1996 (Irish Statute, 1996) and all subsequent amendments and the Southern Region Waste Management Plan 2015-2021 and relevant legislation.

13.9 Residual Impacts

As a result of the mitigation measures and factors listed in Section 13.7 above, there will be no significant adverse impacts on the availability of key construction materials as a result of the proposed development.

The residual impacts on waste facilities, as a result of any waste disposal off-site during the construction phase will be a short term slightly adverse impact.

Due to the nature of the proposed development, there will be no significant impact on existing waste disposal sites during the long-term operational phase.

13.10 Cumulative and In-Combination Impacts

In terms of waste, the demolition of the Maturation Building would result in an increase in C&D materials. However, given the current baseline availability of the regional landfill void, the predicted residual impact of “short-term and slightly adverse” previously outlined for the construction phase will remain unchanged.

As stated in Chapter 2, the Masterplan proposes to develop several other elements including residential / commercial units and leisure spaces (known elements include Mayfair Building (City Library), Brewhouse Building, Skate Park and Riverside Gardens).

Although the proposed development on its own will not have any significant impact on material assets or waste infrastructure, the cumulative impact of future Masterplan structures has the potential to have a significant impact on these elements. However, it is not foreseen that this will be the case here as the cumulative impact of any future Masterplan structures on the local environment and available infrastructure (e.g. natural resources and waste infrastructure) will be considered by the planning authority when making such decisions.

13.11 Monitoring

Waste records will be kept during both the construction and operational phases.

13.12 Difficulties Encountered in Compiling this Information

No difficulties were encountered in compiling this information.

14 MATERIAL ASSETS – TRAFFIC AND TRANSPORT

14.1 Introduction

This chapter of the EIAR provides a description and assessment of the likely impact of the proposed development on Traffic and Transport.

14.2 Methodology

The proposed development is sub-threshold with regard to the need to prepare a Traffic and Transport Assessments for planning applications in accordance with TII (2014) Traffic & Transport guidelines (TII, 2014). Table 2.1 of this guidance gives the thresholds above which a Transport Assessment is automatically required as outlined in Figure 14-1 below.

Figure 14-1: Extract from TII (2014) Guidance.

Table 2.1 Traffic Management Guidelines Thresholds For Transport Assessments

Traffic to and from the development exceeds 10% of the traffic flow on the adjoining road.
Traffic to and from the development exceeds 5% of the traffic flow on the adjoining road where congestion exists or the location is sensitive.*
Residential development in excess of 200 dwellings.
Retail and leisure development in excess of 1,000m^2.
Office, education and hospital development in excess of 2,500m^2.
Industrial development in excess of 5,000m^2.
Distribution and warehousing in excess of 10,000m^2.

* In locations that experience particularly heavy congestion and when traffic flows from a proposed development are less than 5% of the traffic flows on the adjoining road, a Transport Assessment may still be required. When in doubt, the requirement for a Transport Assessment should always be scoped with the relevant local authority.

The proposed development will not meet any of these criteria. However, in order to address issues raised in the scoping opinion received from An Bord Pleanála (Appendix 1.1) and the consultation letter received from TII (Appendix 1.3) the following assessment was completed:

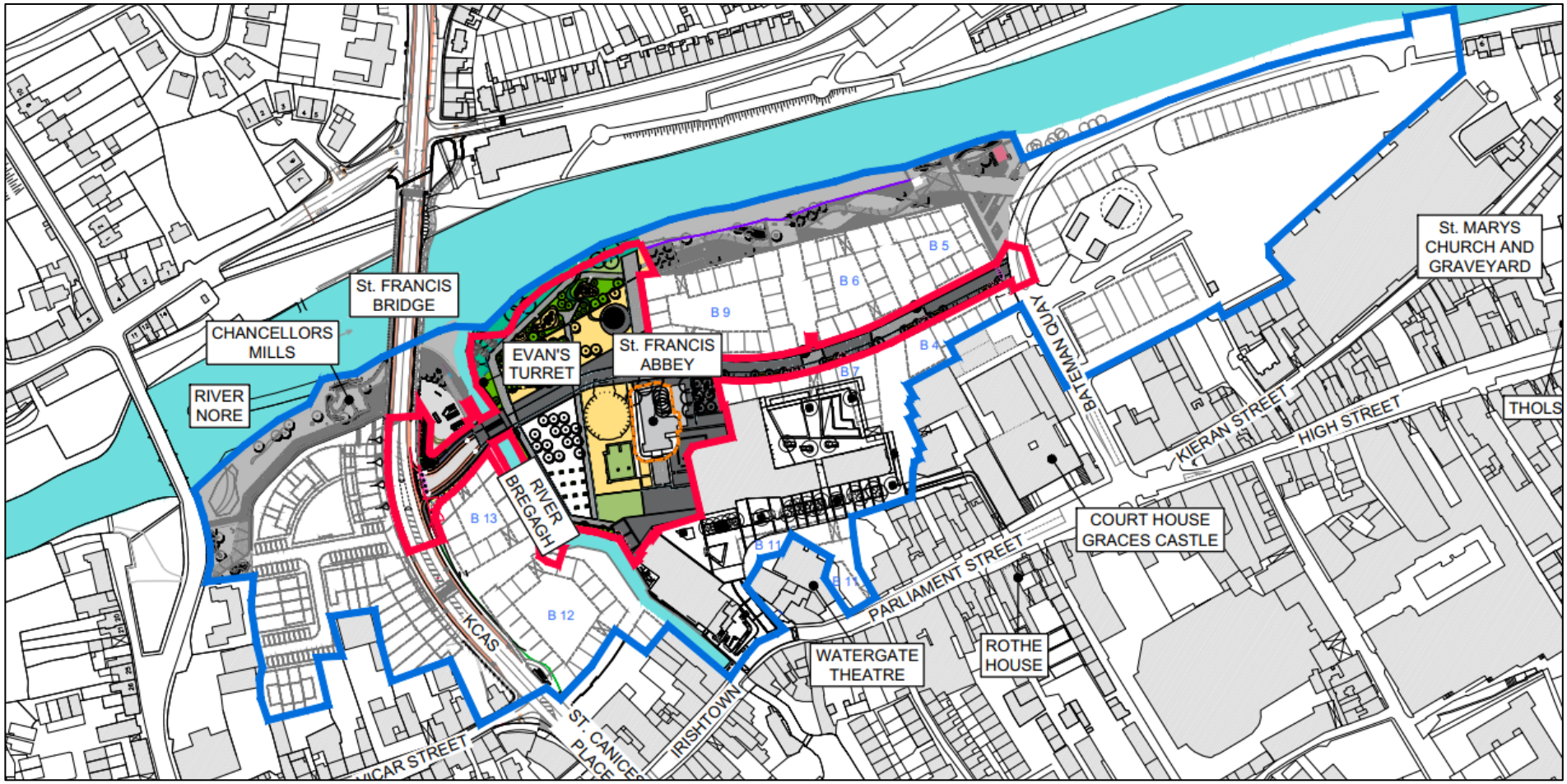
- *Traffic Generation*
  The quantum of traffic generated directly by the proposed development was considered. The impact of the trips generated from the proposed development on the existing adjoining transport infrastructure was considered.
- *Pedestrians and Cyclists*
  The prioritisation for pedestrian and cyclist use was a key feature in the design of the proposed development. The integration of pedestrians and cyclists into the existing transport infrastructure was also assessed.
- *Vehicle Access*
  Based on the traffic generation and intended use of this urban street the vehicular junctions which connect this urban street to existing transport infrastructure were assessed with regard to their geometric design, junction capacity, queue lengths, and geometric layout.

- *Public Transport*
  The proximity of existing public transport infrastructure and how the proposed development will be integrated with existing public transport infrastructure was assessed.
- *Parking*
  The number of required car park and bicycle parking spaces was also assessed.

The objective of this Traffic and Transport Assessment is to provide a comprehensive review of all the potential transport impacts of the proposed development with an agreed plan to mitigate any adverse consequences, if necessary.

The Kilkenny Abbey Quarter Masterplan has identified a number of development plots that will be accessed from this proposed street in the future, namely building plots B4, B5, B6, B7, B9, B13, as shown in Figure 14-2. The proposed development has prioritised pedestrian and cyclist use in the shared space which will service future developments in the area as well as providing a new north-south car free transport corridor in the City Centre. However, attempting to determine the possible quantum and land use within the designated development blocks is speculative as the impact of these plots will be subject to their own independent assessments during future planning applications.

Figure 14-2: Masterplan Development Area and Building Plots



14.3 The Receiving Environment

The Site adjoins two existing streets, St Canice's Place to the north and Bateman Quay to the south. Images showing the existing locations of the current Site boundaries are shown in Figures 14-3 and 14-4 respectively.

Figure 14-3: St Canice's Place

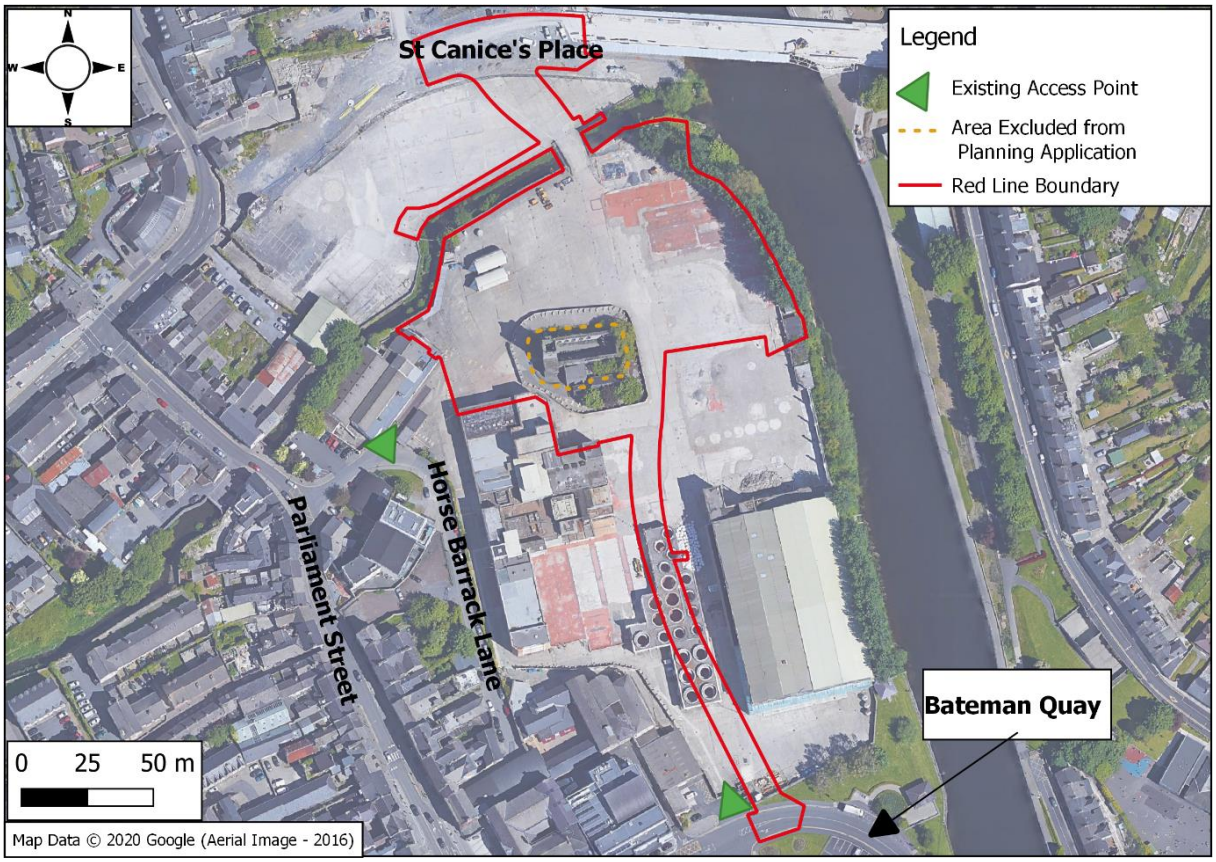
Figure 14-4: Bateman Quay

An existing access to the Site is located between the Brewhouse and Mayfair buildings leading onto Horse Barrick Lane and Parliament Street. The River Breagagh runs from west to east through the Site and is crossed by an existing industrial type bridge which was constructed as part of the former Smithwick's Brewery operations. Refer to Drawing P811 Proposed Traffic Movement Layout for details of surrounding street networks adjacent to the proposed development.

The Site is currently an active construction site for the renovations of the Brewhouse building and Riverside Gardens. Existing traffic to and from the Site is limited to construction traffic related to these developments. HGV's enter the Site via the existing southern entrance off

Bateman Quay and employee vehicles (cars and LGVs) enter the temporary construction car park via Horse Barrack Lane to the west. These access points are shown in Figure 14-5.

Figure 14-5: Existing Access Points



The former brewery operations ceased in 2013. It consisted of a busy industrial site owned by Diageo with significant HGVs, cars, light goods vehicle (LGV) movements occurring on a daily basis. There would have been 80-100 employees working at the Site, most of whom would have driven to work. Numerous HGVs related to deliveries and product dispatch would have served the Site daily as well as service vehicles which would have been a mix of HGVs and LGVs.

The operational brewery had two access points. The main access was via Horse Barrack Lane off Parliament Street and a service entrance off Bateman Quay. These are the same access points as are currently used for construction activities shown in Figure 14-5.

14.4 Characteristics and Predicted Impact of Proposed Development

The design basis of this project is such that it will only generate negligible new trips on the existing transport network, either by car, commercial vehicle, or public transport. The proposed development will generate increased cycling and pedestrian trips as will provide a new amenity space within the City.

Limited service, delivery and maintenance vehicles will enter the Urban Street from the south off Bateman Quay and exit the Urban Street to the north at St Canice's Place, operating a one-way system. Vehicular through traffic will be limited to early mornings and late evenings. This will be controlled by the use of traffic bollards and a permitting system. The Urban Street will utilise the existing bridge over the River Breagagh whilst improving its accessibility and safety for pedestrians and cyclists in the City. Numerous pathways connect from the public footpaths to the existing infrastructure surrounding the proposed development. The Urban street will pass through the proposed Urban Park located to the east and west. The Urban

Street will extend into a large public shared open space in the vicinity of St Francis' Abbey and St Francis' Well. This limited vehicular traffic will exit the Urban Street via a priority junction connection to the existing road network.

It is an objective of Variation 1 of the City Development Plan that specifically relates to the Abbey Quarter Masterplan that pedestrian and cyclist movements shall take precedence over vehicular traffic. Secure bike parking facilities will be provided at Bateman Quay, centrally adjacent to St. Francis' Abbey and to the north of the Breagagh River, adjacent to the new St. Francis' Bridge on St Canice's Place. The Urban Street provides for a pedestrian dominant shared surface within the central section of the Masterplan area in line with Objective 3P of the Kilkenny City & Environs Development Plan 2014-2020 as it is designed "….*to provide for an urban street of pedestrian and cyclist priority between the Central Access Scheme and Bateman Quay crossing the River Breagagh at the existing bridge crossing. To provide for traffic management measures on the street such as to inhibit the flow of through traffic and heavy goods vehicles."*

14.4.1 Design Principles

The Urban Street design has taken account of the recommendations set out in the following relevant documents:

- Design Manual for Urban Roads and Streets (DMURS) 2019 prepared by the Dept of Transport, Tourism and Sport and Dept of Housing (Government of Ireland, 2019);
- Abbey Quarter Urban Design Code which was developed as an objective of the "City and Environs Development Plan (2014 – 2020) (Loci and Kilkenny Co Co, 2018); and,
- Masterplan for Abbey Creative Quarter Kilkenny (KCC, 2015)

The 2009 Kilkenny City & Environs Mobility Management Plan (KCC, 2009) addressed transport modal shift and accessibility with particular emphasis on providing appropriate space for cycling, pedestrians and public transport. The Abbey Quarter Urban Park and Street design was developed to support the objectives of this Mobility Management Plan to create a pedestrian environment in the City, to facilitate cycling and walking by providing a network of safe, and convenient pedestrian and cycle routes within the Site which will encourage such modes of transport. The proposed development is designed to integrate routes for pedestrians and cyclist linking St Francis Bridge to Bateman Quay, High Street, Horse Barrack Lane, Parliament Street and Irishtown.

This Urban Street offers permeability into areas of the development and connectivity and ease of movement within the area. This permeability offers local residents and people of Kilkenny and tourists alike, access routes in the City Centre to connect to the historic monuments that exist on the Site and to the amenity, residential and commercial facilities that may be developed in the future. Comparable urban streets, in terms of functionality, include Kieran Street in Kilkenny, Grafton Street in Dublin and Barron Strand Street in Waterford.

This development will generate minimal direct traffic as it is not designed as a new destination but is designed as a public amenity to compliment all of the existing destinations in the City.

14.4.1.1 Proposed Urban Street Geometric Design

The proposed Urban street is designed to provide for the following design criteria to make the Street safer for users, namely pedestrians and cyclists, and improve accessibility to the proposed development.

- The route selected is reflective of the route outlined in the Urban Design Framework Masterplan for Abbey Quarter Kilkenny (KCC, 2015);
- No through traffic will be permitted to use the proposed street with the exception of service vehicles for future development plots. Pedestrians and cyclists will have freedom of movement across the entire street;

- The Street is designed as a one-way traffic system with access from Bateman Quay at the southern end and exiting onto St. Canice's Place at the northern end;
- Some provision for set down of service vehicles is provided off the shared space;
- The urban street is 320m long and has an overall pavement width of 11.1m consisting of a 5.5m wide shared space and 2m to 3m wide dedicated pedestrian pavement with tree planting and street furniture to each side. Refer to Figure 14-6 for a typical cross section;
- The proposed development will be located with the Kilkenny City Speed limit zone of 30kph zone assigned to St Francis Bridge and Bateman Quay. The proposed speed limit for the Urban Street will be 30kph however the actual design speed for this Urban Street is determined by the designation of a shared pavement design criteria set out in DMURS Table 4.1 (Government of Ireland, 2019). Advisory speed limits of 10-20kph is recommended for urban streets where vehicles, pedestrians and cyclist share a carriage way. Street scape design, tree lines street, furniture design and active street edges encourage these low speeds;
- As this urban street will be a designated shared space no road markings will be provided in the road section from the River Breagagh to Bateman Quay however road markings for cyclists and other vehicles will be provided for the section of this Urban Street from River Breagagh Bridge to St Canice's Place Junction;
- Pavement finishes have been selected and detailed by Mitchel+Associates Landscape Architects. It has been designed to provide for a pavement design with change in colour and textures and grade material changes. The Urban Street will be subtly demarcated with continuous aco drains along the length of the scheme;
- Geometric Alignment and pavement finishes will comply with the requirements of *DMURS* (Government of Ireland, 2019);
- Line of visibility and turning movements identified on Drawing P818 comply with Table 4.2 DMURS (Government of Ireland, 2019);
- A priority junction connecting to St Francis Bridge was designed as a stop junction with a setback of 2.4m provided; and,
- Reduced corner radii are provided for slower moving traffic in accordance with Fig 4.42 of DMURS (Government of Ireland, 2019) encouraging slower vehicle speeds that are more compatible with cyclists speed.

14.4.2 Construction Phase – Predicted Impacts

The construction traffic generation will consist of a mixture of HGVs for bulk deliveries, heavy plant for construction machinery transportation to and from the Site as well as cars and LGVs for staff. The HGV's and heavy plant will be similar to the ongoing small-scale construction projects in the City Centre Site. The proposed construction duration is c.14 months. The majority of traffic movements on-site will consist of light commercial vans and cars entering during peak construction periods.

The construction plant and deliveries are likely to account for a maximum of 12 to 15 HGV deliveries per day during peak construction period. Based on the current traffic using St Francis Bridge the construction traffic impact is unlikely to be significant and will not impact the existing traffic flows. There will likely be intermittent peaks during the 14 month construction period, associated with specific construction tasks, such as during the excavation for services or pouring of concrete at the Site.

During the temporary construction phase, construction vehicles will enter the Site off St Francis Bridge to minimise requirement for construction vehicles on Parliament Street, High Street, John Street. Appropriate advance signage and permits will be coordinated by the Contractor with KCC.

Temporary carparking requirements will arise during the construction phase of the proposed development. Based on the nature of the development the carparking requirements are

estimated to be in the region of 20 – 30 cars. This construction carparking demand can be facilitated on the existing hard surfaced areas in the adjacent development plots following the completion of appropriate construction traffic management plan by the Contractor.

14.4.3 Operational Phase – Predicted Impacts

The proposed development will not generate significant additional trips on adjoining transport infrastructure hence it will not necessitate changes to the adjacent road layout or public transport service for Kilkenny City.

The proposed development provides a shared pavement with the urban street and urban park designed as amenity spaces for use by the public. This urban street is dominated by pedestrian and cyclist users with the exception of limited accessibility for service, delivery and maintenance vehicles.

14.4.3.1 Traffic Generation

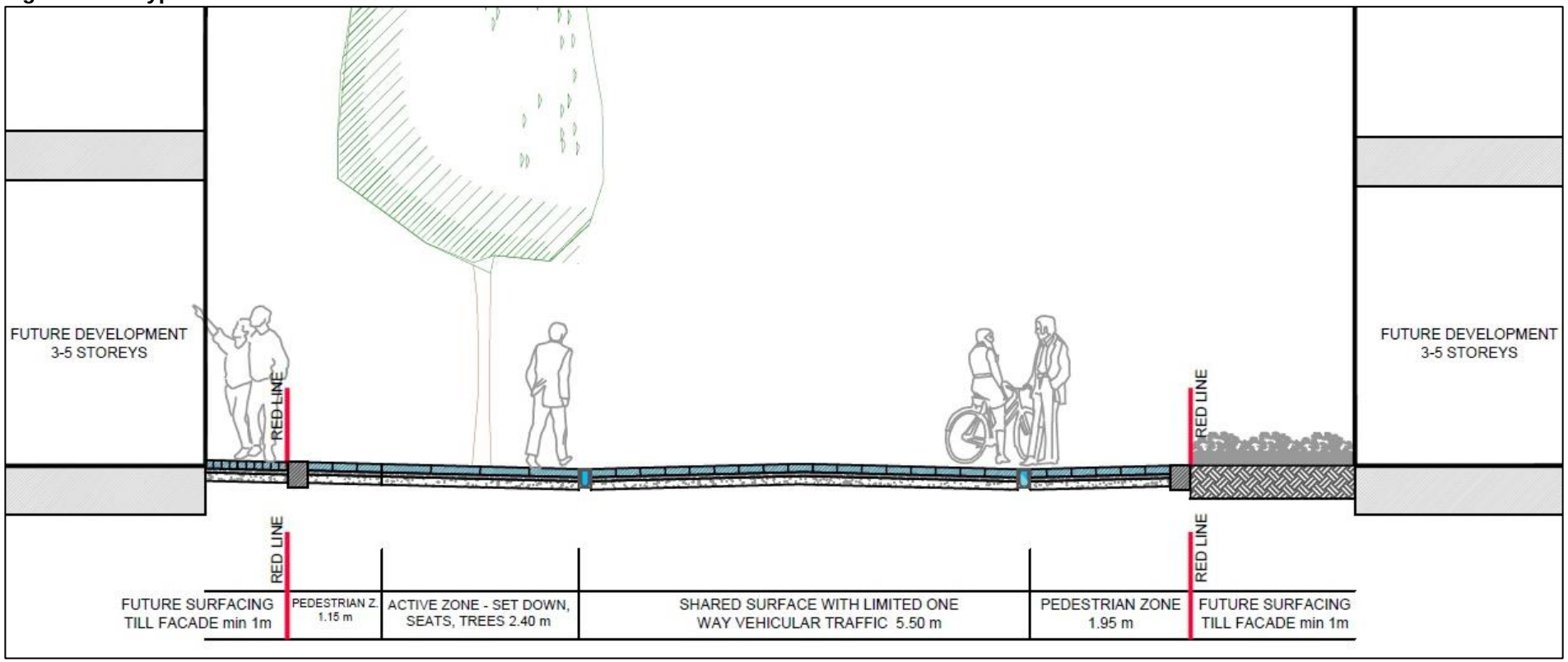
The estimated traffic which will be generated as a result of the proposed development during the operation phase is set out in Table 14-1: Estimated Future Vehicular Traffic Generation

Table 14-1: Estimated Future Vehicular Traffic Generation

Trip type	No. Daily Trips
Public cars\ HGVs	0
Service, Delivery & Maintenance Vehicles	limited to small traffic volumes estimated to be in the region of 10 – 20 trips per day

Based on the negligible vehicular traffic volumes generated by the proposed development the use of traffic modelling software was determined not to be merited.

Figure 14-6: Typical Urban Street Cross Section



14.4.3.2 Pedestrians & Cyclists

Provision is made for cyclists to connect into the City Centre via the proposed Street from St Francis Bridge to Bateman Quay.

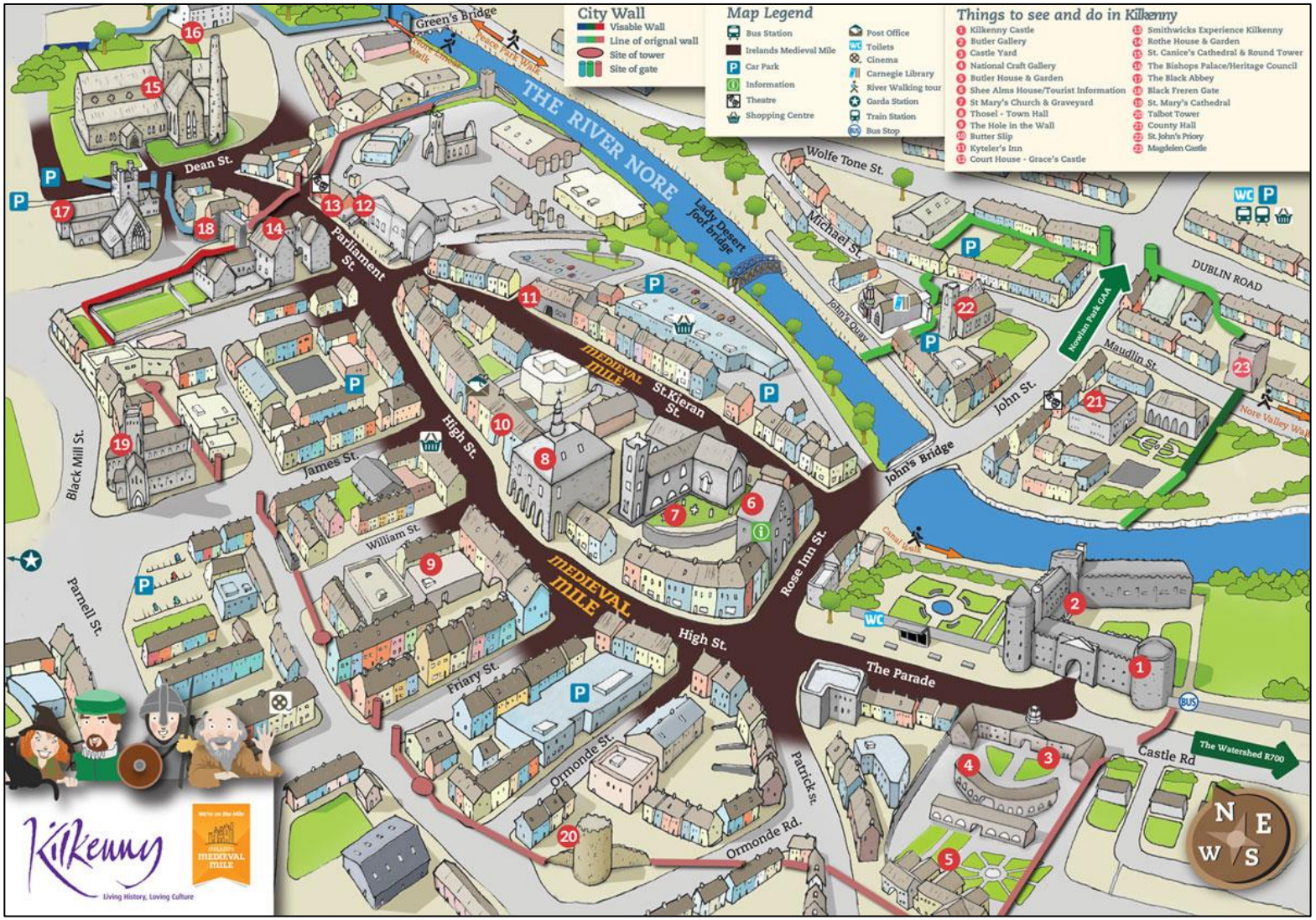
The 5.5m wide shared space carriageway is defined by linear aco drains located approx. 2m to 3m from the boundary line with tree planting, street furniture, dedicated pedestrian zones. Bicycles will be allowed to use all other spaces in the street cross section on the basis of pedestrian priority without the provision of dedicated cycle paths or tracks.

Secure public cycle parking facilities will be provided in designated locations throughout the proposed scheme. This cycle parking will be discretely and conveniently located throughout the scheme. In total, 78 bicycle parking spaces have been provided in the scheme. Additional cycle parking will also be provided as part of the Brewhouse and Riverside Gardens developments.

Connectivity is provided via a number of new key linkages for both pedestrians and cyclists. DMURs recommends the movement towards more integrated and sustainable forms of development where the design should maximise the number of walkable and cyclable routes between destinations (Government of Ireland, 2019). The proposed scheme offers numerous routes for cyclists and pedestrians ensuring improved accessibility for all users as shown in Appendix 14.1.

Integration of the pedestrian links into the existing pedestrian routes in Kilkenny City is a key objective of this proposed development. The design has achieved this by linking with the City Centre and Kilkenny's Medieval Mile which is a tourist trail through the City stretching from Kilkenny Castle to St Canice's Cathedral, including all attractions in between (see 7). It is proposed that the development of the former brewery site will allow the Medieval Mile to incorporate the following heritage structures, including St Francis' Abbey, the City Walls and Evans Turret into this walking route.

Figure 14-7: Kilkenny Medieval Mile Map



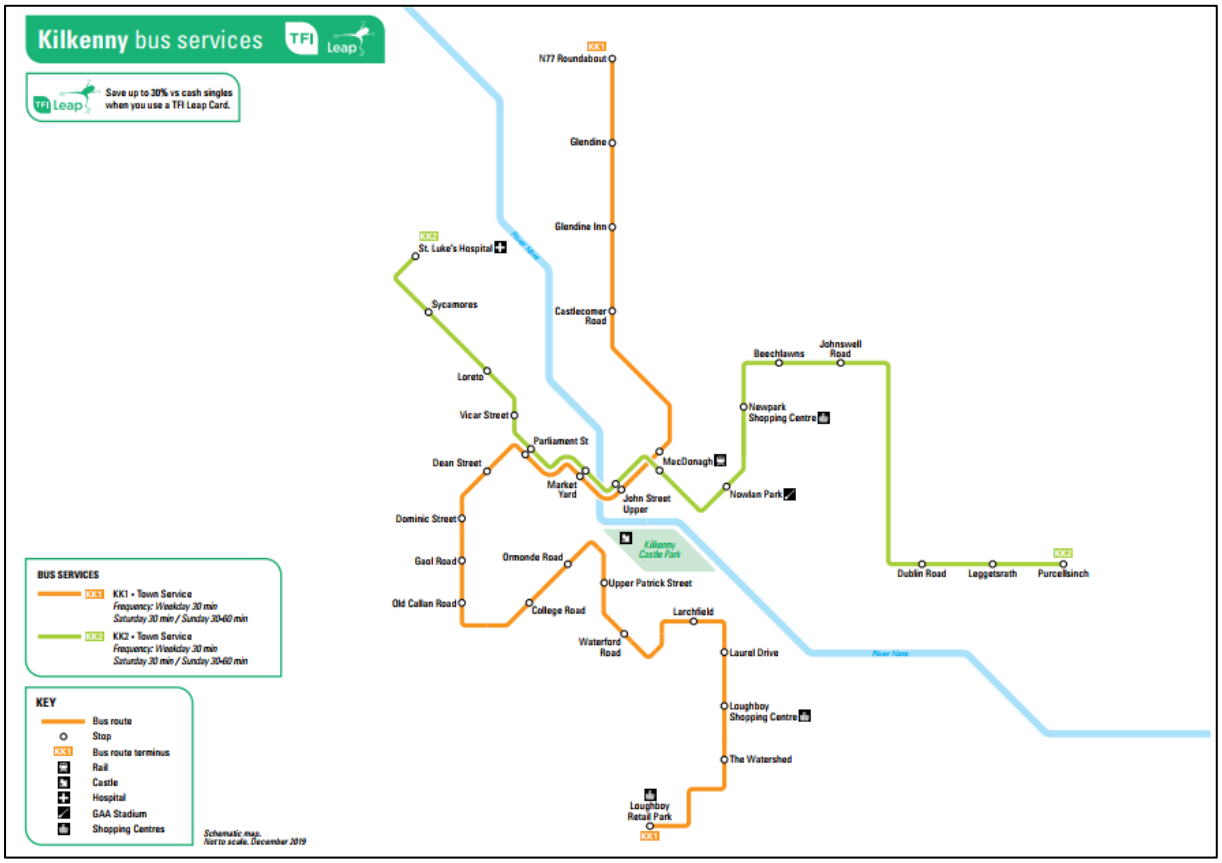
14.4.3.3 Vehicle Access

Limited vehicular access to the proposed development will be permitted at restricted times. Such restricted times will be managed by KCC but it is envisaged that it will be limited to early mornings and late evenings. The urban street will be controlled by way of retractable bollards (automated or removable) as indicated on Drawing P812 Traffic Movement Drawing at the urban street interface with St Francis Bridge at the northern end and Bateman Quay at the southern end. It is intended that access for vehicles associated with service, delivery and maintenance vehicles for the Urban Park, the Smithwicks Visitor Centre and future buildings will be permitted to use this Urban Street.

14.4.3.4 Public Transport

Public transport within the City is primarily by Bus services. It is the policy of KCC to encourage the development of public transport and the Abbey Quarter Masterplan is reflective of this objective. A new public transport service is operating as outlined on the routes and timetables set out in 8. The existing public bus stops located in Market Square and Parliament Street are in close proximity to the proposed development. These bus routes also connect MacDonagh Train Station to the proposed development. Alternatively, McDonagh Station is within c.5-minute walking distance from the Site.

Figure 14-8: Kilkenny City Public Transport Routes



14.4.3.5 Carparking

No carparking is provided within this scheme as the proposed development will not generate traffic which will require carparking facilities.

Within the City Centre, public car parking is provided both on and off street. Car parking is provided by free or daily rate parking spaces within or on the periphery of the City Centre.

Typically, public car parking within the City Centre is reserved for short-term parking, which is subject to a tariff system. Real Time Parking Information Signage and Variable Messaging Signs (VMS) system has been utilised in the provision of parking within the City.

Section 4.1.6 of the Masterplan states that "Limited new carparking will be provided within the Masterplan area, primarily for loading/unloading and for mobility impaired drivers. Options for the provision of additional off-site carparking facilities, within a short walking distance of the Masterplan Area will be considered." (KCC, 2015)

Variation No.1 of the Kilkenny Development Plan (Kilkenny County Council, 2014) also provides the following objective:

"To provide for park and walk facilities for car and bus/coach parking at a site or sites in close proximity to the Abbey Creative Quarter Masterplan area to service both the masterplan area and the City Centre generally taking into account the mobility management plan for the City."

Although not required for this proposed development regardless. The omission of parking from the design complies with these objectives.

A detailed report *Parking Options Assessment Report* prepared in 2017 has set out recommendations for the development of carparking for the City including the Abbey Quarter (Roadplan, 2017). The recommendations offered in this report take account of both short term and long-term objectives for parking requirements in Kilkenny City. It identified two particular sites suitable for the provision of additional parking:

- The Green Street Site; and,
- Bateman Quay Site.

Both sites were identified as very accessible, ready for development and could support the growth of this area of the City.

14.4.3.6 Servicing

Services, delivery and maintenance vehicles will access the Site from Bateman Quay. On street set down areas will be provided. Each future development will be required to allow for special access requirements to their building within the detailed design of the building for set down and servicing.

14.4.3.7 Emergency Service Areas

Access to all areas of the proposed development will be available to emergency service vehicles. The Urban Street will be suitable for use by emergency service vehicles and will be coordinated with KCC Roads Department regarding the access through the retractable bollards.

14.5 Proposed Mitigation Measures and / or Factors

The following mitigation measures will be put in please during the construction and operational phases.

14.5.1 Construction

A construction traffic management plan will be prepared by the contractor in advance of the commencement of works and submitted to KCC for approval. This will include but will not be limited to the following:

- Access arrangements;
- Parking arrangements;
- Limitation of speed;

- Wheel wash arrangements; and,
- Appropriate signage.

Access for HGVs will be limited to the entrance of St. Canice's Place to the north of the Site. This will minimise traffic description in Parliament Street and Irish town.

Construction employee, equipment and HGV parking will be within the former Brewery Site only.

As discussed in Chapter 13 (Waste and Use of Natural Resources) concrete removed during site clearance works will be reused in so far as is possible. This will reduce the number of HGV movements related to the proposed works.

In order to further reduce HGV numbers, the contractor will be required to fill empty trucks which have delivered aggregates and soils with materials to be removed from the Site in order to avoid empty loads.

14.5.2 Operational

The operational phase mitigation measures are integral to the overall scheme design and can be summarised as follows:

- Automated retractable bollards will be provided to ensure that only authorised vehicles, at authorised times will be able to access the Urban Street. This design approach will ensure that the Urban Park and Street will be a pedestrian and Cyclist dominated space;
- A permitting system will be controlled by KCC that will limit access to service, maintenance, deliveries and emergency vehicles serving this and adjoining developments only; and,
- Access to vehicles will be limited to early mornings and late evenings when there will be less footfall along the street.

14.6 Interactions with other Environmental Attributes

Traffic and Transport have the potential to be impacted positively or negatively under several environmental issues including the following:

- Chapter 5 (Population and Human Health)
    - The provision of pedestrian and cyclist linkages in the City has the potential to result in positive physical and mental health benefits; and,
    - The safety of the urban street and its interaction with nearby vehicle priority streets has been an integral factor in the design.
- Chapter 9 (Air and Climate)
    - The provision of a pedestrian and cyclist priority street will encourage the reduction in dependence on combustion engine driven vehicles within the City. This could result in a related reduction in GHG emissions and related air pollutant emissions.

14.7 Residual Impacts

The key residual impacts will be as follows:

- The development consisting of the Urban Street and Public Park is not a destination tourist attraction. It is an amenity space in the centre of Kilkenny City. The vehicle movements generated by this development with particular reference to the character and number of trips in/out combined per day will therefore have a negligible impact on the adjacent existing road network;

- The development Site is consistent with national, regional and local policy by encouraging shared space urban street design which encourages the prioritisation of pedestrians and cyclist over vehicles;
- The development will not generate heavy vehicle traffic in the City Centre area; and,
- The development has been designed in line with the DMURS and therefore has been designed in accordance with best practice taking the safety of all street users, pedestrians and cyclists, into account.

Given that the proposed development will encourages prioritisation of pedestrian and cyclist mode of transport in the City it will have a significantly positive impact on traffic and transport in the City in the medium to long term.

14.8 Cumulative and In-combination Impacts

It would be reasonable to assume that the development plots adjacent to the proposed development will be developed on an incremental basis in accordance with the aspiration of the masterplan. Such development are unlikely to cause any significant traffic and transport issues for the proposed development as Abbey Quarter Urban Street is designed to prioritise pedestrian and cyclist and service, delivery and maintenance vehicles only. This vehicle access is restricted to outside normal working hours.

Any future developments in Abbey Quarter will be subject to separate planning application(s). The detailed assessment of any likely impact on the environment and consistency with the statutory land use plans and Masterplan will be addressed in these applications. Such future applications will determine the nature, quantum, type or form of development including potential traffic generation. Accurate traffic generation related to adjacent development plots are unknown at this stage. An assessment of the traffic generation from any adjacent development plot will need to be assessed as part of the planning applications required for these future developments.

It is our understanding from the criteria set out in the Masterplan that no large-scale car parking will be provided within the development plots directly adjoining the proposed Urban Street. The requirement of any future car parking / access for these developments will be subject to separate planning applications and detailed assessments of likely impacts on the environment and consistency with statutory land use plans and the Masterplan. Cycle parking within future developments will also be considered as part of independent development planning process.

Furthermore, a new Area Based Transport Assessment (ABTA) including traffic modelling for the City is being prepared by KCC in line with TII guidelines (TII, 2018). It is expected that this will be published in Q1 of 2021. This mobility management plan including traffic modelling will take into account the Abbey Quarter Masterplan as a whole including this proposed development, all known developments in and around the City Centre as well as the provisions made in the development plan for the City.

Deliveries and vehicle users associated with the Mayfair (City Library) and Brewhouse Buildings will not be granted access to the proposed Urban Street. There will be no related cumulative traffic impacts associated with these developments. Access to the Skate Park and Riverside Gardens for pedestrians and cyclists will be improved by the proposed development and therefore the cumulative impact with these developments will be positive in the medium to long term.

14.9 Monitoring

Not applicable.

14.10 Reinstatement

Not applicable.

14.11 Difficulties Encountered in Compiling this Information

No difficulties were encountered in compiling this chapter.

15 INTERACTIONS

The major interactions between the environmental impacts are assessed within the above chapters of this EIAR. Table 15-1 outlines a matrix summarising the interactions between impacts on the various factors.

Table 15-1 Interactions Between Impacts on Different Factors

Description	Population & Human Health	Biodiversity	Land & Soils	Water	Air Quality & Climate	Noise & Vibration	Landscape and Visual	Cultural Heritage	Waste & Natural Resources	Traffic & Transport
Population & Human Health		✓	✓	✓	✓	✓	✓	✓	✓	✓
Biodiversity	✓		✓	✓	✓	✓	✓			
Land and Soils	✓	✓		✓	✓		✓	✓	✓	
Water	✓	✓	✓		✓			✓	✓	
Air Quality & Climate	✓	✓								✓
Noise & Vibration	✓	✓						✓		✓
Landscape & Visual	✓	✓	✓					✓		
Cultural Heritage	✓		✓	✓		✓	✓			
Waste & Natural Resources	✓		✓	✓	✓					✓
Traffic & Transport	✓		✓	✓	✓	✓				

✔	Interaction

16 SCHEDULE OF COMMITMENTS

Table 16-1 outlines the environmental commitment which will be undertaken as part of the proposed development, during the Construction and Operational Phase.

Table 16-1: Schedule of Commitments

Section	Commitment	Stage	Responsibility
General			
Various	A CEMP will be prepared by the appointed main contractor and will be submitted to the planning authority in advance of works commencing at the Site.	Construction	Appointed Contractor
Various	To minimise the potential impacts arising from the construction phase, the works will be carried out taking cognisance of relevant legislation and the best practice procedures.	Construction	Appointed Contractor
Biodiversity			
6.5	The Site manager shall ensure that all personnel working onsite are trained and aware of the mitigation measures detailed within the EIAR.	Construction	Appointed Contractor
6.5	An Ecological Clerk of Works (ECoW) will be appointed for the duration of the project.	Construction	Appointed Contractor
6.5	Protected and notable species posters will be erected on the Site notice board and maintained throughout the duration of the works.	Construction	Appointed Contractor
6.5	In advance of works, all site personnel will receive a toolbox talk regarding notable and protected species. Everybody working onsite must understand the role and authority of the ECoW.	Construction	Appointed Contractor
6.5	If protected or notable species are encountered during operations at the Site, works should stop within the area that these animals are identified and the ECoW will be contacted for advice.	Construction	Appointed Contractor
6.5	An ECoW will inspect the Site in advance of works commencing and will undertake Site inspections as required during the works, to ensure that all of the works are completed in line with the CEMP and all wildlife legislation.	Construction	Appointed Contractor
6.5.2	All vegetation clearance required will be scheduled to take place outside of the nesting bird season.	Construction	Appointed Contractor

Section	Commitment	Stage	Responsibility
6.5.2	Sturdy tree protection fencing or suitable site hoarding will be erected before demolition or construction work commences along the lines shown on the Tree Protection Plan within Appendix 6.2 and should remain in place until their removal or re- location is authorised by a qualified arborist.	Construction	Appointed Contractor
6.5.2	The works to lift the existing concrete slab within the Root Protection Areas (RPAs) of the retained trees will be carried out by machinery or operators working with care from hard surfacing outside the RPAs where practicable. Where there is an existing sub-base, this should be left intact and re-used underneath the new concrete slab wherever possible. Where there is no existing sub-base and a compact surface is required beneath the new concrete slab within the RPAs of retained trees, the slab will be poured upon a layer of engineering product designed to minimise soil compaction. Where machinery access has to encroach the RPAs of the trees to be retained for reasons unforeseen and unavoidable; suitable ground protection will be put in place to prevent any significant soil compaction or root damage near the trees.	Construction	Appointed Contractor
6.5.2	The area of new concrete slabs adjacent to retained trees will be lined with an approved geotextile prior to pouring to limit the caustic effects of wet concrete affecting the adjacent tree roots.	Construction	Appointed Contractor
6.5.2	Where it is considered appropriate, smaller roots of 25mm or less will be pruned back by a qualified arborist.	Construction	Appointed Contractor
6.5.2	All new underground services such as water, foul water and electricity will be routed away from the RPAs of trees to be retained; where this is not practical the services will be installed under any significant tree roots into trenches excavated by compressed air lance or other approved tree root friendly system.	Construction	Appointed Contractor
6.5.2	All exposed roots and / or soil profiles containing roots of trees to be retained will be kept damp in dry conditions by regular watering and be covered with a double layer of hessian fabric to prevent desiccation.	Construction	Appointed Contractor
6.5.2	Backfill will be of good quality topsoil, structural soil or clean sand.	Construction	Appointed Contractor
6.5.2	The tree protection measures and specialist work methods will be overseen and directed onsite by a dedicated site arborist. The arborist will also make regular visits to the site during the construction process to ensure compliance and be available to provide advice and guidance where necessary.	Construction	Appointed Contractor

Section	Commitment	Stage	Responsibility
6.5.2	The retained trees will be assessed by a qualified arborist following the completion of the construction works.	Construction	Appointed Contractor
6.5.4	The management of vegetation (including trees) will be restricted to outside the bird breeding season (1ST March-31st of August) and will be monitored by the ECoW. In the event that works need to be undertaken within the main breeding season, this would be undertaken in consultation with NPWS.	Construction	Appointed Contractor
6.5.5	A pre-construction survey will be carried out for otter within or close to the works areas.	Construction	Appointed Contractor
6.5.5	Where excavations will be required onsite, appropriate measures to protect mammals from ingress will be installed.	Construction	Appointed Contractor
6.5.5	If unidentified burrows are identified within the works area during construction, the project ECoW will be contacted for advice.	Construction	Appointed Contractor
6.5.6	In advance of any construction works commencing, an updated survey for invasive species will be undertaken and an updated Site specific invasive species management plan will be prepared.	Construction	KCC
6.5.6	The invasive species management plan will be developed prior to the commencement of the works to ensure that the unintentional spread of these species will be avoided. The management plan will detail how the invasive species will be eradicated / managed as part of the works and will provide further details with regards to the management of soils contaminated with Himalayan balsam and Japanese knotweed material during the works.	Construction	KCC
6.5.6	In order to ensure that invasive species are not introduced or spread from the Site, the following control measures will be put in place: • All vehicles, machinery and any other equipment that may be used for the works will be washed and steam cleaned as required prior to being used on the Site to prevent the import of plant material / seeds;	Construction	Appointed Contractor

Section	Commitment	Stage	Responsibility
	• Before machinery or equipment is unloaded at the Site, equipment will be visually inspected to ensure that all adherent material and debris has been removed; • Any vehicles and machinery that are not clean will not be permitted entry to the Site; • All materials to be imported to the Site including additional planting will be sourced from a reputable supplier and records of all material / supplies to site will be maintained; and, • In advance of works, all site personnel will receive an induction regarding invasive species. All site personnel must understand the role and authority of the ECoW managing the issue of the non-native species.		
6.5.7	Ecological monitoring and training of site operatives in the identification and risks associated with invasive species such as Japanese knotweed will form part of the on-going site operations	Construction	Appointed Contractor
6.5.8.1	Where lighting is essential for safety and security reasons the following measures have be taken into consideration during the layout design: • Avoidance of excessive lighting; • Light Emitting Diodes (LED's) will be used and the brightness will be set as low as possible; • Lighting will be aimed only where it is needed, with no upward lighting; • Lighting will be directed away from landscaped areas, retained sections of vegetation and any waterbodies; and, • The height of lighting columns has been reduced as much as possible to avoid light spillage.	Operational	KCC
6.5.8.1	Following the installation of the lighting for the proposed development, the project ECoW will undertake a further Site inspection, to check the lighting patterns and lux levels along the site boundaries.	Operational	KCC

Section	Commitment	Stage	Responsibility
6.5.8.2	In order to safeguard otter and other species utilising the section of the riverbank along the proposed develop from disturbance, defence planting and fencing is to be installed along the boundary of the park. The planting / fencing will prevent access to the riverbank to walkers and dogs.	Operational	KCC
6.5.10	Artificial bat boxes will be erected on suitable trees along the eastern Site boundary. The number and location of which will be specified by the ECoW.	Operational	KCC
6.5.10	A variety of bird nest boxes designed to attract a variety of nesting bird species will be erected on suitable trees. The number and location of which will be specified by the ECoW.	Operational	KCC
Land and Soils			
7.5.1	A Materials Management Plan will be implemented by the approved Contractor, to minimise the overall impact arising during the construction programme. This will include measures to: • Maximise excavated materials reuse; • Reuse existing stockpiles of crushed concrete on-site, where possible; • Minimise subsoil disturbance; and, • Minimise exportation of materials for disposal.	Construction	Appointed Contractor
7.5.2	Specific control measures will be specified in the CEMP for the handling and temporary storage of potentially contaminated materials that may be encountered during the works.	Construction	Appointed Contractor
7.5.1.1	Soil erosion on the riverbanks at the confluence of the River Nore and River Breagagh will be prevented through the implementation of the following measures: • The works will be undertaken when the seasonal water levels will be at low levels; • Works will be restricted to scrub clearing and replanting by hand to avoid unnecessary ground cover removal and soil erosion; and, • No vehicles will be permitted beyond the concrete hardstanding.	Construction	Appointed Contractor

Section	Commitment	Stage	Responsibility
7.5.1.3	All plant and machinery will be serviced before being mobilised to the Site.	Construction	Appointed Contractor
7.5.1.3	All oil stored on the Site for construction vehicles will be kept in a locked and bund protected area.	Construction	Appointed Contractor
7.5.1.3	Preventative maintenance and relevant maintenance logs will be kept for all on-site plant and equipment.	Construction	Appointed Contractor
7.5.1.3	Refuelling of plant and machinery will be completed in a controlled manner using drip trays (bunded container trays). Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile containers. Bunds for the storage of hydrocarbons and chemicals will have a holding capacity of 110% of the volume to be stored.	Construction	Appointed Contractor
7.5.1.3	Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage.	Construction	Appointed Contractor
7.5.1.3	Drip trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills.	Construction	Appointed Contractor
7.5.1.3	Only designated trained operators will be authorised to refuel plant on-site.	Construction	Appointed Contractor
7.5.1.3	Procedures and contingency plans will be set up to deal with emergency accidents or spills.	Construction	Appointed Contractor
7.5.1.3	An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill.	Construction	Appointed Contractor
7.5.1.4	The production, transport and placement of all cementitious materials will be strictly planned and supervised.	Construction	Appointed Contractor
7.5.1.4	All concrete pours will be carefully planned to avoid any impacts.	Construction	Appointed Contractor
7.5.1.4	Water supply points, if required, will be agreed with the appointed Contractor in advance of the works.	Construction	Appointed Contractor
7.5.1.4	Shutters will be designed to prevent failure. Grout loss will be prevented from shuttered pours by ensuring that all joints between panels achieve a close fit or that they are sealed.	Construction	Appointed Contractor

Section	Commitment	Stage	Responsibility
7.5.1.4	Chemicals used will be biodegradable where possible.	Construction	Appointed Contractor
7.5.1.4	Any spillages will be cleaned up immediately and disposed of correctly.	Construction	Appointed Contractor
7.5.1.4	Where concrete is to be placed by means of a skip, the opening gate of the delivery chute will be securely fastened to prevent accidental opening.	Construction	Appointed Contractor
7.5.1.4	Where possible, concrete skips, pumps and machine buckets will be prevented from slewing over water when placing concrete.	Construction	Appointed Contractor
7.5.1.4	Surplus concrete will be returned to batch plant after completion of a pour.	Construction	Appointed Contractor
7.5.2	During the operational phase, all maintenance equipment used on soft landscaped areas will be regularly checked for leaks and serviced to minimise the risk of fuel / oil spills.	Operational	KCC
7.5.2.1	Existing fill materials will be covered in either hardstanding or by a layer of clean inert imported fill materials (e.g. soil and/or stone), with a minimum depth of 600mm, to achieve the proposed finished ground levels.	Operational	KCC
7.9	Any excavated materials that require offsite disposal will undergo sampling and testing to ensure disposal in accordance with the relevant waste legislation.	Monitoring	KCC
Water			
8.5.1	Construction works within close proximity of the River Breagagh / River Nore will be subject to inspections by Ecology Clerk of Works.	Construction	Appointed Contractor
8.5.1	Existing fuel / oil interceptors will be maintained until they are ready to be replaced.	Construction	Appointed Contractor
8.5.1	The installation of new oil / silt interceptors will be conducted during dry weather.	Construction	Appointed Contractor
8.5.1	Discharges to the River Breagagh / River Nore will be blocked while the new oil / silt interceptors are being installed so that no discharge from the Site occurs during this time	Construction	Appointed Contractor
8.5.1	Existing drains which are not being used as part of the proposed development will be grouted at both ends and associated gullies will be blocked	Construction	Appointed Contractor
8.5.2	All surface water runoff from hardstanding areas will be collected in a closed drainage system before passing through silt / oil separators and discharging to the	Operational	KCC

Section	Commitment	Stage	Responsibility
	Rivers Breagagh and Nore. The drainage system will be inspected regularly and maintained as required.		
8.9	For the duration of the construction works, visual inspection of the River Breagagh / River Nore will be undertaken at the following locations twice daily: • Upgradient of the Site in the River Breagagh; • Downgradient of the Site in the River Breagagh; • Upgradient of the Site in the River Nore; and, • Downgradient of the Site in the River Nore. These visual inspections should include a photographic record and notes regarding water quality and works occurring at the time both on the site and in the vicinity of the observation points.	Construction	Appointed Contractor
8.9	Daily sampling of the River Breagagh / River Nore will be undertaken at the locations outlined above for the following parameters: • pH; • Suspended solids; and, • Oils, Fats and Greases (known as FOG) This sampling should take place, during the working day, from the time that removal of the concrete slab or drainage works commence, whichever is first. Until all groundworks and concrete works are finished and the new drainage system, including oil/water interceptor and silt traps, are fully commissioned.	Construction	Appointed Contractor
Air Quality and Climate			
9.5.1	A Dust Management Plan (DMP) will be prepared by the appointed contractor for the Site and submitted to the KCC for written agreement prior to commencement of construction.	Construction	Appointed Contractor
9.5.1	**Site Management** • Record all dust and air quality complaints, identify cause(s), take appropriate action;	Construction	Appointed Contractor

Section	Commitment	Stage	Responsibility
	• Keep complaints log on site and available for review at all times; • Record any exceptional circumstances which may give rise to dust/emissions either onsite/offsite and take action to resolve if required.		
9.5.1	**Monitoring** • Undertake daily on-site and off-site visual inspections of receptors for evidence of dust, with results logged and maintained onsite. This will include regular dust soiling checks of surfaces with particular attention street furniture, window sills and cars within 100m of the Site should also be checked. If necessary, cleaning should be provided to ensure dust soiling is removed; • Complete regular inspections of site works to ensure compliance with the DMP. The frequency of these inspections should be increased to coincide with activities where the risk of impact (demolition & earthworks) is high or during dry and/or windy conditions;	Construction	Appointed Contractor
9.5.1	**Site Preparation & Maintenance** • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as practicable; • Erect solid screens (hoarding) around St Francis Abbey and Site Boundaries (Maturation building if still present). The hoarding should be at least as high as any potential stockpiles on site; • Fully enclose activities with barriers as far as practicable, including cutting concrete slab, crushing and screening, • Prevent site run-off of water or mud*; • Keep surfaces such as site fencing and barriers clean using wet methods; • Remove materials from Site that have potential to produce dust as soon as practicable. Materials should be covered using tarpaulin or an equivalent which is weighted down until it can be removed appropriately; and • Cover or enclose stockpiles to prevent wind whipping.	Construction	Appointed Contractor
9.5.1	**Operating vehicle/machinery and sustainable travel**	Construction	Appointed Contractor

Section	Commitment	Stage	Responsibility
	• Switch off vehicle engines when stationary – no idling; • Avoid the use of diesel or petrol powered generators where possible, using mains electricity or battery powered items where practicable; • Impose and signpost a speed limit of 20 km/hr on sealed surfaces and 15 km/hr on unsealed surfaces.		
9.5.1	**Operations** • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate*; • Use enclosed skips/chutes; • Minimise drop heights from loading shovels and other loading/handling equipment. Using fine water spray on such equipment as deemed necessary; and Ensure equipment is readily available on site to clean any dry spillages which may occur using wet methods if necessary.	Construction	Appointed Contractor
9.5.1	**Waste Management** • No burning of waste is authorized onsite.	Construction	Appointed Contractor
9.5.2	Reuse/recycling of crushed concrete and concrete slabs from onsite where possible	Construction	Appointed Contractor
9.5.2	Natural materials will be sourced from Kilkenny where possible	Construction	KCC
9.8	If the proposed development and the demolition of the maturation building do occur concurrently, the site manager of the construction phase for the proposed development will be required to liaise with their counterpart for the Maturation Building demolition works to ensure plans are coordinated to minimise environmental impact (i.e. dust generation).	Construction	Appointed Contractor
9.9	Passive monitoring (Bergerhoff method) at four (4No.) Site boundary locations should be completed for the duration of the construction works.	Construction	-
Noise and Vibration			
10.5.1	Management of deliveries and vehicles to minimise vehicles idling on-site.	Construction	Appointed Contractor
10.5.1	All plant and equipment will be compliant with SI 241/2006, as amended, for noise rating of construction plant	Construction	Appointed Contractor

Section	Commitment	Stage	Responsibility
10.5.1	Construction hours will be restricted for activities requiring the operation of noisy plant (i.e. activities likely to result in noise nuisance at NSLs).	Construction	Appointed Contractor
10.5.1	Ensuring that mechanical plant and equipment used for the purpose of the works are fitted with effective exhaust silencers and will be maintained in good working order	Construction	Appointed Contractor
10.5.1	Careful selection of quiet plant and machinery to undertake the required work, where available	Construction	Appointed Contractor
10.5.1	All major compressors will be 'sound reduced' models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use	Construction	Appointed Contractor
10.5.1	Any ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers	Construction	Appointed Contractor
10.5.1	Machines in intermittent use will be shut down when not in use	Construction	Appointed Contractor
10.5.1	Ancillary plant such as generators, compressors and pumps will be placed behind existing physical barriers, and the direction of noise emissions from plant including exhausts or engines will be placed away from sensitive locations. Where possible, in potentially sensitive areas, acoustic barriers of enclosures will be utilised around noisy plant and equipment.	Construction	Appointed Contractor
10.5.1	Handling of all materials will take place in a manner which minimises noise emissions	Construction	Appointed Contractor
10.5.1	Audible warning systems will be switched to the minimum setting required by the Health & Safety Executive or the Health & Safety Authority	Construction	Appointed Contractor
10.5.1	The Contractor will adhere to the codes and practices for minimising noise emissions from construction works, including those provided in BS5228:2009	Construction	Appointed Contractor
10.5.1	Kilkenny County Council and affected residents will be kept informed of the works to be carried out and of any proposals for work outside normal hours by the appointed contractor.	Construction	Appointed Contractor
10.5.1	A complaints procedure will be operated by the Contractor throughout the construction phase, as part of the CEMP.	Construction	Appointed Contractor
10.5.2	In the event the vibration trigger value of 3mm/s PPV is reached, work practices will be reviewed and altered accordingly. If the vibration limit of 4mm/s PPV is reached, all construction activities on-site must cease until such time as a design team review	Construction	Appointed Contractor

Section	Commitment	Stage	Responsibility
	takes place. Groundworks in areas within proximity of monuments will be supervised by archaeologists (refer to Chapter 12).		
10.5.2	In relation to the historical monuments (St Francis Abbey, St Francis Well, Evans Turret & City Walls), all works are to be kept below a threshold level recommendation for ground-borne vibrations following best practice guidance. A vibration cut-off threshold of 4 mm/s peak particle velocity (PPV) is required in line with Eurocode 3 Part 5 for transient vibrations close to ruins or buildings of architectural merit. All monitoring will be in accordance with BS 5228: 2009 (BSI, 2009). A fully automated real time monitoring system must be employed with the contractor, client and a member of the design team receiving constant notifications. A warning notification will be sent to all members if a vibration trigger value of 3mm/s PPV is recorded.	Construction	Appointed Contractor
10.5.2	Vibration monitoring will be established on protected structures. An assessment will be conducted to characterise proposed work methods on site to determine the likely transmission of vibration levels to the historic monuments. The detailed requirements for monitoring and actions to be implemented in-line with onset of vibration trigger values (vibration cut off: 4 mm/s PPV & vibration warning trigger: 3mm/s PPV), must be included in the CEMP completed for the construction phase activities.	Construction	Appointed Contractor
10.5.2	Elements of the works preparation that may contribute to reducing the vibration impact include: • Arranging the project design such that the number of operations likely to be particularly disturbing is kept to a minimum; • When a number of site operators will be working on one site, overall site operations will be coordinated with access traffic routes placed away from sensitive receptors; • The most appropriate plant must be selected in order that limits are not exceeded. The contractor must be aware of the extent of control measures that will be necessary so that appropriate cost allowances can be made;	Construction	Appointed Contractor

Section	Commitment	Stage	Responsibility
	• In terms of control of vibration, the most general means of control are substituting plant with less intrusive plant and relocating or isolating stationary plant using resilient mountings; • Removal of the concrete slab will not be undertaken by hydraulic breaker in the vicinity of protected structures. Instead the slab will be cut into sections and lifted to minimise vibration impacts.		
10.9	Construction phase monitoring will be required for both noise and vibration. The monitoring locations will include proximity NSLs (noise) and the historic monuments	Monitoring	Appointed Contractor
Landscape and Visual			
11.5.1	The provision of site hoarding along strategic portions of the Site boundary will substantially address some of the potential negative effects of construction operations at ground level during the construction stage.	Construction	Appointed Contractor
11.5.1	Appropriate site management procedures will be implemented during the construction works – such as the control of lighting, storage of materials, placement of compounds, control of vehicular access, and effective dust and dirt control measures, etc.	Construction	Appointed Contractor
Cultural Heritage			
12.5.1	Archaeological monitoring of all groundworks will be required at the Site.	Construction	Appointed Contractor
12.5.1	Archaeological monitoring will be carried out following the consent of the Minister. For works outside the bounds of the St Francis' Abbey National Monument and the City Wall National Monument, this consent will be an excavation licence as specified in Section 26 of the *National Monuments Act 1930* (as amended). For archaeological monitoring within the bounds of St Francis' Abbey National Monument and in proximity to the City Wall National Monument, this consent will be a Ministerial Consent as specified in Section 14 of the *National Monuments Act 1930* (as amended).	Construction	Appointed Contractor

Section	Commitment	Stage	Responsibility
12.5.1	If archaeology is discovered during ground works, then ground works in that area will stop and the NMS will be informed. A methodology to mitigate the impact of the works will be submitted to the NMS for approval.	Construction	Appointed Contractor
12.5.1	Archaeological remains encountered will be avoided and preserved *in situ* where possible; if this is not possible, then the remains will be preserved by record in accordance with the *Framework and Principles for Protection of the Archaeological Heritage*	Construction	Appointed Contractor
12.5.1	In places where concrete is removed for the excavation of services [AR-16 & AR-17], the renovation of existing service alignments in proximity to St Francis' Abbey [AR-03] and the graveyard [AR-05], and the replacement of concrete surfaces around St Francis' Abbey [AR-03], archaeological monitoring will ensure the impact is not deeper than removing the concrete surface.	Construction	Appointed Contractor
12.5.1	Archaeological monitoring will also ensure the construction contractors will not move, park or turn heavy machinery or loads in the exposed areas, to avoid compacting or damaging underlying subsurface remains. The removed concrete surface will be replaced with another surface to preserve the archaeology *in-situ*.	Construction	Appointed Contractor
12.5.1	During the excavation of service lines, care will be taken to record the subsurface remains of the mid-nineteenth-century Market Building [AR-18], including its walls and any surfaces or associated features, and the results of this record will be presented in the monitoring report.	Construction	Appointed Contractor
12.5.1	During the renovation of service lines in proximity to St Francis' Abbey [AR-03] and the graveyard [AR-05], care will be taken to: • archaeologically monitor the excavation of the old service line; • avoid impacting any underlying or surrounding archaeological remains, including burials, by keeping the impact within the existing alignment for the service being renovated; and • recover any archaeological material which might have been redeposited in the service trench after it was first excavated. This material will be recovered, recorded and reported according to the methodology agreed with the NMS.	Construction	Appointed Contractor

Section	Commitment	Stage	Responsibility
12.5.1	As with the architectural heritage sites (see below), mitigations for the Horse Barracks [AR-08] will include vibration monitors and protective fencing during the construction stage.	Construction	Appointed Contractor
12.5.5	A conservation plan will be prepared for St Francis' Abbey [BH-04] which will inform the future management and conservation of the monument, and its relationship with the proposed development.	Operational	KCC
12.9	Periodic monitoring of the works will be carried out by suitably qualified archaeologists and architectural heritage specialists nominated by KCC during construction and operational phases to ensure that all mitigation to avoid, reduce and offset adverse effects on archaeology and architectural heritage have been implemented and that the predictions of the EIAR in relation to cultural heritage were accurate.	Monitoring	KCC
Material Assets – Waste & Use of Natural Resources			
13.7.1	Materials required will be ordered only as needed to reduce excess materials leading to waste	Construction	Appointed Contractor
13.7.1	Where excess materials do arise, where possible these will be returned to the supplier	Construction	Appointed Contractor
13.7.1	All waste generated during the Construction Phase will be managed in accordance with the relevant waste management regulations	Construction	Appointed Contractor
13.7.1	Existing concrete slab which will be removed in places will be reused as an aggregate for the construction of the proposed development, as much as is reasonably practical, in place of virgin materials	Construction	Appointed Contractor
13.7.1	Any waste generated during the Construction Phase will be removed offsite using an appropriately permitted waste contractor	Construction	Appointed Contractor
13.7.1	Waste generation on site during construction works will be properly supervised with designated waste storage and segregation areas	Construction	Appointed Contractor
13.7.1	Should hazardous waste be encountered during construction (such as contaminated soils), it will be segregated, contained, classified, transported and disposed of by appropriately permitted waste contractors in accordance with all relevant national and international waste legislation	Construction	Appointed Contractor

Section	Commitment	Stage	Responsibility
13.7.1	Any potential liquid waste possible arising during construction, such as waste oil, will be stored in suitable containers in bunded areas and disposed of off-site by an appropriately permitted waste contractor at a suitable permitted waste facility	Construction	Appointed Contractor
13.7.1	A site-specific Construction Waste Management Plan will be developed and will comply with C&D Waste Management Guidelines	Construction	Appointed Contractor
13.7.2	Small quantities of domestic type waste will be generated from users of the proposed development during the operational phase. Waste collection / removal contractors for the proposed development will operate in accordance with the Waste Management Act, 1996 (Irish Statute, 1996) and all subsequent regulations.	Operational	KCC
13.11	Waste records will be kept during the construction phase.	Construction	Appointed Contractor
13.11	Waste records will be kept during the operational phase.	Operational	KCC
Material Assts – Traffic and Transport			
14.4	Limited service, delivery and maintenance vehicles will enter the Urban Street from the south off Bateman Quay and exit the Urban Street to the north at St Canice's Place, operating a one-way system.	Operational	KCC
14.5.1	A construction traffic management plan will be prepared by the contractor in advance of the commencement of works and submitted to KCC for approval. This will include but will not be limited to the following: • Access arrangements; • Parking arrangements; • Limitation of speed; • Wheel wash arrangements; and, • Appropriate signage.	Construction	Appointed Contractor
14.5.1	Access for HGVs will be limited to the entrance of St. Canice's Place to the north of the Site. This will minimise traffic description in Parliament Street and Irish town.	Construction	Appointed Contractor

Section	Commitment	Stage	Responsibility
14.5.1	Construction employee, equipment and HGV parking will be within the former Brewery Site only.	Construction	Appointed Contractor
14.5.1	As discussed in Chapter 13 (Waste and Use of Natural Resources) concrete removed during site clearance works will be reused in so far as is possible. This will reduce the number of HGV movements related to the proposed works.	Construction	Appointed Contractor
14.5.1	In order to further reduce HGV numbers, the contractor will be required to fill empty trucks which have delivered aggregates and soils with materials to be removed from the Site in order to avoid empty loads.	Construction	Appointed Contractor
14.5.2	The operational phase mitigation measures are integral to the overall scheme design and can be summarised as follows: • Automated retractable bollards will be provided to ensure that only authorised vehicles, at authorised times will be able to access the Urban Street. This design approach will ensure that the Urban Park and Street will be a pedestrian and Cyclist dominated space; • A permitting system will be controlled by KCC that will limit access to service, maintenance, deliveries and emergency vehicles serving this and adjoining developments only; and, • Access to vehicles will be limited to early mornings and late evenings when there will be less footfall along the street.	Operational	KCC
14.8	Deliveries and vehicle users associated with the Mayfair (City Library) and Brewhouse Buildings will not be granted access to the proposed Urban Street.	Operational	KCC

17 REFERENCES

ABP. (2020). *Environmental Impact Assessment Scoping Report.* Dublin: An Bord Pleanala.

ACSU, & Stirland, J. (2018). *Archaeological Test Trenching of the Abbey Creative Quarter, Co. Kilkenny: Public Realm B: Consent C853/E4950.* Report for Kilkenny County Council. ACSU.

ACSU, & Stirland, J. (2018). *Archaeological Test Trenching of the Abbey Creative Quarter, Co. Kilkenny: Public Realm C: Consent C853/E4950.* Report for Kilkenny County Council by ACSU.

AMS. (2016). *Archaeological Assessment Strategy for the Implementation of the Abbey Creative Quarter Masterplan: Public Realm B.* Unpublished Report for Kilkenny County Council.

AMS. (2016). *Archaeological Assessment Strategy for the Implementation of the Abbey Creative Quarter Masterplan: Public Realm C.* Report for Kilkenny County Council.

AMS. (2017). *Preliminary Archaeological Assessment of Kilkenny City Wall: Mayfair Boundary Wall with the River Breagagh.* Report for Kilkenny County Council: 3/1/2017.

AMS. (2018). *Final Report on the Archaeological Assessment of Kilkenny City Wall: Mayfair Boundary Wall with the River Breagagh.* Report for Kilkenny County Council.

AMS. (2019). *Archaeological Impact Assessment of the Demolition of the Maturation Building, Abbey Quarter, Kilkenny.* Report for Kilkenny County Council.

AMS. (2019). *Interim Report on Archaeological Excavations in Advance of Construction of the ESB Substation and Switching Room, Mayfair Building, Abbey Creative Quarter, Kilkenny City. Consent C789; E4822.* Report for Kilkenny County Council January 2019.

AMS. (2020). *Archaeological Monitoring of Geotechnical Investigations north and east of St Francis' Abbey, Kilkenny, January 2020. Consent Number C000853/ E4950.* Report for Kilkenny County Council.

AMS. (2020). *Mayfair Building Site, Kilkenny City: Archaeological Monitoring of Geotechnical Investigations January 2020. Consent Number C000798, E04822.* Report for Kilkenny County Council.

Arup. (2014). *St. Francis Abbey Brewery CRAMP - Detailed Site Assessment (Ref: 16-05-14_229808-08_Detailed Site Assessment).* Dublin: Arup.

Ask About Ireland. (2003). *Griffith's Valuation*. Retrieved 7 14, 2020, from AskAboutIreland: http://www.askaboutireland.ie/griffith-valuation/

Bradley, J. (2020). *Irish Historic Towns Atlas No. 10, Kilkenny.* Dublin: Royal Irish Academy.

British Standard. (2019). *BS4142 2014+A1:2019: Methods for rating and assessing industrial and commercial sound* (2 ed.). London: BS.

British Standards Institution. (1993). *BS7385-2 (1993) Evaluation and measurement for vibration in buildings - Guide to damage levels from ground borne vibration.* London: British Standards Institution.

BSI. (2009). *BS 5228-2:2009 2009 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.* London: British Standard.

BSI. (2009). *BS5228-1:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites. Noise.* London: British Standards Institution.

CAAS and Kilkenny Co Co. (2015b). *SEA ENVIRONMENTAL REPORT: MASTERPLAN FOR ABBEY CREATIVE QUARTER.*

CAAS Ltd. (2015). *NATURA IMPACT REPORT IN SUPPORT OF THE APPROPRIATE ASSESSMENT OF THE Masterplan for Abbey Creative Quarter .* Kilkenny County Council.

Chambers, C. S. (2003). *Kilkenny Open SPace, Sports and Recreation Study.* Kilkenny.

CIRIA. (2001). *C532: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors.* London: Construction Industry Research and Information Association.

CIRIA. (2006). *C648 - Control of Water Pollution from Linear Construction Projects Technical Guidance .*

CIRIA. (2006). *C649 - Control of Water Pollution from Linear Construction Projects: Site Guide.*

CIRIA. (2015). *C741 - Environmental Good Practice on Site (4th edition).*

Commission European. (2016). *EU Construction and Demolition Waste Management Protocol.*

Conlon, P. 1975. Notes on St Francis' Abbey. (1975). *Old Kilkenny Review, 1*(2), 80–84.

Courtney Deery Heritage Consultancy. (2014). *Abbey Quarter Masterplan Area Archaeological Strategy for Kilkenny City Council (Appendix C Abbey Quarter Masterplan).* Report for Kilkenny County Council. Retrieved from https://www.kilkennycoco.ie/eng/Services/Planning/Abbey-Quarter-Brewery-site/Appendix-C-ACQ-Masterplan-Archaeological-strategy.pdf

Courtney Deery Heritage Consultancy. (2015). *Proposed Riverside Garden Kilkenny City, Kilkenny Archaeological Impact Assessment.* Report for Kilkenny County Council.

Courtney Deery Heritage Consultancy. (2019). *Building Assessment Report Maturation Building, St. Francis' Abbey Brewery Site, Kilkenny, Co. Kilkenny.* Report for Kilkenny County Council.

CSO. (2020a, 02 12). *Census 2016 Sapmap Area: Settlements Kilkenny.* Retrieved from http://census.cso.ie/sapmap2016

CSO. (2020b, 02 18). *Labour Force Survey (LFS): Quarter 4 2019.* Retrieved from https://www.cso.ie/en/releasesandpublications/er/lfs/labourforcesurveylfsquarter42019/

CUCAP. (2020). *Cambridge University Collection of Aerial Photographs*. Retrieved 7 14, 2020, from https://www.cambridgeairphotos.com/

Cummins, K. C. (2013). *Birds of Conservation Concern in Ireland 2014-2019.* Birdwatch Ireland .

DCHG. (2020). *Buildings of Ireland*. Retrieved 6 28, 2020, from https://www.buildingsofireland.ie/

DCHG and NMS. (2019). *archaeology.ie*. Retrieved 7 14, 2020, from List of Preservation Orders held by the National Monuments Service: https://www.archaeology.ie/sites/default/files/media/publications/po19v1-all-counties.pdf

DCHG, & NMS. (2020). *Historic Environment Viewer*. Retrieved 07 14, 2020, from archaeology.ie: archaeology.ie

DCHG, & Wordwell. (2020). *Excavations Bulletins*. Retrieved 7 14, 2020, from excavations.ie: www.excavations.ie

DCHLG & NMS. (2009). *Lists of Monuments in State Care*. Retrieved 07 14, 2020, from archaeology.ie: https://www.archaeology.ie/national-monuments

DEHLG. (2009). *The Planning System and Flood Risk Management - Guidelines for Planning Authorities.* Ireland: DEHLG.

Department of Communications, Climate Action and Environment. (2019). *Climate Action Plan 2019 - to tackle Climate breakdown.* Department of Communications, Climate Action and Environment.

Department of Housing, Planning and Local Government . (2018). *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment .* Department of Housing, Planning and Local Government.

Department of Transport, Tourism and Sport and the Department of Housing, Planning and Local Government. (2019). *Design Manual for Urban Roads and Streets.* Dublin: Government of Ireland. Retrieved from https://www.housing.gov.ie/sites/default/files/publications/files/design_manual_for_urban_streets_version_1.1_low_res.pdf

Devine, E., Jennings, R., Lenehan , J., Muyllaert, M., & O Drisceoil, C. (2009). *Heritage Audit of the Northern River Nore: An action of the draft Kilkenny Heritage Plan 2007-2012: Volume 4 Cultural Heritage.* Kilkenny: Kilkenny County Council.

DoCCAE. (2018). *National Adaptation Framework; Planning for a Climate Resilient Ireland.* Dublin: Department of Communications, Climate Action & Environment .

DoECLG. (2015). *The national Planning Policy Statement.* Dublin: Department of Environment, Community and Local Government.

DoEHLG. (2008). *National Policy on Town Defences.* Dublin: Department of Environment, Heritage and Local Government.

DoH. (2016). *Get Ireland Active - Physical Activity Plan.* Dublin: Department of Health.

DoT. (2009). *Smartertravel: A Sustainable Transport Future.* Dublin: Departmetn of Transport.

Duchas. (1999). *Framework and Principles for the Protection of the Archaeological Heritage.* Dublin: Department of Arts Heritage and the Gaeltacht.

Eastern Midlands Region / Connacht Ulster Region / Southern Region. (2016). *National C&D Capacity Report complied for the Eastern-Midlands, Connacht-Ulster and Southern Regions .*

Eco Fact. (2020). *Bat Assessment – Lighting Review (Draft).*

Environmental protection Agency (EPA). (2011). *EPA Guidance on Soil and Stone By-Products in the context of Article 27 of the European Communities (Waste Directive) Regulations.* EPA.

EPA. (2002). *Guidelines on the Information to be Contained in Environmental Impact Statements.* Dublin: Environmental Protection Agency.

EPA. (2003). *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements).* EPA.

EPA. (2011). *Environmental Research Centre - Report Series No. 17 - A Review of Groundwater Levels in the South-East of Ireland.* EPA.

EPA. (2014). *Health Benefits from Biodiversity and Green Infrastructure Report No. 195.* Wexford: Environmental Protection Agency.

EPA. (2015). *Surrender Memo - IE Licence Reg. No. PO448-01.* EPA.

EPA. (2016). *Health Benefits from Biodiversity and Green Infrastructure.* EPA.

EPA. (2016d). *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities.* Environmental Protection Agency.

EPA. (2017). *Air Quality in Ireland - 2016.* Wexford: Environmental Protection Agency.

EPA. (2017). *EPA. 2017. Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.* Dublin: Environmental Protection Agency.

EPA. (2017). *Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft).* Dublin: EPA.

EPA. (2017). *Revised Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Draft).* Dublin: Environmental Protection Agency.

EPA. (2017). *Revised Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Draft).* Dublin: Environmental Protection Agency.

EPA. (2018). *Air Quality in Ireland - 2017.* Dublin: EPA.

EPA. (2019). *Air Quality in Ireland.* Wexford: Environmental Protection Agency.

EPA. (2020, May). *Air Quality Monitoring at Seville Lodge, Kilkenny*. Retrieved from www.epa.ie: https://www.epa.ie/air/quality/data/kk/

EPA. (2020). *EPA Map Viewer*. Retrieved from EPA Maps: https://gis.epa.ie/EPAMaps/

EPA Catchments. (2020). Retrieved from Catchments.ie: https://www.catchments.ie/maps/

European Commission. (2001a). *EU Guidance on EIA: EIS Review.* Luxembourg: European Commission.

European Commission. (2014). *2030 Climate Change and Energy Framework.* Retrieved from https://ec.europa.eu/clima/policies/strategies/2030_en

European Commission. (2015). *Interpretation of Definitions of Project categories of annex I and II of the EIA Directive.* European Commission.

European Parliment. (2008). *The Clean Air for Europe Directive 2008/50/EC.* Brussels: European Parliment.

Farrelly, J., O'Reilly, B., & Loughran, A. (1993). *The Urban Archaeological Survey of County Kilkenny.* Dublin: Unpublished Report for the NMS.

FI. (2018). *Future Supply of: Tourist Accomodation in Cork, Galway & Kilkenny 2018-2022.* Dublin: National Tourism Development Authority.

Flynn, C. (2018). *Archaeological Test Trenching Report: Brewhouse Redevelopment Abbey Creative Quarter, Kilkenny City. Ministerial Consent No. C773/ E4766. Report date Feb 2018.* Report for Kilkenny County Council. Colm Flynn.

Flynn, C. (2019). *Preliminary Report on Archaeological Excavation and Preservation in situ of Archaeology, at Brewhouse Redevelopment, Kilkenny City. Ministerial Consent No. C773; Archaeological Registration E4766. Report date Nov 2019.* Report prepared for Kilkenny Council.

Flynn, C. (2019). *Report on Archaeological Monitoring of Construction of the ESB Substation and Switching Room, Mayfair Building, Abbey Creative Quarter, Kilkenny City. Consent C789/ Excavation E4822.* Report for Kilkenny County Council.

Fossitt, J. A. (2000). *A Guide to Habitats in Ireland.* Dublin: The Heritage Council.

Government of Ireland. (2018). *Project Ireland 2040 National Planning Framework.* Department of Housing, Planning and Local Government.

Government of Ireland. (2018). *Statutory Instrument 549 of 2018 European Communities (Environmental Noise) Regulations.* Dublin: Government of Ireland.

Government of Ireland. (2019). *Design Manual for Urban Roads and Streets.* Retrieved from https://www.housing.gov.ie/sites/default/files/publications/files/design_manual_for_urban_streets_version_1.1_low_res.pdf

GSI. (2020). *GSI Spatial Resources (Geological Survey of Ireland)*. Retrieved April 6, 2018, from https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228

Hammond, F. (1990). *An Industrial Archaeological Survey of County Kilkenny.* Kilkenny: Kilkenny County Council Planning and Environment Section. .

Healthy Ireland. (2013). *A Framework for Improved Health and Wellbeing 2013-2025.* Dublin: Healthy Ireland.

Healthy Ireland. (2017). *Get Ireland Walking - Strategy & Action Plan 2017 2020.* Dublin: Healthy Ireland.

Heritage Council. (2020). *Kilkenny Archaological Project on Heritage Maps*. Retrieved 07 14, 2020, from Heritage Maps: https://heritagemaps.ie/

Historic Environment Scotland. (2020). *Britain From Above*. Retrieved 7 14, 2020, from https://www.britainfromabove.org.uk/

HSE. (2015a). *Health Profile 2015 Kilkenny.* Kildare: Health Service Executive.

HSE. (2019b, April). *Healthy Ireland: Summary Report 2019.* Retrieved from https://www.hse.ie/eng/about/who/healthwellbeing/healthy-ireland/publications/healthy-ireland-survey-2019-summary-report.pdf

IAQM. (2016). *Guidance on the Assessment of Dust From Demolition and Construction.* London: Institute of Air Quality Management.

IAQM. (2018). *Guidance on Monitoring in the Vicinity of Demolition and Construction Sites.* London: Institute of Air Quality.

IEMA. (2020). *IEMA guide to: Materials and Waste in Environmental Impact Assessment.* IEMA.

IGI. (2013). *Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statement.* Instute of Geologists of Ireland.

Inland Fisheries Ireland. (2016). *Guidance and Protection of Fisheries during Construction Works in an adjacent to Water.* Dublin: IFI.

Institute of Environmental Management & Assessment. (2014). *Guidelines for Environmental Noise Impact Assessment.* Lincoln: IEMA.

International Standards Organisation (ISO). (2003). *1996:1 Acoustics - Description, Measurement and Assessment of Environmental Noise, Part 1 Basic Quantities and Assessment Procedures.* ISO.

International Standards Organisation (ISO). (2007). *1996:2 Acoustics - Description, Measurement and Assessment of Environmental Noise, Part 2: Determination of Environmental Noise Levels.* ISO.

Irish Concrete Federation. (2019). *Essential Aggregates - Providing for Ireland's Needs to 2040.* Irish Concrete Federation.

Irish Statute. (1996). *Waste Managment Act 1996.* Ireland: Office of the Attorney General.

ISO. (1996). *9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.* International Organization for Standarization.

ISO. (2010). *ISO 4866: 2010 - Mechanical vibration and shock vibration of fixed structures guidelines for the measurement of vibrations and evaluation of their effects on structures .* International Organization for Standardization .

ISO. (2016). *Acoustics -- Description, measurement and assessment of environmental noise -- Part 1: Basic quantities and assessment procedures.* International Organization for Standarization.

ISO. (2017). *Acoustics -- Description, measurement and assessment of environmental noise -- Part 2: Determination of sound pressure levels.* International Organization for Standardization.

KCC. (2009). *Kilkenny City & Environs Mobility Management Plan 2009-2014.* Retrieved from https://www.kilkennycoco.ie/resources/eng/Services/Roads/Draft_mobility_mgmt_plan/Kilkenny_City_Mobility_Managment_Plan-2009-2014.pdf

KCC. (2014). *Kilkenny City & Environs Development Plan 2014-2020.* Kilkenny Council.

KCC. (2015, July 31). *Urban Design Framework Masterplan for Abbey Creative Quarter, Kilkenny.* Retrieved from Kilkenny County Council: https://www.kilkennycoco.ie/eng/Services/Planning/Abbey-Quarter-Brewery-site/ACQ-Masterplan-July-2015.pdf

KCC. (2019). *Kilkenny County Council Climate Change Adaptation Strategy 2019-2024.* Kilkenny: Kilkenny County Council.

Kilkenny County Council. (2014). *County Development Plan 2014-2020.*

Kilkenny County Council. (2014). *Kilkenny City & Environs Development Plan 2014-2020 Appendix 1: Record of Protected Structures.* Kilkenny: Kilkenny County Council. Retrieved 6 28, 2020, from https://www.kilkennycoco.ie/eng/Services/Planning/Development-Plans/Development_Plans_2014-2020/County-Appendices-for-printing.pdf

Kilkenny County Council. (2018). *Draft Noise Action Plan 2019-2023.* Kilkenny: Kilkenny County Council.

Kilkenny County Council. (2018). *Kilkenny County Council. 2018. Kilkenny City & Environs & Kilkenny County Record of Protected Structures - 18 Additions and 1 Deletion as ratified by Kilkenny County Council on 19th February 2018.* Kilkenny: Kilkenny County Council. Retrieved 6 28, 2020, from https://www.kilkennycoco.ie/eng/Services/Planning/Development-Plans/Development_Plans_2014-2020/County-Appendices-for-printing.pdf

Kilkenny Limestone. (2020, June 20). *Our Quarries*. Retrieved from Kilkenny Limestone - Irish Blue Limestone: https://kilkennylimestone.com/profile/quarries/

KLCDC. (2018). *Healthy Ireland Community Plan 2018-2022.* Kilkenny: Kilkenny Local Community Development Committee.

Lanigan, K., & Tyler, G. (1987). *Kilkenny: its Architecture & History 2nd ed.* Belfast: Appletree.

Loci and Kilkenny Co Co. (2018). *Abbey Quarter: Urban Design Code.* Kilkenny Co Co.

Moore Group. (2014). *Appropriate Assessment Screening Report as required under Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC) Renovation of the Mayfair Building, Horse Barrack Lane, Kilkenny.* Kilkenny County Council.

Moore Group. (2015). *Appropriate Assessment Screening Report as required under Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC) Kilkenny Abbey Quarter Riverside Gardens.* Kilkenny County Council.

Moore Group. (2015). *Appropriate Assessment Screening Report as required under Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC) - Renovation of the Brewhouse Building St. Francis' Abbey, Kilkenny .* Kilkenny County Council.

Moore Group. (2015). *Riverside Gardens Ecological Impact Assessment.*

Moore Group. (2019). *Appropriate Assessment Screening Report as required under Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC) Proposed Refurbishment and Extension of the Mayfair Building, Horse Barrack Lane, Kilkenny.* Kilkenny County Council.

Moore Group Environmental Services. (2015). *Abbey Quarter Riverside Gardens Ecological Impact Assessment.* Kilkenny County Council.

MOR. (2011). *Central Access Scheme for the City of Kilkenny - Revised Environmental Impact Statement.* Dublin: Malone O'Regan.

MOR. (2018). *Soil Monitoring Data 2017 - 2018.*

MOR. (2020). *Detailed Quantitative Risk Assessment.* MOR.

MOR. (2020). *Soil Monitoring Data 2018 - 2020.*

Murphy, D. (2017). *Archaeological Assessment of the Abbey Creative Quarter Riverside Garden Project, Kilkenny. Licence Number 17E0108.* Report for Kilkenny County Council; 26 April 2017.

National Library of Ireland. (2020). *National Library of Ireland catalogue*. Retrieved 07 14, 2020, from On line catalogue: www.nli.ie

National Parks and Wildlife Service. (2020). *National Parks and Wildlife Service*. Retrieved from National Parks and Wildlife Service: https://www.npws.ie

National Roads Authority (NRA). (2009). *Guidelines for Assessment of Ecological Impacts of National Roads Schemes.* NRA.

National Roads Authority. (2005). *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.* Dublin: National Roads Authority.

National Roads Authority. (2006). *Guidelines for the Treatment of Bats prior to the Constrcution of National Road Schemes.* Dublin: National Roads Authority.

National Roads Authority. (2006). *Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes.* National Roads Authority.

NBDC. (2020). *National Biodiversity Live Maps*. Retrieved from National Biodiversity Data Centre: http://maps.biodiversityireland.ie/

Nicholls, J. (2017). *Abbey Creative Quarter Masterplan, Kilkenny Ground Penetrating Radar Survey: Licence No. 16R0143. Target Archaeological Geophysics Report: TAG IE16014 (9 December 2016).* Report for Kilkenny County Council.

Ó Drisceoil, C. (2014). *Archaeological Assessment: The Mayfair Ballroom, Horse Barrack Lane, Kilkenny.* Report for Reddy Urbanism and Architecture. Retrieved 7 14, 2020, from https://consult.kilkenny.ie/en/system/files/Mayfair-Building_Archaeology-Statement_Rev-A.pdf

Ó Drisceoil, C., Bradley, J., Jennings, R., McCullough, L., & Healy, J. (2008). *The Kilkenny Archaeological Project: Report for the Irish National Strategic Archaeological Research (INSTAR) Programme.* Kilkenny: Kilkenny Archaeology.

OPW. (2018). *Flood Risk Management Plan - River Basin 15 - Nore.* OPW.

OPW. (2020). *Flood Info*. Retrieved from http://www.floodinfo.ie/

OSI. (2020). *GeoHive MapViewer*. Retrieved 7 14, 2020, from GeoHive: http://map.geohive.ie/mapviewer.html

Roadplan. (2017, December). *Parking Options Assessment for Abbey Creative Quarter Kilkenny.* KCC.

Rooney, S., O'Gorman, N., Cierpial, D., & J.J., K. (2014). *NationalProgramme: Habitats Directive and Red Data Book Species Executive Report 2013.* Inland Fisheries Ireland.

Royal Irish Academy. (2019). *Irish Historic Town Atlas Online: Kilkenny*. Retrieved 7 14, 2020, from Irish Historic Town Atlas Online: https://www.ria.ie/irish-historic-towns-atlas-online-kilkenny

RSES. (2020, 01 31). *Regional Spatial & Economic Strategy for the Southern Region.* Retrieved from www.southernassembly.ie: https://www.southernassembly.ie/uploads/general-files/Regional_Spatial__Economic_Strategy_for_the_Southern_Region_LOW_RES.pdf

Southern Regional Assembly. (2020, 01 31). *Regional Spatial & Economic Strategy for the Southern Region.* Retrieved from www.southernassembly.ie: https://www.southernassembly.ie/uploads/general-files/Regional_Spatial__Economic_Strategy_for_the_Southern_Region_LOW_RES.pdf

Southern Waste Region. (2015). *Southern Region Waste Management Plan 2015-2021.* Southern Waste Region.

Southern Waste Region. (2018). *Southern Waste Region Annual Report 2017.* Southern Waste Region.

TII. (2014, May). *Traffic and Transport Assessment Guidelines PE-PDV-02045.* Retrieved from https://www.tiipublications.ie/library/PE-PDV-02045-01.pdf

TII. (2018). *Area Based Transport Assessment (ABTA) Guidence Notes: PE-PDV-02046.* April.

UCD. (2020). *Ordnance Survey Ireland (OSi) 19th Century Historical Maps*. Retrieved 7 14, 2020, from UCD Library: https://digital.ucd.ie/view/ucdlib:40377

United Nations. (2016). *Paris Agreement.* Paris. Retrieved from https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

WHO. (2005). *World Health Organization Air Quality Guidelines.* Geneva: World Health Organization.