River Bride (Blackpool) Certified Drainage Scheme

Environmental Impact Assessment Report

May 2018

McCarthy Keville O'Sullivan

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TABLE OF CONTENTS

1 INTRODUCTION

1.1 INTRODUCTION

This Environmental Impact Assessment Report (EIAR) has been prepared by Ryan Hanley in association with McCarthy Keville O'Sullivan Ltd. on behalf of the Office of Public Works (OPW) who intend to implement the River Bride (Blackpool) Certified Drainage Scheme. The Office of Public Works (OPW) is the lead agency for flood risk management in Ireland. The coordination and implementation of the Government's policy on the management of flood risk in Ireland, in conjunction with its responsibilities under the Arterial Drainage Acts, 1945-1995, form one of the four core services of the OPW.

Ryan Hanley in association with McCarthy Keville O'Sullivan Ltd. were appointed as Planning and Environmental Consultants on this project and commissioned to prepare initially an Environmental Impact Statement, which went on public exhibition in December 2015 and subsequently (following some scheme re-designs) an EIAR.

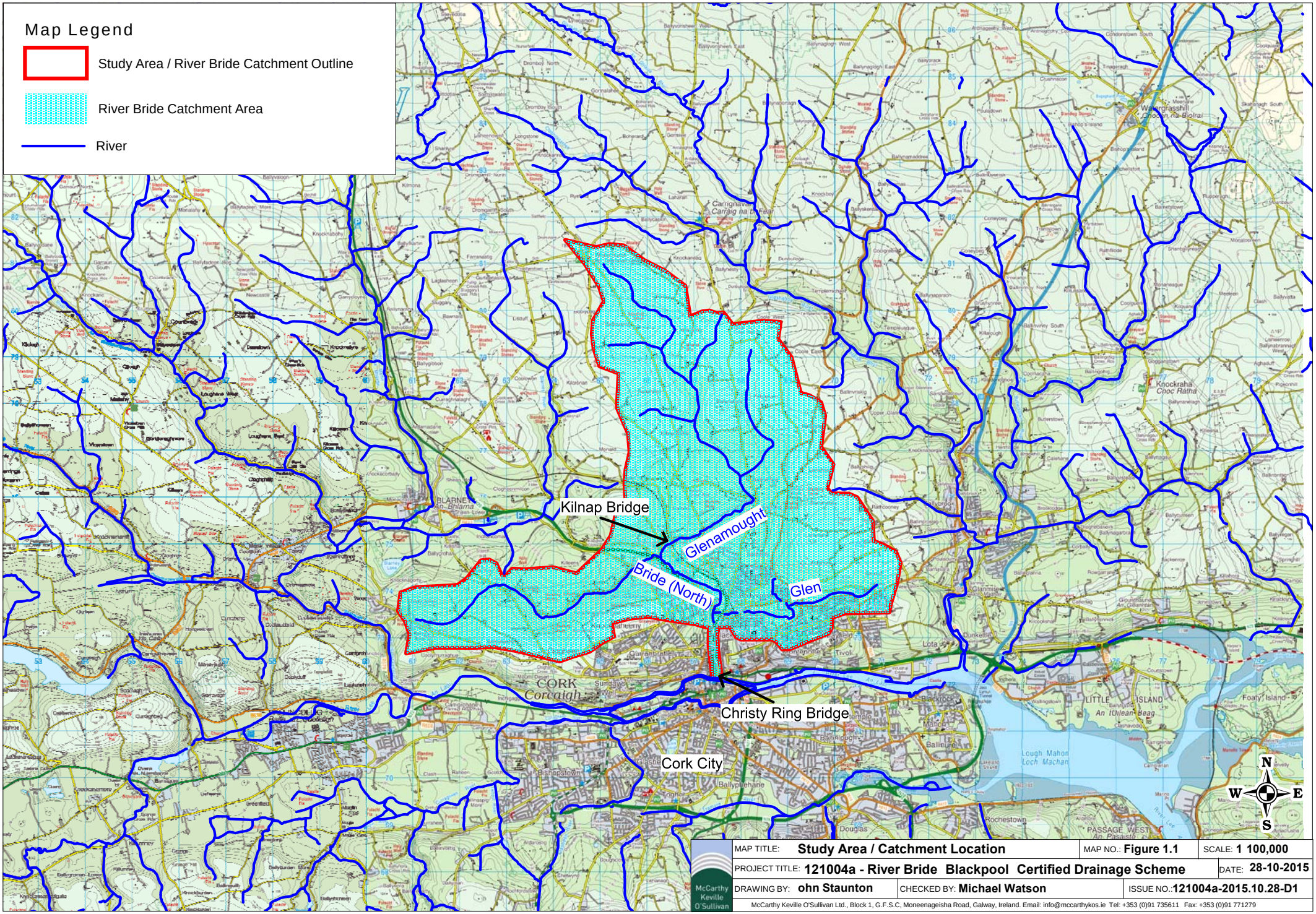
1.2 BRIEF DESCRIPTION OF THE PROPOSED DEVELOPMENT

The design of the proposed River Bride (Blackpool) Certified Drainage Scheme has evolved through an initial screening process of a range of potential engineering measures typically considered for flood alleviation schemes, the development of potential options and finally the development of an emerging preferred scheme design which was publicly exhibited in December 2015. Following the public consultation at that time and thereafter, and as a result of further hydrological modelling, it was decided to extend the area of works upstream of the previously proposed (and exhibited) works area. This EIAR takes account of these additional works in full as part of its assessment of effects.

The proposed scheme will consist of a combination of flood walls, culverting a section of open channel, bridge replacement, embankment construction and other minor works. The Preferred Option will be designed to cater for the 1% Annual Exceedance Probability (AEP) flood event (also known as the 100-year flood event). The design of the proposed works has considered the future adaptability of the scheme for the potential impacts of future climate change in accordance with Office of Public Works guidance in relation to climate change and also includes an allowance for freeboard.

In summary, the preferred flood relief scheme will involve the following proposed works:

- Construction of new and replacement of existing bridges / culverts;
- Construction of new flood walls/ earthen embankments;
- Constructing bridge parapets;
- Local channel widening of the River Bride (referred to as a 'Winter Channel' on the scheme drawings in Appendix 3A);
- Construction of a sedimentation trap on the left bank of the River Bride;
- Removal of approximately 70m of existing culvert and restoration of open channel (River Bride) at this location;



MAP TITLE: **Study Area / Catchment Location**		MAP NO.: **Figure 1.1**	SCALE: **1 100,000**
PROJECT TITLE: **121004a - River Bride Blackpool Certified Drainage Scheme**			DATE: **28-10-2015**
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- Construction of a new trash screen and roughing screens, and removal of existing trash screens on the River Bride, and the Glen and Glenamought Rivers;
- Modifications to the existing foul and surface water collection networks in the vicinity of the proposed works, including construction of pumping stations, in order to prevent flooding;
- Removal of an existing sluice structure in the channel of the River Bride to the rear of the Dulux factory;
- Localised regrading of ground levels, erection of fencing and access gates, to facilitate pedestrian/ vehicular access to and around flood defences, or to redirect overland surface water flow paths;
- Filling in an existing open watercourse;
- Introduction of a flow control structure on the entrance to the Brewery culvert on the River Bride and the Spring Lane culverted branch of the River Glen;
- Regular maintenance of the river channel and pumping stations;
- Local Stonework repairs within an existing masonry arch culvert (Brewery Branch culvert); and
- Utility diversions.

The description of the scheme is provided in more detail in Chapter 3 – Description of the Proposed Development.

Initially, the River Bride (Blackpool) Certified Drainage Scheme formed part of the greater Lower Lee Flood Relief Scheme. A constraints study was carried out as part of this larger project. The Study Area at this constraints study stage was described as 'the channel, floodplain and immediate surrounding areas of the River Lee from the Inniscarra Dam extending along the main channel of the river'. When the River Bride (Blackpool) Certified Drainage Scheme was pursued as a separate project to the Lower Lee Flood Relief Scheme, the Study Area for the proposed scheme encompassed a large area covering the entire catchment of the River Bride (including its tributaries, the Glenamought and the Glen) in order to allow for the consideration of all potential scheme options and their various impacts on the receiving environment. The catchment which drains into Blackpool is shown on Figure 1.1. As the scheme design progressed based on feedback from the constraints study and other relevant assessments, the Study Area was refined to a more specific area, within which impacts may arise. For most studies conducted as part of this EIAR, the Study Area was reduced to the channel and immediate surrounding areas of the River Bride extending from upstream of Glenamought Bridge, downstream through Blackpool, to the confluence with the River Lee at the Christy Ring Bridge. The Study Area for each aspect of the receiving environment is defined in each chapter of the EIAR in order to clarify the extent of the area assessed for impacts relating to the proposed works.

1.3 LEGISLATIVE CONTEXT

European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive'), is currently transposed into Irish planning legislation by the Planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001 (as amended). The EIA Directive was amended by Directive 2014/52/EU the provision of which as of the date of preparation of this EIAR have not yet been transposed into Irish law.

Member States had until 16th May 2017 to transpose the amended EIA Directive into national legislation. Although the transposition had not occurred on the specified transposition date the Department of Housing, Planning, Community and Local Government (Department) issued a Circular Letter PL 1/2017 on the 15th May 2017 providing advice on the implementation of the Directive. This included advice to competent authorities on the assessment of applications for planning permission received on or after 16th May 2017. The Circular states the following:

"In respect of applications for planning permission or other development consent received on or after 16 May 2017 falling within the scope of Directive 2011/92/EU, or within the scope of Directive 2014/52/EU, competent authorities are advised to consider applying the requirements of Directive 2014/52/EU by way of administrative provisions in advance of the transposition of Directive 2014/52/EU into Irish law."

Accordingly, this EIAR complies with the EIA Directive as amended by Directive 2014/52/EU. To the extent relevant and necessary regard has been had to the existing provisions of the Planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001 (as amended) insofar as they transpose the EIA Directive.

Article 5 of the EIA Directive as amended by Directive 2014/52/EU provides where an EIA is required, the developer shall prepare and submit an environmental impact assessment report (EIAR) previously referred to an Environmental Impact Statement ('EIS'). The information to be provided by the developer shall include at least:

(a) a description of the project comprising information on the site, design, size and other relevant features of the project;

(b) a description of the likely significant effects of the project on the environment;

(c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;

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

(e) a non-technical summary of the information referred to in points (a) to (d); and (f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

Ryan Hanley in association with MKO was appointed as environmental consultants on the proposed project and commissioned to prepare this EIAR in accordance with the requirements of the EIA Directive as amended by Directive 2014/52/EU.

In preparing this EIAR regard has also been taken of the provisions of 'Advice Notes on Current Practice in the Preparation of EIS' (EPA, 2003) and the 'Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment', published by the Department of the Environment, Community and Local Government (DECLG) in March 2013 to the extent these guidelines are relevant having regard to the enactment of the revised EIA Directive.

The Environmental Protection Agency (EPA) recently published its 'Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, August 2017), which are intended to guide practitioners during the transition to new Regulations transposing the updated Directive. These draft guidelines have been used in the compiling of this EIAR.

The European Commission published a number of guidance documents in December 2017 in relation to Environmental Impact Assessment of Projects (Directive 2011/92/EU as amended by 2014/52/EU) including 'Guidance on Screening', 'Guidance on Scoping' and 'Guidance on the preparation of the Environmental Impact Assessment Report', which were also referred to.

This EIAR complies with the EIA Directive as amended by Directive 2014/52/EU. To the extent relevant and necessary, regard has been had to the existing provisions of the Planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001 (as amended) insofar as they transpose the EIA Directive. Information regarding the proposed scheme were put on public display in accordance with the Arterial Drainage Act (1945) and Amendment Act (1995), in Blackpool Library for a period of four weeks between the 24th November and 21st of December 2015.

This EIAR has been prepared on behalf of the Office of Public Works (OPW). The OPW is a publicly funded body formed in 1831, one of whose responsibilities is the design, construction and implementing of drainage schemes throughout Ireland. They have extensive experience in successfully undertaking such projects nationwide. They carried out large arterial drainage schemes on Irish river systems as early as the mid19th century. In addition to Flood Risk Management, the OPW is responsible for Estate Portfolio Management and Heritage Services, and the National Procurement Service.

1.4 PURPOSE AND SCOPE OF THE EIAR

The purpose of this EIAR is to document the current state of the environment in the vicinity of the proposed development site in an effort to quantify the possible effects, if any, of the proposed development on the environment. The assessment process that led to the compilation of this document served to highlight any areas where mitigation measures may be necessary in order to protect the surrounding environment from any negative impacts of the proposed development.

The objective of this process is to facilitate the most efficient and positive design of the proposed scheme in order to enable the scheme to be incorporated into the receiving environment insofar as possible and to plan for the identified effects so that measures are in place to ensure that any adverse impacts are avoided, reduced or remedied as appropriate.

1.5 STRUCTURE AND CONTENT OF THE EIAR

1.5.1 General Structure

This EIAR uses the grouped structure method to describe the existing environment, the potential impacts of the proposed development thereon and the proposed mitigation measures. Background information relating to the proposed development, scoping and consultation undertaken and a description of the proposed development are presented in separate sections. The grouped format sections describe the impacts of the proposed development in terms of: human beings, population and human health; biodiversity; land, soils and geology; hydrology and hydrogeology; air and climate, noise and vibration; landscape and visual; cultural heritage, and; material assets (including traffic and transportation), along with the interaction of the foregoing.

The EIAR also includes a non-technical summary, which is a condensed and easily comprehensible version of the EIAR document. The non-technical summary is laid out in a similar format to the main EIAR document and comprises a description of the proposed development followed by the existing environment, impacts and mitigation measures presented in the grouped format.

1.5.2 Description of Impacts

As stated in the 'Guidelines on the Information to be contained in Environmental Impact Statements' (EPA, 2002), an assessment of the likely impacts of a proposed development is a statutory requirement of the EIA process. The statutory criteria for the presentation of the characteristics of potential impacts requires that potential significant impacts are described with reference to the extent, magnitude, complexity, probability, duration, frequency, reversibility and transfrontier nature (if applicable) of the impact.

The classification of impacts in this EIAR will follow the definitions provided in the Glossary of Impacts contained in the following guidance documents produced by the Environmental Protection Agency (EPA):

- Guidelines on the Information to be contained in Environmental Impact Assessment Reports – Draft August 2017 '(EPA 2017).
- 'Advice Notes on Current Practice in the Preparation of Environmental Impact Statements' (EPA, 2003)
- 'Guidelines on the Information to be contained in Environmental Impact Statements' (EPA, 2002)
- Revised Guidelines on the Information to be contained in Environmental Impact Statements – Draft September 2015 '(EPA 2015)
- 'Advice Notes for Preparing Environmental Impact Statements – Draft September 2015' (EPA 2015).

Table 1.1 presents the glossary of impacts as published in the EPA guidance documents. Standard definitions are provided in this glossary, which permit the evaluation and classification of the quality, significance, extents, probability, duration and type of impacts

associated with a proposed development on the receiving environment. The use of pre-existing standardised terms for the classification of impacts ensures that the EIA employs a systematic approach, which can be replicated across all disciplines covered in the EIAR, as advised in 'Guidelines on the Information to be contained in Environmental Impact Statements' (EPA, 2017). The consistent application of terminology throughout the EIAR facilitates the assessment of the proposed development on the receiving environment.

Table 1.1 Effect Classification Terminology (EPA, 2017)

Impact Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An effect capable of measurement but without significant consequences
	Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight	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 consistent with existing and emerging baseline 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 most of a sensitive aspect of the environment
	Profound	An effect which obliterates sensitive characteristics
Extent & Context	Extent	Describe the size of the area, number of sites and the proportion of a population affected by an effect
	Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions
Probability	Likely	Effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented
	Unlikely	Effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented
Duration and Frequency	Momentary	Effects lasting from seconds to minutes
	Brief	Effects lasting less than a day
	Temporary	Effects lasting less than a year

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

Each impact is described in terms of its quality, extent, duration, significance and type, where possible. A 'Do-Nothing' impact is also predicted in respect of each environmental theme in the EIAR. Residual impacts are also presented following any impact for which mitigation measures are prescribed. The remaining impact types are presented as required or applicable throughout the EIAR.

1.6 PROJECT TEAM

1.6.1 Protect Team Responsibilities

The companies and staff listed in Table 1.3 were responsible for completion of the EIA of the proposed development. Further details regarding project team members are provided below.

Table 1.3 Project Team

Consultants	Principal Staff Involved in Project	EIAR Input
Ryan Hanley Consulting Engineers Sherwood House, Sherwood Avenue, Taylor's Hill, Galway	Jonathan Reid Sinead Gavin Sarah Mullen Kathy Carney Raymond Brennan	EIAR Project Managers, Co-ordination and editing of EIAR, Scoping and consultation, EIAR Sections 3, 5, 6, 7, 10 & 11
McCarthy Keville O' Sullivan Ltd. Block 1 GFSC, Moneenageisha Road, Galway	Brian Keville Michael Watson Evelyn Sikora John Staunton	EIAR Sections 1, 2, 4, 8, 9 & 12: Introduction, Background, Human Beings, Population & Human Health, Air & Climate, Noise a& Vibration, and Interaction of Foregoing
ARUP Consulting Engineers One Albert Quay, Cork	Ken Leahy Alan Leen Darragh Ryan	Scheme Design
JBA Consulting 24 Grove Island Corbally, Limerick, Co Limerick	Jonathan Cooper Elizabeth Russell David Forde Joanne Cullinane Seb Bentley	Hydrology
John Cronin & Associates 3a Westpoint Trade Centre, Link Road, Ballincollig, Cork	John Cronin Tony Cummins	Cultural Heritage Section
Damian Brosnan Acoustics Shronagreehykealkill, Bantry, Co. Cork	Damian Brosnan	EIAR Section 9: Noise & Vibration
Proviz Courthouse Rd., Kinvara, Co. Galway	Mel Durkan	Photomontages

2 BACKGROUND TO THE PROPOSED DEVELOPMENT

2.1 SITE OF THE PROPOSED DEVELOPMENT

2.1.1 Site Location

The site of the proposed drainage works is located almost completely within the environs of Cork City, with a small part of it located within the townlands of Killeens, Rathpeacon and Kilbarry County Cork. The overall study area, which covers the full catchment area for the River Bride (north) extends into both Cork City and County. Site location maps are presented in Figures 2.1 and 2.2. Figure 2.3 shows an aerial view of the proposed development site. Where the 'site' is referred to in this Environmental Impact Assessment Report (EIAR), this refers to the Study Area for the assessments undertaken in order to prepare the EIAR. During the course of the assessment process, the Study Area was refined to account for the more specific area within which impacts were likely to arise, on the basis of the proposed scheme. For the purposes of this EIAR document the wider Study Area is presented, but within the introduction to each chapter the specific and relevant parts of the Study Area to each chapter are further defined. For the purposes of providing background information on the project in this chapter, the 'study area' relates to the entire catchment of the River Bride (North) upstream of Blackpool.

The population density is generally high within the study area due to the location within and adjacent to Cork City, and the main urban centres include Blackpool and Ballyvolane, Cork. The Grid Reference co-ordinates for the approximate centre of the catchment study area are E168,000 N76,000. The land within the Study Area falls generally towards the river Bride and its tributaries, the Glenamought and Glen Rivers. The Rivers have a relatively flat gradient within the Cork City area, where the proposed works will take place. The culverted system in Blackpool has been incrementally constructed since the early the 1980s as part of the Glen-Bride-Kiln River Improvement Scheme which was commissioned by Cork Corporation in 1981.

2.1.2 Site Access

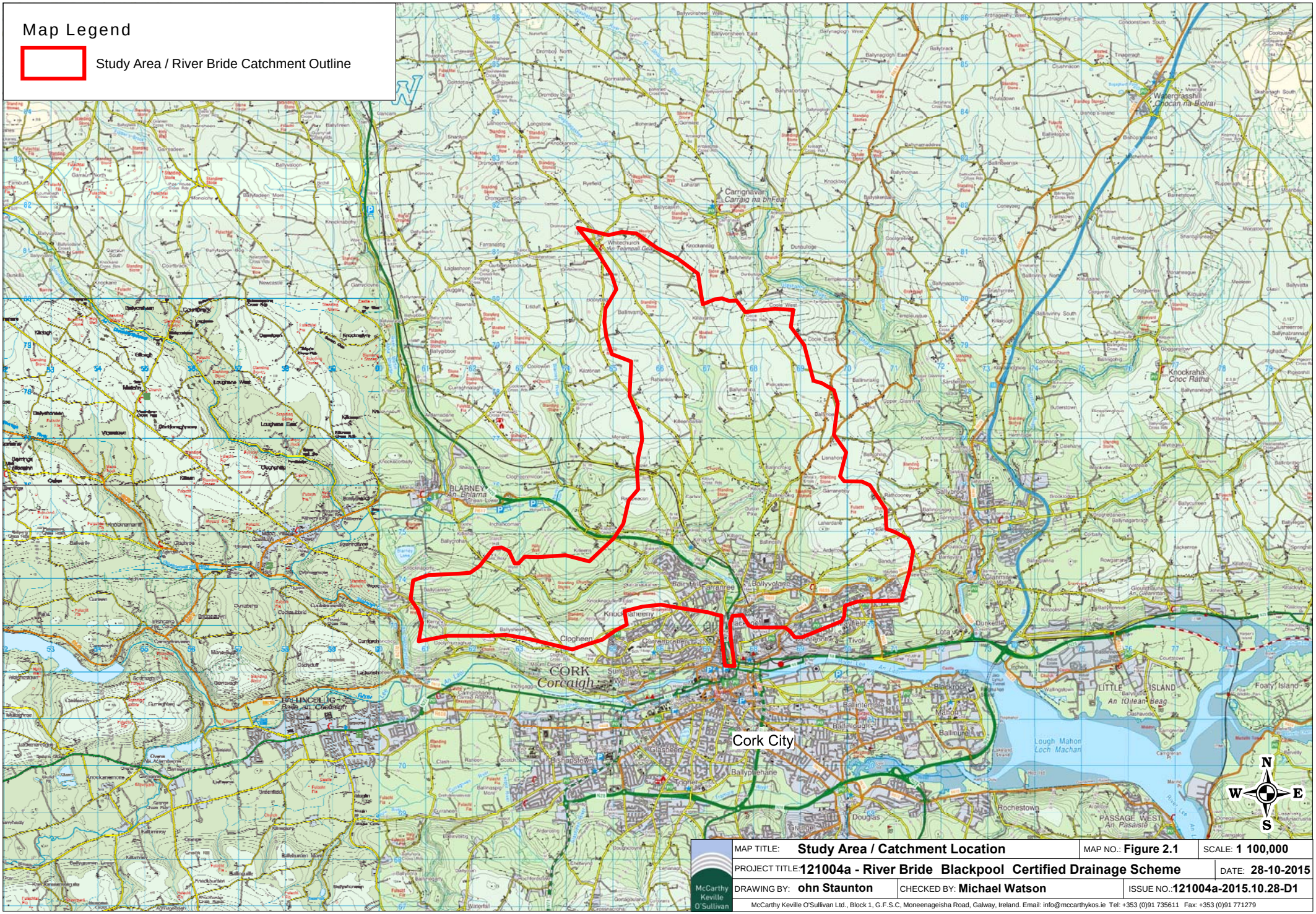
The proposed development site is accessed via several routes along the length of the works. Various local roads provide most of the direct site access, while the N20 national road runs in a northwest-southeast direction near the site. In addition, the R535 regional road approaches the eastern side of the study area. The wider area and Cork City are served by the M8 motorway, and the N8, N40, N22, N71, N27 and N28 national roads.

2.1.3 Physical Characteristics of Site and Surrounding Lands

The proposed works area is located within the Landscape Character Area: City, Harbour and Estuary (LCA No. 19), as set out in the Draft Landscape Strategy for County Cork. The City, Harbour and Estuary LCA forms part of the general Landscape Type: City, Harbour and Estuary (Type 1). The City, Harbour and Estuary Landscape Type extends east and southeast from Cork City and in the areas surrounding Cork Harbour. The proposed works area is found in the western-most areas of this LCA.

The topography of the catchment area is undulating in most areas, with most areas sloping towards the rivers. The catchment area elevations are in the range 25 to 188 metres O.D. in general.

Current land-use in the area surrounding the proposed works comprises mainly residential and commercial development with some areas of recreational ground. Continuous urban fabric occurs throughout the area.



MAP TITLE: **Study Area / Catchment Location**	MAP NO.: **Figure 2.1**	SCALE: **1 100,000**	
PROJECT TITLE: **121004a - River Bride Blackpool Certified Drainage Scheme**		DATE: **28-10-2015**	
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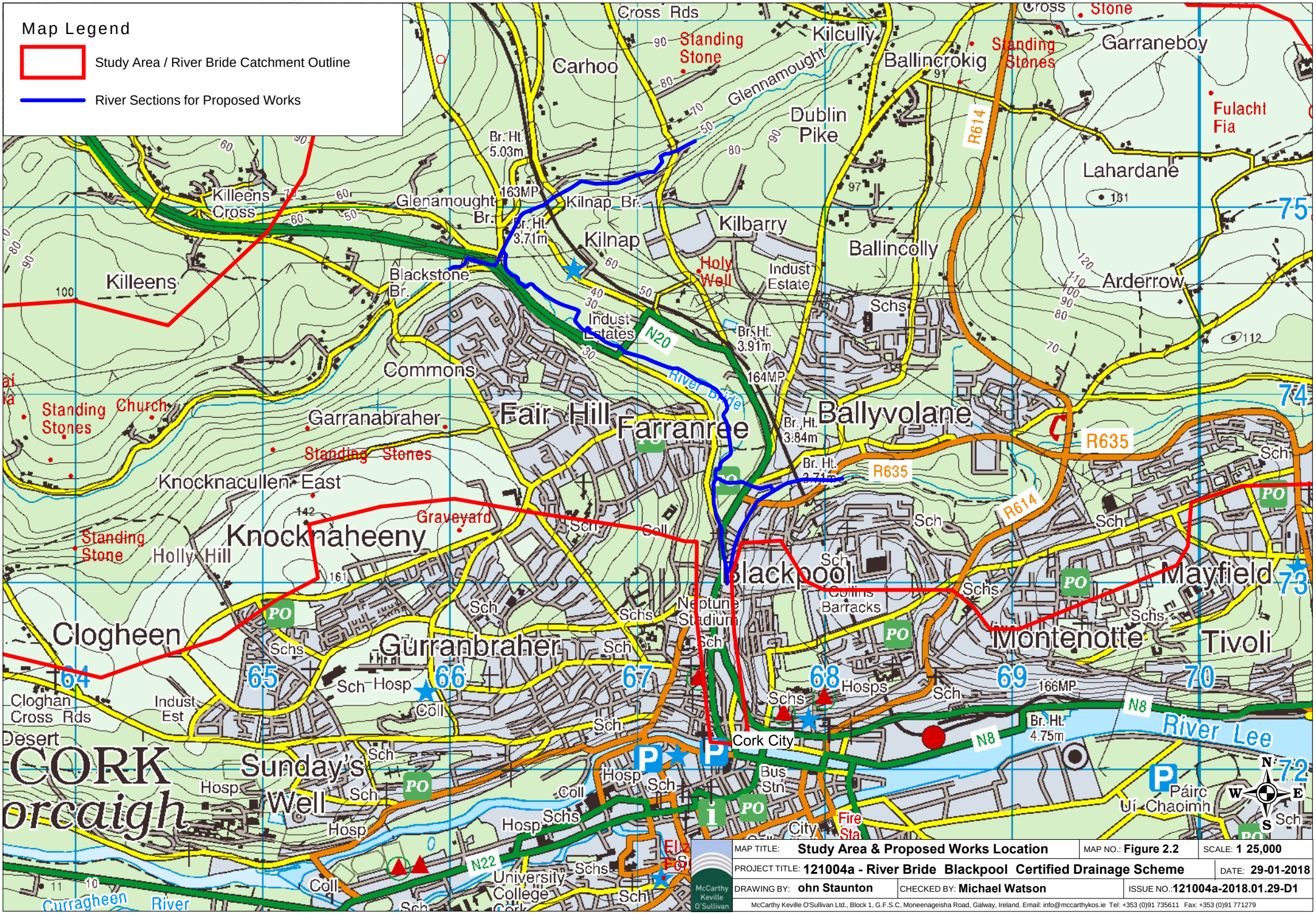

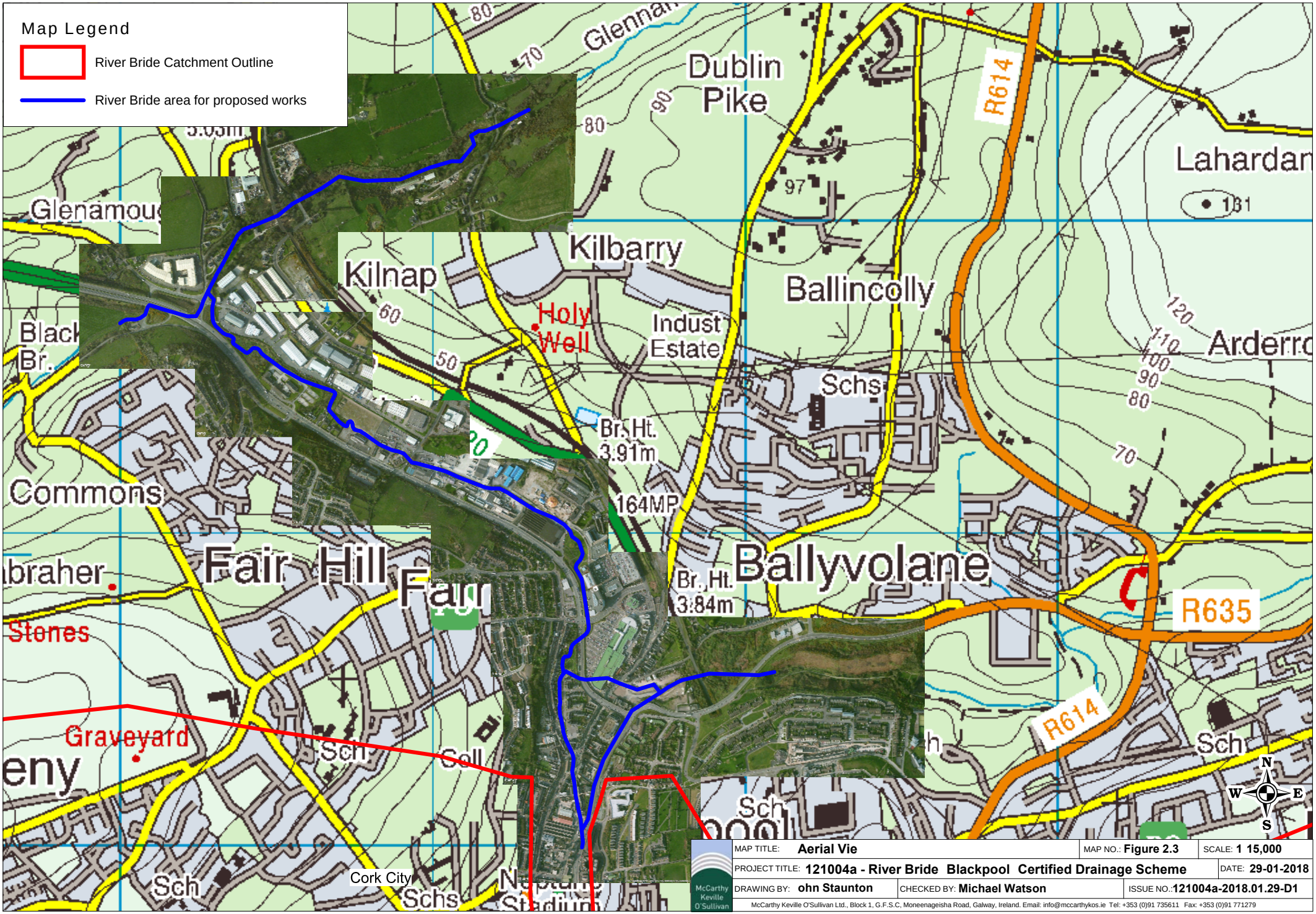

MAP TITLE: **Aerial Vie**		MAP NO.: **Figure 2.3**	SCALE: **1 15,000**
PROJECT TITLE: **121004a - River Bride Blackpool Certified Drainage Scheme**			DATE: **29-01-2018**
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The greater catchment land-use comprises mainly intensive agriculture, with urban areas in the south and only a few small pockets of forestry.

There are no sites designated for nature conservation of national or European importance within the Study Area. The nearest site of national importance is the proposed Natural Heritage Area (pNHA) of Shournagh Valley, located approximately 300 metres to the west of the study area (Cork Lough is located approximately 2 kilometres south of the proposed works). The nearest site of international importance is Cork Harbour Special Protection Area (SPA), located approximately 1.1 kilometres to the southeast of the study area (approximately 4 kilometres east of the proposed works). Further details regarding the designated areas are provided in Chapter 5 of this EIAR on Biodiversity.

The study area is entirely within the Bride (North) catchment and also includes the Glenamought and Glen tributaries.

2.2 NEED FOR THE PROPOSED DEVELOPMENT

There has been an extensive history of flooding in the Blackpool area of Cork City in recent years. Flooding is primarily due to heavy rainfall in the catchment of the Bride River and of its tributaries, the Glenamought and Glen Rivers. Prior to the early 2000s, the primary source of flood risk came from the Glen River, while after this time main source of flood risk has been the River Bride. Figure 2.4 below summarises the recent flood history and illustrates the flood risk of both watercourses. Figure 2.4 also shows the dates of culvert construction works as part of what was known as the Glen-Bride-Kiln (GBK) River Improvement Scheme. This work appears to have alleviated the flooding on the River Glen. Appendix 2A shows the existing flood extents in the Blackpool area.

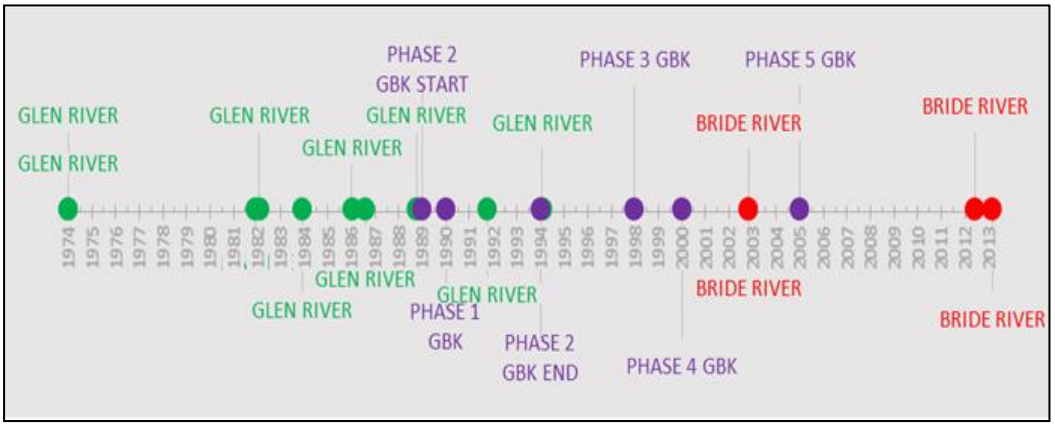


Figure 2.4 Timeline and source of recent flood events in Blackpool, showing River Improvement Scheme work phases

The risk of flooding may increase with time. Future changes, which have the potential to affect the risk of flooding include:

- Climate change resulting in higher rainfall
- Geomorphological processes, such as (i) Sedimentation transport, which affects the area of conveyance of the river channel and (ii) Erosion
- Development within the catchment of the Bride River, which does not conform with the principles of Sustainable Drainage, and which adversely affect the response of the catchment to rainfall
- Changes in land use, including forestation and land drainage

2.3 STRATEGIC PLANNING AND DEVELOPMENT CONTEXT

2.3.1 National Level

National Flood Policy

The Office of Public Works has the main responsibility for devising and implementing measures to deal with flooding. This responsibility is assigned by Government Decision S 28507 of 7 March 1995. In addition, the Arterial Drainage (Amendment) Act, 1995 enables the OPW to undertake local flood relief work schemes.

The National Flood Policy that was adopted by Government in 2004 identified OPW as the lead agency in coordinating the management of flood risk in the State. The Policy introduced a shift away from solely structural to non-structural measures to protect against flooding. The report prepared by the Flood Management Review Group decided that future Flood Management policy in Ireland would be:

> *"to minimise the national level of exposure to flood damages through the identification and management of existing, and particularly potential future, flood risks in an integrated, proactive and river basin based manner".*

It encompasses a series of measures regarding sustainable flood prevention, protection and mitigation. An implementation plan of work programmes and associated resources that would be required to put the new policy into effect was developed by OPW.

In November 2007 the EU Floods Directive (Directive on the Assessment and Management of Flood Risks - 2007/60/EC) came into effect. The existing national Flood Policy described above is in line with the Directive.

2.3.2 Regional Level

Regional Planning Guidelines for the South West 2010 – 2022

The Regional Planning Guidelines (RPGs) for the South West Region 2010 – 2022 provide a framework for long-term strategic development in the South West Region, which comprises the administrative areas of Cork County Council, Cork City Council and Kerry County Council. The RPGs aim to ensure the successful implementation of the National Spatial Strategy at regional, county and local level. A key aspect of the RPGs is to maintain a balance between protecting and enhancing the environment and sustainable economic development of the South West Region. Flood protection is identified in Chapter 1 of the guidelines as a priority for the 2010 to 2022 period. Flood Risk Management is highlighted as an important issue for the region.

Cork City Development Plan 2015 - 2021

The Cork County Development Plan 2015 - 2021 sets out the overall strategy for the proper planning and sustainable development of the administrative area of Cork City Council. It recognises that rivers within the city are an important asset to the city with many functions including provision of habitats, public amenity, drainage and flood water storage. One of the strategic goals identified in the plan is to *"Tackle climate change through reducing energy usage, reducing emissions, adapt to climate change and mitigate against flood risk"*. Open spaces within the city are noted as playing a large role in flood risk management. Chapter 12 of the Plan deals with the issues of Environmental Infrastructure and Management and also contains a subsection on Flood Risk Management. One of the key needs in terms of surface water drainage identified in the plan is the construction of a major flood relief scheme on the Lower Lee, specifically on the River Bride

in Blackpool and Ballyvolane. It is noted that the responsibility for these schemes rests with the Office of Public Works (OPW). The specific Objectives of the Cork City Council Planning Authority with regards to flooding include:

12.1 (i) Restrict landuse or require appropriate design as necessary to reduce risk of hazard, including those arising from flooding and controlled substances in industrial processes

12.13. Cork City Council shall have regard to the recommendations of the Draft Lee Catchment Flood Risk Assessment and Management Plan and shall incorporate the updated hydraulic modelling, mapping data and recommendations of South West CFRMP / Lee CRFMP (River Catchment Framework Management Plan) and the Lower Lee Flood Relief Scheme as each plan progresses.

12.14. Cork City Council will implement The Planning System and Flood Risk Management: Guidelines for Planning Authorities, 2009 in the preparation of land-use plans and determining planning applications.

12.15. To restrict development in identified flood risk areas, in particular, floodplains, except where the applicant satisfies the Justification Test as outlined in The Planning System and Flood Risk Management: Guidelines for Planning Authorities 2009.

12.16. To protect, enhance and manage the City's floodplains, wetlands and coastal habitat areas that are subject to flooding as vital 'green infrastructure' which provides space for storage and conveyance of floodwater, enabling flood risk to be more effectively managed and reduce the need to provide flood defence infrastructures.

12.17. All significant developments impacting on flood risk areas will be required to provide a Flood Impact Assessment to accompany the planning application to identify potential loss of floodplain storage and proposals for the storage or attenuation (e.g. SUDS) of run-off discharges (including foul drains) to ensure development does not increase the flood risk in the relevant catchment.

2.3.3 Local Level

North Blackpool Local Area Plan 2011

The North Blackpool Local Area Plan 2011 makes specific reference to flood risk. The plan states that the Draft Lee Catchment Flood Risk Assessment and Management Studies (CFRAMS) are at the core of new policies for flood risk management.

The plan notes that Cork City is "very vulnerable to adverse effects from small changes in sea level combined with changes in the occurrence of severe rainfall events and associated flooding of the River Lee and a number of smaller urban streams such as the River Bride". Appendix 2A ("*Proposed North Blackpool LAP Strategic Environmental Assessment (SEA) Screening Report*") of the Plan also notes that the North Blackpool Local Area Plan will not have a significant effect on flooding in the area.

2.4 SCHEME DESIGN PROCESS

The design process comprises a number of steps involving co-ordination of project engineering and environmental teams. The following steps have been completed in the design and assessment process:

- Constraints Study
- Hydrology Study
- Hydraulic Modelling

- Preliminary Site Investigation
- Flood Risk Assessments
- Selection of Preferred Option
- Appropriate Assessment Screening
- Cost Benefit Analyses
- Environmental Impact Assessment

The consultation and outcome of the above assessments are discussed below and within the various relevant EIAR chapters in this document.

2.5 CONSTRAINTS STUDY

An environmental constraints study was completed at the outset of the project to identify the key environmental issues relating to the River Bride (Blackpool) Certified Drainage Scheme Study Area. These included features which had the potential to be impacted by the possible flood alleviation measures and/or impose constraints on the viability or the design of the measures proposed.

Environmental constraints were investigated under the following headings:

- Human Beings
- Ecology
- Water
- Soils and Geology
- Archaeology and Cultural Heritage
- Landscape
- Air and Climate
- Material Assets

Desk studies on the status of the receiving environment under each heading were undertaken and a summary of the key constraints and implications of any proposed scheme was completed. In addition to the assessments undertaken, public consultation was undertaken and is outlined in more detail below. A summary of the key constraints identified for the Lower Lee Flood Relief Scheme (which included the River Bride (Blackpool) Certified Drainage Scheme) is summarised below. The full constraints document is available to access online at http://www.blackpoolfrs.ie

Table 2.1 Summary of the key constraints identified for the Lower Lee Flood Relief Scheme (which included the River Bride (Blackpool) Certified Drainage Scheme)

Human Beings
In designing the proposed scheme, the value (both cultural and economic) of any buildings (Residential, Retail, etc) close to river edge or likely to be adversely affected by the scheme should be taken into account. In addition, adverse impacts on buildings or structures of conservation interest should be minimised or avoided where possible.
Any design proposals should ensure that Bridge links between east and west sides of Blackpool are maintained so that temporary or permanent disruption on local transport links in the City and on the major access routes for Cork are minimised.
The design of the scheme should consider the public amenity value of the study area. Impacts on public amenity areas adjacent to river such as the riverside walks should be considered, with replacement

mitigation proposed if necessary. Similarly, specialist amenity areas including angling areas should be given consideration
Properties and businesses currently accessed by culverted sections or bridges over the Bride River will need to have access maintained/re-established where possible, if works on these areas are proposed.
Impacts on especially sensitive receptors e.g. schools, crèches, nursing homes, hospital should be considered in the flood risk assessment.
The proposed scheme should take consideration of the proposed zoning objectives set out in the Draft Local Area Plan.
Ecology
Given the sensitivity of the river habitat, factors that materially affect the function of the river under normal flow conditions such as water depth, velocity and changes to the shape of the bed should be given consideration, so that the existing function of the river can be maintained. Impacts to areas up and downstream of the Study Area should also be considered as part of the assessment.
In design of the proposed scheme, consultation with both the IFI and NPWS will be necessary, together with an appropriate amount of survey work (including electro-fishing) to establish baseline conditions in the river. Constraints may be placed on the times of year that in-stream works may be carried out depending on the results of the various surveys and the requirements of the IFI and NPWS. Constraints may also be placed on the time of year/weather conditions that the surveys may be undertaken.
In salmonid spawning areas (such as are located upstream of the study area), in-stream works are generally not permitted during the period October – March (inclusive), as this is the sensitive time for spawning. Given that the river is not an important angling or nursery area, it is unlikely that further constraints will need to be considered.
Pearl Mussel Surveys and Otter surveys can be undertaken at any time of year but are dependent on water levels. Pearl Mussel surveys require that there is good visibility in the water column and can only be undertaken in sunny, bright weather when water levels are not high and sediment loading on the river is low. Where such surveys are required, climatic conditions will constrain the timing of these.
Kingfisher surveys should be carried out during the summer nesting period (April – September)
It must be ensured that there are no significant impacts on Natura 2000 sites (SAC/SPA). Negative impacts on migrating fish have the potential to negatively affect the status of this designated site.
The woodlands, wetlands and riparian vegetation along the river corridor within the study area add greatly to the biodiversity. Damage to these riparian habitats should be minimised insofar as is practical so that the existing biodiversity in the area can be maintained.
Where possible works within the areas designated as pNHAs, the woodlands and areas with wetlands fringing the river should be minimised as these are likely to be the terrestrial areas of highest ecological sensitivity. The urban areas, arable and pastoral fields are likely to be the habitats of lesser ecological significance.
Appropriate measures should be taken to ensure that the spread of Japanese Knotweed and other invasive species is not is not accelerated by any proposed works.
Water

The design of the proposed scheme should take into account the water requirements (both Quality and Quantity) of any existing or future abstractions from the Bride and Lower Lee Rivers in Cork.
The design should also take into consideration the impact that any proposed flood relief scheme will have on the yields of existing groundwater abstractions from the Ground Water Body, taking into account the extreme and high vulnerability ratings of the local aquifer and presence of poorly productive bedrock aquifer's in the area.
The design of the proposed scheme should take into account the main objectives of the Water Framework Directive River Basin District Management Plan (RBDMP) by ensuring that any works proposed do not result in the deterioration of water quality.
The design should also take into account the presence of protected and sensitive areas identified in the RBDMP. Appendix 3 of the Plan lists the Protected Areas in the South Western RBD. The Lee is listed in Appendix 3 under the following headings: Lower Lee (Cork City) Flood Relief Scheme in association with Constraints Study Report - Drinking Water Protected Area – River Waterbodies: Lee (River) - Nutrient Sensitive Areas: Lee Estuary / Lough Mahon
Soils & Geology
It is recommended that a geotechnical investigation be carried out once the potential flood alleviation measures are developed in order to identify local geology and ground conditions.
Archaeology & Cultural Heritage
Given the provisions of the National Monuments Acts, no disturbance or interference to any archaeological sites listed in the RMP can take place without prior consultation with the National Monuments Service. In the event that any ground works are required in the immediate vicinity of any of these archaeological sites, it is recommended that appropriate mitigation measures be designed in consultation with the National Monuments Service.
All features listed in the RPS have statutory protection and, where feasible, avoidance of these features is recommended. Should works be required in the vicinity of protected structures then the formulation of site specific mitigation strategies in consultation with the Cork City and County Council heritage staff is recommended. It is also recommended that the same strategy be adopted for architectural heritage features listed in the NIAH. It is envisioned that the mitigation strategies will conform to those outlined in the various Development and Local Area Plans within the study area and that the EIAR for the scheme will present the various objectives and other relevant information presented in the local authority plans.
There is also the potential for the presence of unrecorded archaeological sites and artefacts within the study area. Any green field areas that may be impacted by ground disturbance works required by the proposed scheme (e.g. flood defences, access tracks, compounds, site clearance works, trial-pits) may require archaeological investigations. Depending on the nature and extent of the works the mitigation measures may take the form of pre-construction test trenching or monitoring of ground works carried out during the scheme. The appropriate mitigation measures will be determined during the Design Phase in consultation with the NMS and local authority archaeological staff.
In the event that works are required within the channels and banks of the River Lee, and its tributaries, then there will be the potential for negative impacts on both recorded and unrecorded cultural heritage riverine features, e.g. bridges, quays, weirs, fords, wrecks, fish-traps and landing/mooring features. It

is recommended that the Underwater Archaeological Unit (NMS) should be consulted in order to agree the appropriate underwater archaeological assessment and mitigation strategies for proposed in-channel works. These may consist of licensed underwater archaeological surveys and archaeological monitoring of all sediment extraction works during the construction phase

Landscape

In the design of a proposed flood relief scheme, the following recommendations of the Cork County Development Plan should be taken into account in relation to Broad Fertile Lowland Valley Landscape Type, in which the majority of the Study Area is located:

Protect and preserve the River Lee and its surrounding floodplains as unique landscape features in this Landscape Character Type and as valuable resource for scenic and amenity values.

Conserve and enhance the characteristics in this Landscape Character Type that are important to tourism.

Have regard to the rich and diverse natural heritage in this Landscape Character Type and the areas that are designated for protection. While protecting these areas it is also important to recognise their potential as key recreation and amenity sources.

Protect the existing character and setting of Blackpool and adjacent areas which are under pressure from development and population growth as they are located close to Cork City centre.

The relevant recommendations for the City Harbour and Estuary Landscape Type, in which the eastern half of the Study Area is located and to which regard should be had in designing the proposed scheme, include:

Manage development that will adversely affect distinctive linear sections of the Lee River Valley, especially its open flood plains, when viewed from relevant scenic routes and settlements.

Improve public access to the River Lee by enhancing it as a key recreational and amenity source.

Recognise the potential constraints on development created by the River Lee flood plain and the value of this flood plain as an increasingly rare habitat.

In the design of a proposed flood relief scheme, the following recommendations of the Cork County Development Plan should be taken into account in relation to Broad Indented Estuarine Coast Landscape Type, in the eastern-most section of the Study Area:

Minimise disturbance of hedgerows in rural areas.

Encourage appropriate landscaping and screen planting of proposed developments by using predominately indigenous/local species and groupings,

Protect the existing character and setting of villages and village nuclei, which are under pressure from population growth.

Continue to promote agriculture as a major land use in this LCT. This will help maintain the existing features of the landscape while also supporting the local economy and rural diversification.

Appropriate design, siting and mitigation measures will be required to integrate the proposed scheme within the landscape. Particular regard should also be had to the potential visual impact on views available from the three stretches of designated Scenic Route and the areas of Scenic Landscape, which are located within the Study Area.

Air Quality

Prior to the selection of a preferred flood relief scheme as part of the Engineering Study, it is recommended that the short listed flood alleviation measures be assessed in relation to the impact of noise and vibration during the construction phase of the project.
It is recommended that mitigation measures be put in place to reduce the impacts on air quality and the noise environment during the construction phase of any proposed flood relief scheme.
It is recommended that the affects of vibration during the construction phase be considered in the selection process for potential flood alleviation measures.
Material Assets
It is recommended that the existing and proposed location of watermains and underground services in the vicinity of any proposed flood alleviation scheme be ascertained as part of the Engineering Study. It is recommended that Cork City and County Councils and other utility providers with services in the area be consulted regarding the location and priority of existing and proposed services. It is further recommended that the services be protected as part of any proposed flood relief scheme.
It is recommended that any proposed change in the hydrological regime of the River Lee and its tributaries be assessed in relation to the assimilative capacity of the river at the locations of all discharges from Wastewater Infrastructure within the Study Area.

2.6 CONSIDERATION OF ALTERNATIVES

2.6.1 Options Report

This section of the EIAR contains a description of the alternatives that were considered for the proposed works, in terms of flood alleviation works design and location of the works.

The Environmental Impact Assessment Directive states that the information provided in an EIAR should include an outline of the main alternatives studied by the developer and an indication of the main reasons for the final choice, taking into account the environmental effects. The consideration of alternatives typically refers to alternative sites, designs and processes.

The consideration of alternatives is an effective means of avoiding environmental impacts. The Environmental Protection Agency documents 'Guidelines on the Information to be Contained in Environmental Impact Statements' (EPA, 2002) and 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports; Draft August 2017' (EPA, 2017) state that it is important to acknowledge however the existence of difficulties/issues and limitations when considering alternatives. These include hierarchy, non-environmental factors and site-specific issues, as described below.

A copy of the Flood Risk Management Options Report is available to download on www.blackpoolfrs.ie. There follows a summary of the information regarding alternatives considered as part of the options assessment.

The possible flood risk management (FRM) methods were initially screened to identify those that would be applicable and viable considering the risks to society, the environment, cultural heritage and the economy and the objectives of the flood risk management plan for the project. The potentially viable options were developed so that they could be evaluated in more detail. This involved hydraulic modelling of options where flood levels and extents had to be considered. The options were assessed against the flood risk management objectives with the use of local weightings. The preferred option was then identified following discussion with the OPW and steering group. The design standard to be adopted for the scheme is the 1%

AEP flood level with provision for adaptability to the Medium Range Future Scenario. The 1% AEP flood event has been used in this assessment of options.

2.6.2 Possible Flood Risk Management Methods

The possible flood risk management methods which could be utilized in a flood relief scheme include:

a) Do Nothing (i.e., implement no new flood risk management measures and abandon any existing practices)

b) Continue Existing Regime (i.e. Flood Early Warning System and Flood Emergency Response Plan)

c) Do Minimum (i.e. implement additional minimal measures to reduce the flood risk in specific problem areas without introducing a comprehensive strategy)

d) Non-Structural Measures

- Implement Planning and development control measures
- Enact building regulations relating to floor levels, flood-proofing, flood resilience, sustainable drainage systems, prevention of reconstruction or redevelopment in flood-risk areas, etc.
- Enact regulations for sustainable urban drainage systems
- Carry out targeted public awareness and preparedness campaign
- Individual property flood resistance
- Land use management, including creation of wetlands, riparian buffer zones, etc.

e) Structural Measures (potential future risk where necessary floodplain development may occur)

f) Structural Measures (existing risk)

- Upstream flood water storage
- Upstream restriction on river flows
- Flow diversion
- Increase conveyance
- Construct flood defences (e.g. walls, embankments, demountable defences, etc)
- Rehabilitate and improve existing defences including localised protection works (e.g. minor raising of existing defences/levels, infilling gaps in defences, etc.)
- Relocation of properties

g) Channel or flood defence maintenance works/programme

The criteria used for the screening of the various options included:

- Applicability to Area
- Social
- Environmental
- Cultural
- Economic

Flood Risk Management Option Assessment

A number of flood relief options (which are all discussed in detail in the Flood Risk Management Options Report) were developed before choosing the most preferred option. These were:

- Option 1 – 'Do-Minimum'.
- Option 2 – Ballincrokig flood storage, combined with conveyance improvements and direct defences at Common's Road/Blackpool
- Option 3 – Conveyance improvements and direct defences (with high walls in Orchard Court).
- Option 4 – Conveyance improvements and direct defences (with culvert through Orchard Court).
- Option 5 – Conveyance improvements & direct defences (culvert replacement from Orchard Court to Madden's Building).

The 'do-minimum' option (Option 1) was ruled out, as the flood risk in the catchment would remain at similar levels to the existing case. This option was primarily used as a baseline to compare with the other options.

Option 2 (Ballincrokig flood storage, combined with conveyance improvements and direct defences at Common's Road/Blackpool) appeared to be a strong option. It has the strongest cost-benefit ratio, and also gave similar results to the other options in the multicriteria analysis. It involved the construction of a flood reservoir upstream of Ballincrokig, combined with increasing the conveyance of the river and building direct flood defences in the Blackpool area. However, construction of a flood storage dam above Ballincrokig would create a new hazard (in the event of breaching or overtopping), and would result in the frequent flooding of valuable land in the area. Furthermore, the reservoir would only slow down water coming from upstream of that point, as there was a significant area downstream of it. It was considered more appropriate to manage locally through the risk area. This option will therefore be held as a reserve strategy for adapting to climate change if required in the future.

Increased river flow conveyance can be achieved by a number of means, including increasing the width of the channel over some or all of the channel, increasing the depth of the channel, removal of local constrictions and a combination of any of the aforementioned measures. The hydraulic computer model created for River Bride (Blackpool) Certified Drainage Scheme was used to simulate various options. Results are presented in the Flood Risk Management Options Assessment Report, available for download from www.blackpoolfrs.ie.

The layout/arrangement of the works for option 3 (Conveyance improvements and direct defences (with high walls in Orchard Court) was considered optimal, and no major engineering drawbacks were identified. The works on Commons Road in this option consist of a mixture of conveyance improvements and direct defences. The Commons Road element of these works are consistent across all remaining option 3, 4 and 5. This option took into account the feedback received from Inland Fisheries Ireland, who expressed a strong desire to maintain the Bride in Orchard Court as an open channel. However, hydraulic modelling indicated that very high defence walls would be required to contain flood waters. Feedback from the public on this option demonstrated that this option would be publicly unacceptable.

Option 4 (Conveyance improvements and direct defences (with culvert through Orchard Court)) was developed using the option 3 above as a basis. In Blackpool Village, in order to alleviate the local concerns, this option replaces the high walls in Orchard Court with a pressurised culvert. This option was marginally the most favourable in terms of MCA benefit/cost ratios, MCA Benefit Score and Option Selection Benefit Score. It also had the second strongest cost benefit ratio of the options assessed (after the storage option).

When this option was reviewed holistically in the context of the other options, it was clear that this option had the least amount of drawbacks while still achieving the objectives of the project. In addition, there was no viable alternative to the culvert to address the concerns or the local community about the negative impacts of the high walls, whereas it is considered that there are opportunities further upstream in the catchment to compensate or mitigate any local loss of fish habitat in the short length of culverted section through Orchard Court. Such compensatory measures include the de-culverting of a significant length of culvert through sunbeam as well as a commitment from OPW to provide appropriate funding to IFI for other compensation measures in the catchment to be agreed with IFI.

There are several factors which combined to rule out option 5 (Conveyance improvements & direct defences (culvert replacement from Orchard Court to Madden's Building)). These included technical challenges and difficulties due to existing infrastructure, considerable risk of property damage to Terraced housing on Watercourse Road, excessive costs and disruption to the local area during construction and significant risks of time and cost overruns. This option would also still require the construction of flood walls in Orchard Court.

Flood Risk Management Options Conclusions

The various options were appraised using a multi-criteria analysis (MCA) and Cost Benefit Analysis (CBA). The indicators, minimum requirements and aspirational targets, along with the global weightings and local weightings were agreed with the OPW for each objective to ensure consistency with the appraisal of options in other schemes nationally. It was found that the standard tools for options assessment (CBA and MCA) resulted in very small differences between the options and could therefore only be used as indicators on which to inform the use of professional judgement. The Cost Benefit Analysis shows that all options are cost-beneficial (excluding do-minimum). Therefore, a decision on the preferred option was ultimately made by careful and holistic professional consideration of all of the various issues, resulting on Option 4 being chosen. Details of the proposed scheme are provided in Chapter 3 of this EIAR.

2.7 CUMULATIVE ASSESSMENT

The EIA Directive requires that the description of likely significant effects of a project includes an assessment of cumulative impacts that may arise. The factors to be considered in relation to cumulative effects include, inter alia, population and human health, biodiversity, soil, water, landscape and cultural heritage. The potential for cumulative impacts arising from the proposed development in combination with other Projects has therefore been fully considered. As individual projects may not be relevant to all sections and disciplines included in the EIAR, the cumulative assessment of projects is contained within each chapter.

The potential cumulative impact of the proposed development and other relevant developments has been carried out in each chapter, with the purpose of identifying what influence the proposed development will have on the surrounding environment when considered cumulatively and in combination with relevant permitted, proposed and constructed projects in the vicinity of the proposed site.

The material was gathered through a search of relevant online Planning Registers, reviews of relevant EIS/EIAR documents, other flood alleviation projects, planning application details and planning drawings, and served to identify past and future projects, their activities and their potential environmental impacts.

In general, projects which have the potential for cumulative effects are referred to where relevant, in the individual chapters of this report. Some projects which have the potential to cause cumulative effects which are relevant to every chapter include the Lower Lee Flood Relief Scheme, as well as the proposed settlement at Monard.

Lower Lee (Cork City) Drainage Scheme

The overall study area, which covers the River Lee between Kennedy Quay in Cork City and Innishcarra Dam extends across both Cork City and County. The site of the proposed flood relief works is located within both the environs of Cork City and within the townlands of Curraghbeg, Garravagh, Coolroe, Great Island, Coolyduff, Lackenshoneen, Coolymurraghue, Carrigrohane, Inchigaggin and Mount Desert, County Cork.

The Proposed Scheme for the Lower Lee (Cork City) Drainage Scheme comprises of a combination of flood walls, embankments, regrading of road and pavement sections, bridge construction, flow control measures and pen stock construction, culverting, and other minor works. The Scheme will be designed to cater for the 1% Annual Exceedance Probability (AEP) fluvial flood event (also known as the 100-year fluvial flood event) and the 0.5% AEP tidal flood event (also known as the1 in 200-year tidal flood event).

Proposed Monard Strategic Development Zone

The draft Monard Strategic Development Zone Planning Scheme was approved by An Bórd Pleanala in May 2016. The scheme proposes a new town at Monard, to the north of Blackpool. The Strategic Development Zone (SDZ) incorporates lands to the north of the Cork-Dublin Railway line at Rathpeacon, and the site boundary lies in close proximity to the study area for this proposed development. The site boundary for the SDZ lies just north of the Gateway Business Park, and the N20 Cork-Limerick Road. The planning scheme also refers to the provision of a railway station at Kilbarry.

2.8 SCOPING & CONSULTATION

Consultation in relation to the project has been completed on a number of occasions at various stages in the design process. These have included broad general consultation at the Constraints Study stage and an associated Public Information Event and Questionnaire. Subsequently, the emerging preferred option was presented to the public in another Information event in Blackpool and formal scoping as part of the Environmental Impact Assessment process was undertaken. Interference notices were issued to those that would be directly impacted by the proposed works in advance of the Public Exhibition to ensure that they were aware of the scheme and they had time to provide feedback. The following sections outline the consultation completed to date.

2.8.1 Constraints Study Scoping

Scoping was carried out with numerous public and private bodies to identify any constraints for the proposed River Bride (Blackpool) Certified Drainage Scheme. The replies to this scoping can be found in Appendix 2B.

2.8.2 Public Consultation

Advertising of Public Consultations

Advertising of the 1st and 2nd Public Information Days (PID) was undertaken by the Environmental Team, in the local press in advance of each event. This included adverts in local publications; Cork Independent, The Corkman, The Carrigdhoun, The Cork News, The Muskerry News, Ballincollig Newsletter and The Southern Star, in addition to two national daily newspapers; The Examiner and The Evening Echo. In addition, notices were placed on local radio Cork 96 FM, Cork 103 FM and Cork Red FM in advance of each event. The events were also well publicised locally through the distribution of information on local websites and social media of Cork City Council, Cork County Council and the Office of Public Works and through text alerts via the private CorkFloodWatch website.

Advertising for the Statutory Public Exhibition was carried out via printed press ad radio before the event. Local publications Muskerry News, Cork Independent and Cork News in addition to National publications Irish Examiner, Evening Echo, Irish Independent and Irish Times were used to advertise the event. It was also publicised in Iris Oifigiúil. Advertisements were also placed on local radio stations Cork 96 FM, Cork 103 FM and Cork Red FM.

2.8.2.1 First Public Information Day

The first Public Information Day (constraints study stage) was held in Cork City Hall on the 17th of July 2013 from 3.00pm – 9.00pm, and covered the larger Lower Lee (Cork City) Flood Relief Scheme, including the River Bride (Blackpool) Certified Drainage Scheme. The purpose of this event was to advise the public on the scheme design process and to invite comments on same from the local community. A presentation also took place for elected members of Cork City Council and Cork County Council earlier in the day.

Members of staff the project team from the Office of Public Works, Cork County Council, Cork City Council, the Environmental Team (Ryan Hanley and McCarthy Keville O'Sullivan) and the Design Team (Arup Consulting Engineers and JBA Consulting) were available to answer questions on the day.

Literature Available for first Public Information Day

Brochures and questionnaires were provided at the first PID. With stamped addressed envelopes for those who wished to return the questionnaire by post. Additional information was also accepted on the evening of the event or subsequently by post/email.

A Constraints Study Public Consultation brochure was produced for the scheme (see Appendix 2C), which showed the Study Area under consideration and provided a brief explanation as to the process involved and the options being considered.

The questionnaire was provided to each attendee (see Appendix 2D), in association with the brochure. This provided an opportunity for members of the public to express their views on the Study Area shown and to provide information regarding flooding in their area, in addition to other comments they may have had relating to the design or the Environmental Constraints Study.

Posters for First Public Information Day

The format of the first PID was based on a number of scheme posters. The posters included:

- Scheme Objectives and Overview
- Constraints Study
- Study Area Map – Archaeological & Ecological Sites
- Statutory Process
- Public Involvement

Copies of the exhibition posters are included in Appendix 2E.

Public Attendees and Response to First Public Information Day

A total of 44 visitors signed the attendance book at the first Public Information Day. Most of the attendees were from the Blackpool area.

Comments received generally related to the level of flooding in the past, and most especially during the 2012 and 2013 events. Some members of the public brought photographs or maps of their property or demonstrated to project team staff the location of their property and their general concerns regarding the

level of flooding and damage which arose from the events. Attendees also provided information regarding previous maintenance of the river and their suggestions relating to potential flood alleviation measures.

Contact details were taken from members of the public who had additional information or had recorded flood levels, for the purposes of calibrating the hydraulic model. A total of 22 questionnaires were returned either at the PID or shortly thereafter by post. Submissions were made by a number of members of the public both at the first PID and subsequently by post or email. The information provided generally related to flood levels, photographs of recent local flooding and articles regarding flooding history in Cork. All information was subsequently provided to the Design Team.

In summary, feedback from attendees was satisfaction at being involved in the Public Consultation and at having their views heard, however many also wanted to see action arise out of the information provided as soon as possible.

2.8.2.2 Second Public Information Day

The second Public Information Day for the Lower Lee (Cork City) Flood Relief Scheme, which includes the River Bride (Blackpool) Certified Drainage Scheme, was held in Cork City Hall foyer on Tuesday 29 July 2014, from 3pm – 9pm. The purpose of this second Public Information Day was to provide information to the local community on the emerging preferred option comprising. a combination of dredging and defences.

A total of 181 attendees signed the attendance book at the event in Cork City Hall. Completed questionnaires were returned by 54 people (Appendix 2D). In advance of this event, a briefing was held for the City and County Councillors on Monday 28th July 2014 at 3.30pm.

Posters (Appendix 2E) on display described the process to date, the various options assessed, a preliminary impact assessment, summaries of surveys undertaken and included drawings showing the emerging preferred option. Brochures were also available (Appendix 2C).

The majority of feedback received on the day was favourable to the proposals presented for the area.

The following verbal and written comments were also noted:

- Several people commented that they were optimistic the issue of flooding would be dealt with based on the proposed works.
- Some concerns were raised in relation to diverting water into other channels, with concern that different areas could then flood. It was noted that the buildings on the north side quays have not flooded in living memory.
- A suggestion was made regarding re-opening an existing old masonry culvert for the Bride, to divert some water
- The suggestion was made that dredging the existing channel would significantly reduce flooding without the need for embankments.
- Several people suggested that development be halted on green areas upstream of Blackpool.
- A number of people noted that the release of water from hydro-electric dams needs to be more carefully planned
- It was suggested that a flood storage lake/dam be created upstream to prevent high water levels.
- Several people noted that current maintenance of river channels (dredging) was insufficient, and need to be increased.

- It was noted that having a flood wall along Orchard Court will encourage illegal dumping, and that an enclosed culvert would be more beneficial
- One person noted that high flood walls would encourage anti-social behaviour.
- The existing sharp turns in the river were noted by one person to have caused problems in the past as a result of creating turbulence in the water. It was also questioned if proposed walls were strong enough to cope with water forces.
- It was noted by one person that the proposed concrete flood walls are too high, and will look unsightly.
- Suggestions were made that good maintenance of trash screens and man hole covers will be essential to the avoiding future flooding
- It was suggested that further screening would be beneficial through Blackpool.
- A query was raised in relation to traffic implications and access to a local factory. It was noted that their work was busiest from January to August.
- It was suggested in one submission that glass be used for flood walls rather than concrete, for aesthetic purposes.
- A concern was raised as to whether the proposed works were conflicting with existing planning consents. It was suggested that the final design details will be discussed with landowners.

The comments and queries raised at both Public Information Days were considered in the scheme design and during the preparation of the Environmental Impact Assessment Report.

2.8.2.3 Statutory Public Exhibition

After the preparation of the EIS for the River Bride (Blackpool) Certified Drainage Scheme, the statutory Public Exhibition was held between 24 November 2015 and 21 December 2015 in Blackpool, Co. Cork.

A series of schedules, drawings and plans were exhibited in Blackpool Library for the four-week exhibition period. A series of four Open Days were also held at the Blackpool Community Centre to enable members of the public, including those who had received interference notices, to discuss issues or raise queries with representatives of OPW and the design team. The Open Days were held on the following dates:

- 24 November 2015
- 3 December 2015
- 10 December 2015
- 21 December 2015

Members of the public who attended these Open Days were encouraged to submit their comments and observations in writing to OPW.

Feedback from the Public Exhibition covered a number of topics, but most notable were:

- Concerns (regarding security, privacy and the environment) about the culverting of the river behind Orchard Court and creation of an amenity area
- Provision of increased security measures for individual properties
- Concerns about access to private property for construction phase and ongoing/periodical maintenance works, particularly in relation to security and privacy
- Queries/concerns regarding proposed flood alleviation at individual properties
- Concerns/queries regarding potential interference with rail transport networks

- Suggestions and recommendations for works to alleviate local flooding, and improve the amenity value, accessibility and security of the area
- Concerns regarding the protection of historical/archaeological structures
- Requesting further information about particular locations or aspects of the scheme
- Concerns regarding impacts of the works on businesses, income and future site developments
- Obstruction of views by the proposed works
- Queries about potential negative ecological and environmental impacts, and associated proposed mitigation, and considered alternatives
- Queries regarding traffic management
- Appreciation for the proposed works
- Request for an Underwater Archaeological Impact Assessment to be carried out
- Concerns/queries regarding potential interference with gas networks
- Queries regarding flood defence works outside the scope of the current project

2.8.3 EIA Scoping

Scoping is the process of determining the content, depth and extent of topics to be covered in the environmental information to be submitted to a competent authority for projects that are subject to an Environmental Impact Assessment (EIA). This process is conducted by contacting the relevant authorities and Non-Governmental Organisations (NGOs) with interest in the specific aspects of the environment likely to be affected by the proposal. These organisations are invited to submit comments on the scope of the EIA and EIAR and the specific standards of information they require. Comprehensive and timely scoping helps ensure that the EIAR refers to all relevant aspects of the proposed development and its potential effects on the environment and provides initial feedback in the early stages of the project, when alterations are still easily incorporated into the design. In this way scoping not only informs the content and scope of the EIA, it also provides a feedback mechanism for the proposal design itself.

2.8.4 First Round Scoping

An EIA scoping report, providing details of the works footprint and emerging preferred flood relief option, was prepared by McCarthy Keville O'Sullivan Ltd. in association with Ryan Hanley and circulated on 30th September 2015. Comments were requested from the relevant personnel/bodies in their respective capacities as consultees with regards to the EIA process.

Scoping Responses

Appendix 2F lists the consultees to whom copies of the EIA scoping document were circulated in September 2015. A copy of the EIA scoping document and cover letter is presented in Appendix 2G. Copies of all scoping responses received are included in Appendix 2B of this EIAR and a summary of the responses is outlined in Table 2.2 below. The recommendations of the consultees have informed the EIA process and the contents of the EIAR.

Table 2.2 Consultee Scoping response summaries

Consultee	Summary of Response
Gas Networks Ireland	There are no gas transmission infrastructure in the vicinity of the proposed network. There is a gas distribution network in the area. A map was included to show the network.
Inland Fisheries Ireland	Requested further information on specific features of the development. Made comments on several aspects of the proposed works.
Transport Infrastructure Ireland (TII)	They are not in a position to comment on the proposed development. Best practice guidelines for drainage schemes were included.
Cork County Council	Acknowledged receipt of Scoping pack
Department of Jobs, Enterprise & Innovation	Acknowledged receipt of Scoping pack
Blackpool Flood Group/Blackpool Traders Association	The plan is fully supported by this group. Had several specific questions on the proposed works.

2.8.5 Second Round Scoping

A second scoping letter was prepared by McCarthy Keville O'Sullivan Ltd. in association with Ryan Hanley and circulated on 9th October 2017prior to the preparation of this EIAR. This provided information relating to the reason for re-scoping of the project, and details of the proposed additional works. Comments were requested of the relevant personnel/bodies in their respective capacities as consultees with regards to the EIA process.

Scoping Responses

Appendix 2G lists the consultees who were circulated copies of the EIAR scoping letter in October 2017. A copy of the EIAR scoping letter and cover letter is presented in Appendix 2G. Copies of all scoping responses received by 17th December 2017 are included in Appendix 2H of this EIAR and a summary of the responses is outlined in Table 2.3 below. The recommendations of the consultees have informed the EIA process and the contents of the EIAR.

Table 2.3 Consultee Scoping response summaries

Consultee	Summary of Response
Gas Networks Ireland	There is no gas transmission infrastructure in the vicinity of the proposed works. Phone and written response.
Inland Fisheries Ireland	Requested further information on specific features of the development.
Transport Infrastructure Ireland (TII)	They are not in a position to comment on the proposed development. Best practice guidelines for drainage schemes were included.
Cork City Council (Director of Services)	Confirmation of no comment on the project
Department of Housing, Planning and Local Government	Acknowledged receipt of Scoping letter
Blackpool Flood Group/Blackpool Traders Association	The plan is fully supported by this group. Phone and written response.
Department of Communications, Climate Action and Environment	Acknowledged receipt of Scoping letter
ESB Networks	Acknowledged receipt of Scoping letter
Health and Safety Authority	Acknowledged receipt of Scoping letter
Cllr. Thomas Gould	Requested clarification on some design elements over the phone. Requested a call back from project designers. Attempts were made to contact Cllr. Gould, but no response was received at the time of producing this EIAR.
Chris Moody	Highlighted presence of Badger, Fox, Otter and Heron in Glennamought area. Also highlighted area of high otter activity, which is likely to have holts present. Stated opposition to culverting at Orchard Court due to presence of otter.

3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

As described in Chapter 2, the Proposed Scheme for the River Bride (Blackpool) Certified Drainage Scheme comprises of a combination of flood walls, culverting a section of open channel, bridge replacement, embankment construction and other minor works. The Scheme will be designed to cater for the 1% Annual Exceedance Probability (AEP) flood event (also known as the 100-year flood event). The design of the proposed works is adaptable for future climate change in accordance with Office of Public Works guidance in relation to climate change and also includes an allowance for freeboard.

The proposed works are detailed on the scheme drawings included in Appendix 3A and are described generally in the following section. To undertake the proposed works on site, some access will be required to adjacent lands and the river channel, the extent of which can also be seen in Appendix 3A. The locations of each of the proposed works features are marked on the relevant drawing with a code, with the adjacent table providing a description for each code.

3.1 PROPOSED WORKS

The proposed works for the River Bride (Blackpool) Certified Drainage Scheme will comprise the following:

- Site investigation;
- Construction of new culverts;
- Replacement of existing bridges/ culverts;
- Construction of new flood walls/ earthen embankments;
- Constructing bridge parapets;
- Local channel widening of the River Bride (referred to as a 'Winter Channel' on the scheme drawings in Appendix 3A);
- Construction of a sedimentation trap on the left bank of the River Bride;
- Removal of approximately 70m of existing culvert and restoration of open channel (River Bride) at this location;
- Construction of a new trash screen and roughing screens, and removal of existing trash screens on the River Bride, and the Glen and Glenamought Rivers;
- Modifications to the existing foul and surface water collection networks in the vicinity of the proposed works, including construction of pumping stations, in order to prevent flooding;
- Removal of an existing sluice structure in the channel of the River Bride to the rear of the Dulux factory;
- Localised regrading of ground levels, erection of fencing and access gates, to facilitate pedestrian/ vehicular access to and around flood defences, or to redirect overland surface water flow paths;
- Filling in a part of an existing open watercourse;
- Introduction of a flow control structure on the entrance to the Brewery culvert on the River Bride and the Spring Lane culverted branch of the River Glen;
- Regular maintenance of the river channel and pumping stations;
- Local stonework repairs within an existing masonry arch culvert (Brewery Branch culvert); and
- Utility diversions.

3.1.1 Site Investigation

A detailed site investigation has been carried out to inform the detailed design of the drainage scheme. The contract may choose to carry out additional site investigations prior to construction, however these are expected to be limited. Trial pits, slit trenches, boreholes, rotary core boreholes and dynamic probes may be carried out along the footprint of the proposed works, in addition to utility identification.

3.1.2 Culverts

The scheme will include construction of new culverts and reconstruction of existing culverts at the following locations:

- Reconstruction of 75m of existing pipe culvert of internal dimension 2.5m wide and 2.0m high adjacent to North Point Business Park.
- 342m of new reinforced concrete culvert (approximate internal dimensions 5.5m x 2.1m) commencing downstream of the Blackpool bypass (N20 Commons Road) at Orchard Court and terminating under the Old Commons Road to the North of Blackpool Church.
- Replacement and slight realignment of 7m of existing culvert (approximate internal dimensions 5.5m x 2.1m) on Old Commons Road upstream of Blackpool Church.
- Rehabilitation of 26m of existing culvert on Old Commons Road upstream of Blackpool Church and 163m of existing culvert on Watercourse Road upstream of Madden's Buildings.
- Replacement and slight realignment of 69m of existing culvert at Blackpool Church commencing on Old Commons Road and terminating on Watercourse Road. This will also involve culverting an open section of channel outside the Church.
- Replacement and slight realignment of 62m of existing culvert at Madden's Buildings commencing on Watercourse Road and terminating on the North City Link Road (N20). This will involve construction of a flow control structure at the entrance to the 'Brewery' culvert, which runs under Watercourse Road.

The culverts will consist of reinforced concrete structures and in general will be constructed on the footprint of the existing river channel (within only minor realignment). The one exception will be the culvert at the northern end of Orchard Court, which will be constructed off the line of a slight meander in the existing channel. This is required in order maximise the hydraulic efficiency of the proposed culvert system.

A concrete blockwork boundary wall will be constructed along the property boundaries on the right bank of the new Orchard Court culvert.

3.1.3 Bridge Replacement

The scheme will include replacement of existing bridges/ culverts at the following locations:

- Two existing bridges/ culverts on the Glenamought River will be replaced with new reinforced concrete bridges between Sweeney's Hill and the North Point Business Park.
- Two existing bridges/ culverts on the River Bride will be replaced with new reinforced concrete bridges between the North Point Business Park and Commons Road (N20).
- Two pedestrian bridges at Blackpool Retail Park will be removed and replaced by a new single crossing point located approximately 120m and 10m to the North of the two bridges respectively.

The purpose of the replacement is to increase the conveyance capacity of the River Bride at the first two locations, and to the facilitate construction of flood defences at Blackpool Retail Park in the case of the two pedestrian bridges. It will also be necessary to limit vehicular and pedestrian access points across the river during construction stage to facilitate the construction of the new bridges and culverts.

In addition, the construction of the culvert will result in the removal of two existing bridges at Orchard Court, including one pedestrian bridge. These access points will be fully restored on completion of the works, the bridge effectively being replaced by the new culvert.

3.1.4 Flood Walls/ embankments

The scheme will include construction of new flood walls/ earthen embankments at the following locations:

- 62m of earthen embankment to upstream of Glenamought Bridge to tie into high ground and reinforced concrete wall,
- 30m of reinforced concrete wall to be constructed to flood defence levels on the wet side of the existing boundary wall at Collins House;
- 21m of reinforced concrete wall at O'Sheas Building
- 58m of reinforced concrete wall at O'Sheas Building
- 109m of earthen embankment at Woodpark (Glenamought River), downstream of the railway viaduct on the Cork-Limerick railway line to tie into high ground and reinforced concrete wall,
- 31m of reinforced concrete wall at Woodpark (Glenamought River), downstream of the railway viaduct on the Cork-Limerick railway line,
- 102m of flood wall adjacent to the Lower Killeens Road (River Bride),
- 34m of existing open wall to be reconstructed in solid blockwork to 1.1m above the path adjacent to the Lower Killeens Road,
- 31m of flood wall and 114m of earthen embankment to the North and West of the Commons Inn Hotel,
- 50m of flood wall on the right bank of the Fairhill Stream to the rear of Bride Villas,
- 259m of flood wall on the right bank of the River Bride between the Bride Villas and the 'Topaz' filling station,
- 232m reinforced concrete wall on the right bank of the River Bride between the Dulux factory and the Sunbeam Industrial Estate (new wall behind existing wall),
- 144m reinforced concrete wall on the right bank of the River Bride between the Dulux factory and the Sunbeam Industrial Estate (raising existing wall),
- 147m reinforced concrete wall on the right bank of the River Bride between the Dulux factory and the Sunbeam Industrial Estate (new wall),
- 76+153+91m reinforced concrete wall on the left bank of the River Bride between the Dulux factory and the Sunbeam Industrial Estate (new wall behind existing wall),
- 219+88m reinforced concrete wall on the left bank of the River Bride between the Dulux factory and the Sunbeam Industrial Estate (new wall),

- 121m of earthen embankment along the left bank of the River Bride at the location of a new crossing point and trash screen,
- 212m of flood wall on the left bank of the River Bride alongside to the Blackpool Retail Park/ Heron Gate and River House, and
- 49m of flood wall on the left bank of the River Bride between the Commons Road (N20) and the carpark of the Blackpool Shopping Centre.
- 109m of flood wall on the left bank of the River Bride at Springlane.

Table 3.1 Flood defence heights

Location of Defence	Flood Defence Type	Height of Defence (m)
Upstream of Glenamought Bridge (Glenamought River)	62m of earthen embankment.	1.0m above existing ground levels (typically)
Upstream of Glenamought Bridge (Glenamought River)	30m of flood wall.	0.56m above existing ground levels (typically)
O'Sheas Building	21m of reinforced concrete wall	0.8m above existing ground levels (typically)
O'Sheas Building	58m of reinforced concrete wall	0.53m above existing ground levels (typically)
Woodview (Glenamought River), downstream of the railway viaduct on the Cork-Limerick railway line.	109m of earthen embankment.	0.8m-0.9m above existing ground levels (typically)
Woodview (Glenamought River), downstream of the railway viaduct on the Cork-Limerick railway line.	31m of flood wall.	1.5m above existing ground levels (typically)
"Rose Cottage" [adjacent to the Lower Killeens Road (River Bride)].	102m of flood wall.	0.65m above existing ground levels (typically)
"Rose Cottage" [adjacent to the Lower Killeens Road (River Bride)].	34m solid block flood wall.	1.1m above existing ground levels (typically)
North and West of the Commons Inn Hotel.	31m of flood wall.	0.45m above existing ground levels
North and West of the Commons Inn Hotel.	114m of earthen embankment.	0.8m above existing ground levels (typically)

Location of Defence	Flood Defence Type	Height of Defence (m)
Bride Villas (Fairhill Stream)	50m of flood wall	1.2m above existing ground levels (typically)
Right bank of the River Bride between Bride Villas and the 'Topaz' filling station	259m of flood wall	0.45 / 0.83m above existing ground levels (varies)
Right bank of the River Bride between the Dulux factory and the Sunbeam Industrial Estate (new wall behind existing wall)	232m of flood wall	0.35 / 0.59m above existing ground levels (varies)
Left bank of the River Bride between the Dulux factory and the Sunbeam Industrial Estate (new wall behind existing wall)	350m of flood wall	Height varies significantly along the length (up to 1.27m above existing ground level). Refer to Appendix 3A for heights of individual sections.
Right bank of the River Bride between the Dulux factory and the Sunbeam Industrial Estate (raise existing wall)	144m of flood wall repair	Height of wall will not typically increase
Right bank of the River Bride between the Dulux factory and the Sunbeam Industrial Estate (new wall)	147m of flood wall	0.9m above existing ground levels (typically)
Left bank of the River Bride between the Dulux factory and the Sunbeam Industrial Estate (new wall)	297m of flood wall	1.27m above existing ground levels (varies)
Blackpool Retail Park, along the left river bank at the location of a proposed trash screen.	121m of earthen embankment.	1.15m above existing ground levels (typically)
On the left bank of the River Bride alongside to the Blackpool Retail Park/ Heron Gate and River House.	212m of flood wall.	Height varies significantly along the length (up to 1.53m above existing ground level). Refer to Appendix 3A for heights of individual sections.
On the left bank of the River Bride between the Commons Road (N20) and the carpark of the Blackpool Shopping	Repair and/or reconstruct existing river wall to flood	1.53m above existing ground levels (varies)

Location of Defence	Flood Defence Type	Height of Defence (m)
Centre.	defence level (49m)	

The purpose of the flood walls and embankments is to prevent overtopping of the river banks and to subsequent flooding that would result from overtopping. The locations and heights of flood walls and embankments have been chosen based on a hydrological and hydraulic analysis of the River Bride, topographical data, the 1% Annual Exceedance Probability (AEP) flood event (also known as the 100 year flood event), and allowance for freeboard.

Where space is available, flood defences will consist of earthen embankments. In most cases, space constraints in the vicinity of the urbanised catchment of the River Bride in the vicinity of Blackpool means that flood walls will be required. In some locations, such as to the rear of the Dulux Paints factory, the new flood walls will replace existing walls or will consist of extensions to existing reinforced concrete retaining walls.

3.1.5 Bridge Parapets

It will be necessary to carry out works to bridge/ culvert parapets at the locations shown on the Scheme Drawings contained in Appendix 3A in order to contain flood waters within the river channel. The existing bridges/ culverts in question are located between the North Point Business Park and Commons Road (N20) as shown on the Scheme Drawings in Appendix 3A. Works will consist of repairs to existing parapets where they exist, replacement of existing parapets where repairs are not practical or cannot deliver the required level of protection, construction of new parapets where existing parapets do not exist, or where existing parapets are not of a sufficient height to contain flood waters.

3.1.6 Winter Channel

A series of sharp bends in the Bride channel contribute to elevated flood levels along the Commons Road (N20). This is because the water velocity is abruptly slowed at each of these bends. It is proposed to introduce a 'winter channel' to the existing channel to help with high flows by cutting a secondary flow route into the existing bank. In normal flow conditions, the river would be confined to the 'low-flow' or 'summer channel', however during periods of high flow the winter channel would provide additional capacity.

The winter channel will consist of an excavation of the right bank (looking downstream). The left bank will be undisturbed. The width of the cut will vary from 0m at the upstream/downstream ends, to maximum 7-10m at the apex of the river bend. The formation level of the cut will be at approximately 1.2m above the channel invert (approx. 18.9mOD). This will leave the existing low flow channel substantially undisturbed apart from cutting back vegetation. The total length of the cutting will be approximately 50m on plan, measured along the bank line.

The slope of the new cutting will match the existing bank slope. The surface of the new cut slope will be covered with a biodegradable membrane, which will protect the exposed soil from erosion while vegetation is re-established over a number of months following the works.

3.1.7 Sedimentation Management

It is proposed to construct a sediment trap at the upstream end of the Sunbeam Industrial Estate.

The purpose of the sediment trap at the Sunbeam Industrial Estate is to capture fluvial sediments (primarily small cobble sized material), to help minimise the risk of large sediments settling in the Blackpool culvert system, which would reduce hydraulic capacity. A sediment trap is an online pond which increases local width and depth of the channel and reduces flow velocity. This promotes the settlement of suspended solids, and the deposition of coarser bedload. Sediment traps require regular maintenance to remove sediment and will no longer function when full.

The proposed sediment trap will typically be 20m wide x 80m long. It will most likely be constructed of reinforced concrete or sheet pile walls with shallow rock weirs constructed at 20m centres. It will be constructed by excavating an area of the existing channel to make it wider and deeper. The inlet and outlet structures will have the same invert level and approximate dimensions as the existing channel in those locations, to minimise impact on upstream and downstream water levels. The bed level of the basin will be approximately 1.5m below the existing bed level.

The sediment trap will also incorporate a ramp along the left bank to allow access for a JCB/excavator to remove accumulated sediment and will also require a slight realignment of the river channel at the downstream end of the sedimentation trap. It will also be necessary to slightly realign local access routes to the north of the sediment trap.

3.1.8 Open Channel

The scheme will include removal of approximately 100m of existing culvert to the rear of the Sunbeam Industrial Estate, and restoration of open channel (River Bride) at this location. This work will be done in combination with construction of a sedimentation trap, a new pumping station, regrading of ground levels and construction of flood walls at the same location (described separately in this chapter).

3.1.9 Screens

The scheme will include construction of a new trash screen within the channel of the River Bride at the Blackpool Retail Park and three new roughing screens upstream of the Viaduct on the Glenamought River, upstream of Rose Cottage on the River Bride (North) and upstream of the existing Spring Lane trash Screen on the River Glen. The existing trash screens on the River Bride (North) (two existing screens) and the River Glen at Spring Lane will then be removed. The purpose of the roughing screens and trash screen will be to remove large debris from the river channel, which could potentially cause a blockage in the almost entirely culverted channel downstream of Blackpool Retail Park.

Trash screens will be designed in accordance with the UK Environment Agency "Trash and Security Screen Guide 2009" and CIRIA guidance document C689 "Culvert Design and Operation Guide". The EA guidance states that only mature salmon species could be discouraged by a screen. Other fish species are unlikely to be affected by bars with a minimum clear spacing of 250 mm. For the Blackpool screen, the minimum bar spacing will be no less than 200mm in accordance with the CIRIA guidance document. A small bypass route throught the western arm of the structure will alos be provided in order to facilitate the movement of otters.

The roughing screens will be designed to catch only large debris and allow smaller material to pass through. The screens will be designed to allow for overtopping and/or bypassing during high flood levels

or blockage scenarios without the risk of flooding nearby properties. The overall screen width will be approximately 20m on the Glenamought River and approximately 10-15m on the River Bride.

3.1.10 Drainage Works

Flooding in Blackpool is primarily fluvial (i.e. flood waters flow directly from the River Bride, however restricting the river channel by constructing hard flood defences will also restrict pluvial flow - surface water run off during rainfall events which coincides with high river levels. There are existing surface water and combined foul and surface water collection networks in Blackpool.

In order to prevent pluvial flooding, particularly during flood events, it will be necessary to modify the surface water and combined drainage network in the town. Initially, existing outfalls will need to be sealed against backflow from rising flood waters, where this has not already taken place.

Pumping stations will be required so that surface water run off can be pumped to the river channel during flood events and on occasions when the new non-return valves malfunction. In addition to substructure, pumping stations will incorporate a surface mounted kiosk in close proximity to the underground substructure. Eight pumping stations are proposed at the following locations:

- Bride Villas (Commons Road),
- Fitz's Boreen,
- Two pumping stations to the rear of the Dulux factory, one on either bank of the River Bride,
- Open area at North end of Orchard Court,
- Old Commons Road (at entrance to Orchard Court),
- Public carpark at the southern end of Orchard Court
- Blackpool Church/ Thomas Davis Street.

New collector drains will be required to connect the new and old collection networks. Surface water will be pumped into the river channel/ new culvert at these locations through new rising mains fitted with non-return valves.

It addition to the above, it will be necessary regrade impermeable areas (roads, footpaths) at certain locations along the route of the River Bride, in order to redirect overland flow towards the river or other surface water drainage networks. The extent of regrading works required is shown on the Scheme Drawings in Appendix 3A.

3.1.11 Maintenance Regime

A rigorous and organised channel maintenance programme will be required throughout the reach of the channel impacted by the proposed works. The channel maintenance programme will include the following stretches of river/ stream channel:

- The Glenamought River from the new roughing screen upstream of the Viaduct to its confluence with the River Bride (517m),
- The River Bride from the new roughing screen upstream of Rose Cottage to Blackpool Church (2,623m),

- The River Bride (Kiln culvert branch) from Blackpool Church to the confluence of the Kiln Branch and the Kiln Brewery Branch (946m, running under Watercourse Road and the N20 Blackpool Bypass),
- The River Bride (Kiln Brewery culvert branch) between its bifurcation with the Kiln culvert branch at its upstream end to its confluence with the Kiln culvert branch at its downstream end (740m, running under Watercourse Road and the Heineken Brewery),
- The Glen River (Spring Lane culvert branch) from its confluence with the new culvert on the River Bride to the proposed sluice structure at the head of this channel section (333m),
- The Glen River (mainly open channel) from the proposed sluice structure referred to above to the existing culvert under the North Ring Road (230m),
- The Glen River (Back Watercourse culvert branch) from the proposed sluice structure referred to above to its confluence with the (Kiln Watercourse culvert branch) outside Madden's Buildings (542m, running mainly under the N20 Blackpool Bypass),
- The Rathpeacon Stream from its confluence with the River Bride for a distance of 193m upstream, and
- The Fairhill Stream from its confluence with the River Bride for a distance of 108m upstream,

The channel maintenance programme will pay particular attention to locations where silt, gravel and debris are likely to accumulate, such as at structures, sharp bends, culvert inlets, etc.

The new trash screen and roughing screens will require regular maintenance, as will the proposed surface water pumping stations. The surface water pumping stations will require regular maintenance and it will be necessary to jet the surface water sewers to maintain hydraulic capacity to drain flood waters.

Other measures will include regular inspections of flood walls and embankments, regular scheduled maintenance of the river channel and pruning of trees (including removal of tress where necessary), planning and control measures. The inspection regime will ensure than there is no deterioration in the structural integrity of the defences which may occur as a result of a collision for example. It is expected that the flood defences will be relatively maintenance free otherwise. The extents of channels/culverts to be maintained will be shown on the drawings contained in Appendix 3A. In general, maintenance activities will consist of the following:

- The channels and structures will be monitored by means of a walkover survey from the banks on a regular basis (likely annually, and also following a flood event). The walkover surveys would aim to identify issues with implications for flood risk (e.g. fallen trees, excessive vegetation build-up, overgrown trees, illegal dumping, accumulation of granular deposits, etc.). In-channel debris will typically be removed by JCB. Excessive overhanging vegetation will typically be pruned back or removed by hand using a cherrypicker, depending on access.
- Culverts will be inspected by means of man-entry on an annual basis, or following a significant flood event. Any debris present in the culvert will be cleared by hand. A full CCTV survey and clearing of silt/sediment from the culvert is expected to take place approximately every five years. Removal of debris will be carried out as required.
- The optimum frequency of cleaning of the sediment trap and trash screen will evolve over time based on experience. However, initially it is proposed to carry out cleaning generally on a

quarterly basis, and also following a significant flood event. Water level monitoring and alarms will also be installed at the trash screen to alert maintenance staff of a screen blockage.

3.2 ANTICIPATED CONSTRUCTION METHODS

3.2.1 New Culverts

Construction of new culverts will form the most significant aspect of the new scheme. Approximately 480m of new culvert will be constructed in Blackpool, some of which will be constructed along the route of the River Bride. Construction of the new culvert will take place as follows:

- The works area will be isolated and traffic management set up as required. Temporary road closures will be required for the culvert replacement in the vicinity of Blackpool Church and Madden's Buildings. Alternative access routes may be required for Orchard Court during construction works if it does not prove possible to maintain one lane of the existing bridge open at all times/ maintain access in the vicinity of the existing bridge.
- Temporary works will be put in place, including silt barrages, and flow diversions/ over pumping where in stream works are required at Blackpool Church and between the Old Commons Road and the N20 culvert (upstream of Orchard Court). Service diversions will also be required in advance of culvert construction, particularly at Blackpool Church and Madden's Buildings.
- The foundations will be excavated down to formation level. Utilities and drainage pipes will be diverted as required. Excavated material will be transported off site to a licenced facility or stored for reuse on site. Blinding will be poured.
- Reinforced concrete culverts will be placed in position. Utilities and drainage pipes will be diverted into permanent positions as required.
- The excavation will be backfilled, the area reinstated, and the works area reopened. In the case of culverts constructed under the public road, permanent reinstatement may be required approximately six months following reopening of the road.
- An otter ledge will be integrated into the existing and proposed culvert network. Light wells will be provided within the culvert periodically to provide light for otters and aquatic organisms using the structure.

3.2.2 Bridge Replacement

The replacement of existing bridges is likely to comprise the following proposed works:

- The works area will be isolated and traffic management set up as required. Temporary road closures may be required if it does not prove possible to maintain one lane of the existing bridge open at all times/ maintain access in the vicinity of the existing bridge, or if an alternative convenient access route is available.
- Temporary works will be put in place, including silt barrages, and flow diversions/ over pumping. Service diversions may also be required in advance of culvert construction.
- The existing bridge/ culvert structure will be dismantled/ demolished and removed off site.
- The foundations will be excavated down to formation level. Excavated material will be transported off site to a licenced facility or stored for reuse on site. Blinding will be poured.

- The new bridge/culvert will be constructed using either precast units or reinforced concrete placed in situ. Utilities and drainage pipes will be diverted into permanent positions as required during/ following construction. Construction of an in-situ reinforced concrete bridge would involve
  - Fixing of reinforcement for abutments and piers,
  - Placing of formwork for abutments and piers,
  - Placing of cast in-situ concrete for abutments and piers,
  - Stripping of formwork,
  - The placing and fixing of a precast concrete bridge deck, and
  - Construction of bridge parapets.
- The excavation will be backfilled, the area reinstated, and the works area reopened. Permanent reinstatement of road surfaces may be required approximately six months following reopening of the road.

3.2.3 Bridge Parapets

New/ upgraded bridge parapets will be constructed as follows:

- Isolation of works area, including traffic management.
- One lane of the bridge will be closed at a time where possible. Where sufficient space is not available to accommodate a working area and live traffic, a road closure will be acquired and alternative access put in place.
- The existing bridge parapet/ railings will be removed where these exist.
- The underlying concrete will be scabbled and starter bars dowelled into the concrete.
- Formwork will be set up from the bridge deck for the construction of the reinforced concrete bridge parapet.
- Scaffolding will be set up as required. The parapet will be poured following steel fixing. Once the concrete has cured, the formwork will be stripped and the scaffolding removed.
- The lane will be opened, the second lane closed and the plant and equipment will be relocated to the location of the second parapet.

3.2.4 Flood Defence Walls

The construction of the reinforced concrete flood defence walls is likely to be carried out by traditional methods comprising the following activities:

- isolation of works area, including traffic management where the work area will overlap with a public road/ pedestrianised area,
- temporary works including silt barrages where in stream works are required,
- excavation for foundations,
- blinding of formation,
- fixing of reinforcement,

- placing of formwork,
- placing of concrete,
- stripping of formwork, and
- reinstatement of works area.

In certain locations, where there is a possibility of flood water passing underneath the flood defence wall foundations, either sheet piles or grouting techniques will be required to provide a cut-off. The sheet piles may be metal or plastic and will be driven to the required depth using a piling hammer or similar.

3.2.5 Earthen Embankments

The construction of the earthen flood defence embankments is likely to comprise the following activities:

- Temporary works,
- Excavation for formation,
- Placing and compaction of suitable clay material, and
- Reinstatement of area, including grass seeding.

3.2.6 Drainage Works

The drains/ surface water sewers will be constructed by one of two methods as follows:

- Where the trench does not overlap with the footprint of the excavation for the flood wall, the trench of the drainage pipe will be set out. Where the trench is located in a road, the road will be saw cut. Where the trench is located in a grassed area, the topsoil will be removed and stored in close proximity to the trench. The trench will then be excavated to the required depth. Excavated material unsuitable for use as backfill material will be disposed of to an approved waste management facility. Pipe bedding will be placed, followed by the pipe and granular pipe surround. Trenches in roads will be backfilled with granular material or lean mix concrete, depending on its location in accordance with DDTS (2017) *Guidelines for Opening, Backfilling and Reinstatment of Openings in Public Roads* and Cork City Council (2010) *Directions for Management and Control of Roadworks in Cork City*. Trenches in grassed areas will be backfilled with suitable excavated material, following which the original topsoil will be replaced. The trench will be left to consolidate for approximately six months, following which the surface layer will be removed is necessary, the backfill material will be supplemented and the trench reinstated.
- Where the trench overlaps with the footprint of the excavation for the flood wall, the steps outlined above will be taken. The order of excavation, pipelaying, backfilling and reinstatement will depend on the sequence of construction of the retaining wall and the proximity of the proposed retaining wall to the pipe trench. The pipe may be laid and partially backfilling prior to pouring of concrete for the wall. Pipelaying may alternatively take place following pouring of the base of the wall or following construction of the wall.

3.2.7 Pumping Stations

The footprint of the pumping station will be set out. Where the proposed excavation is located in a paved area, the pavement will be saw cut. Where the proposed excavation is located in a grassed area, the topsoil will be removed and stored in close proximity to the excavation. The excavation will take place to

the required depth. Sheet piling will likely be required in order to facilitate construction of deep excavations in an urban area. Excavated material unsuitable for use as backfill material will be disposed of to an approved waste management facility. Lean mix concrete blinding will be placed, followed by formwork and steel fixing. Once concrete has been poured and has cured, the formwork will be stripped and the area outside the pumping station will be backfilled. Excavations in grassed areas will be backfilled with suitable excavated material, following which the original topsoil will be replaced. Excavations in paved areas will be backfilled with granular material and reinstated to their original condition. Mechanical and electrical fit out of pumping stations will take place following backfilling.

3.2.8 Other Instream Works

Other proposed works which will be carried out partially or wholly instream include:

- Local channel widening of the River Bride (referred to as a 'Winter Channel' on the scheme drawings in Appendix 3A);
- Construction of a sedimentation trap on the left bank of the River Bride;
- Construction of roughing screens and a new trash screen;
- Removal of existing trash screens on the River Bride (North) and Glen River;
- Removal of an existing sluice structure in the channel of the River Bride to the rear of the Dulux factory; and
- Fisheries enhancement measures will be provided at interference number C06 C02, downstream of McDonalds to the area adjacent to Blackpool Shopping Centre and will include 4 channel meanders with a low flow wetted area and stone deflectors and the provision of riparian zones including window boxes.

In general, these works will involve:

- Isolation of works area, and temporary works including silt barrages, flow diversions or over-pumping;
- Dismantling/ demolition and removal of the existing structure (in the case of sluice structure at Dulux and the screens on the River Glen and Bride North) and removal off site;
- Excavations;
- Blinding of formation (as required);
- Construction of sedimentation trap/ screen; following which
- The excavation will be backfilled, the area reinstated, flow redirected, and the works area reopened.

3.3 CONSTRUCTION PROGRAMME AND SEQUENCING OF PROPOSED WORKS

The construction works will be preceded by geotechnical investigations, which will consist of a mixture of shell and augur boreholes, cable percussive boreholes, rotary drilled boreholes, trial pits and slit trenches at the locations of the proposed structures. The construction works themselves will last approximately eighteen months and will be subject to the following programme constraints:

- Instream works (include preparatory work) on all watercourses supporting salmonids shall be undertaken from May to October (inclusive) and in consultation with Inland Fisheries Ireland to avoid accidental damage or siltation of spawning beds.
- To avoid impacting on bird nesting sites, the vegetation removal within the defined working area will not be carried out during the peak bird nesting season of March to August (inclusive) prior to the onset of works.
- Christmas non-working time is from the beginning of the second week of December to the end of the second week of January.

3.4 TEMPORARY CONSTRUCTION WORKS FACILITIES

The site compound will be located on a brownfield site in the immediate vicinity of the works. The selection of the compound will be by the Contractor appointed to construct the works in consultation with the Office of Public Works and the project ecologist. Due to the length of channel involved, it the Contractor may choose to move the compound during the construction period, in which case the same selection process shall apply. Site compounds will be bound by the mitigation measures identified within this EIAR.

3.5 ESTIMATED COST OF PROPOSED WORKS

The estimated cost of the River Bride (Blackpool) Certified Drainage Scheme is € 11M, excluding VAT, and Non-Contract Costs. The total project budget is currently estimated at € 18M, excluding VAT.

4. HUMAN BEINGS, POPULATION & HUMAN HEALTH

4.1 INTRODUCTION

This section of the Environmental Impact Assessment Report (EIAR) describes the potential impacts of the proposed development on human beings, population and human health and has been completed in accordance with the guidance set out by the Environmental Protection Agency (EPA) in 'Guidelines on Information to be contained in Environmental Impact Statements' (EPA, 2017).

One of the principle concerns in the development process is that people, as individuals or communities, should experience no diminution in their quality of life from the direct or indirect impacts arising from the construction and operation of a development. Ultimately, all the impacts of a development impinge on human beings, directly and indirectly, positively and negatively. The key issues examined in this section of the EIAR include population, employment and economic activity, land-use, residential amenity, community facilities and services, tourism, and health and safety.

Reference is also made, in this chapter, to nuisance impacts on human beings that are dealt with in other sections of this EIAR such as flooding from Chapter 7 - Hydrology and Hydrogeology; dust and noise from Chapter 8 - Air and Climate, Noise and Vibration; and traffic from Chapter 11 - Material Assets.

4.2 RECEIVING ENVIRONMENT

4.2.1 Methodology

The following sources of information and literature pertinent to the area were used in the preparation of this section:

- Central Statistics Office (CSO),
- Cork City Development Plan 2015 – 2021,
- North Blackpool Local Area Plan 2011 – 2019,
- Farranferris Local Area Plan 2009,
- Fáilte Ireland
- Local club websites

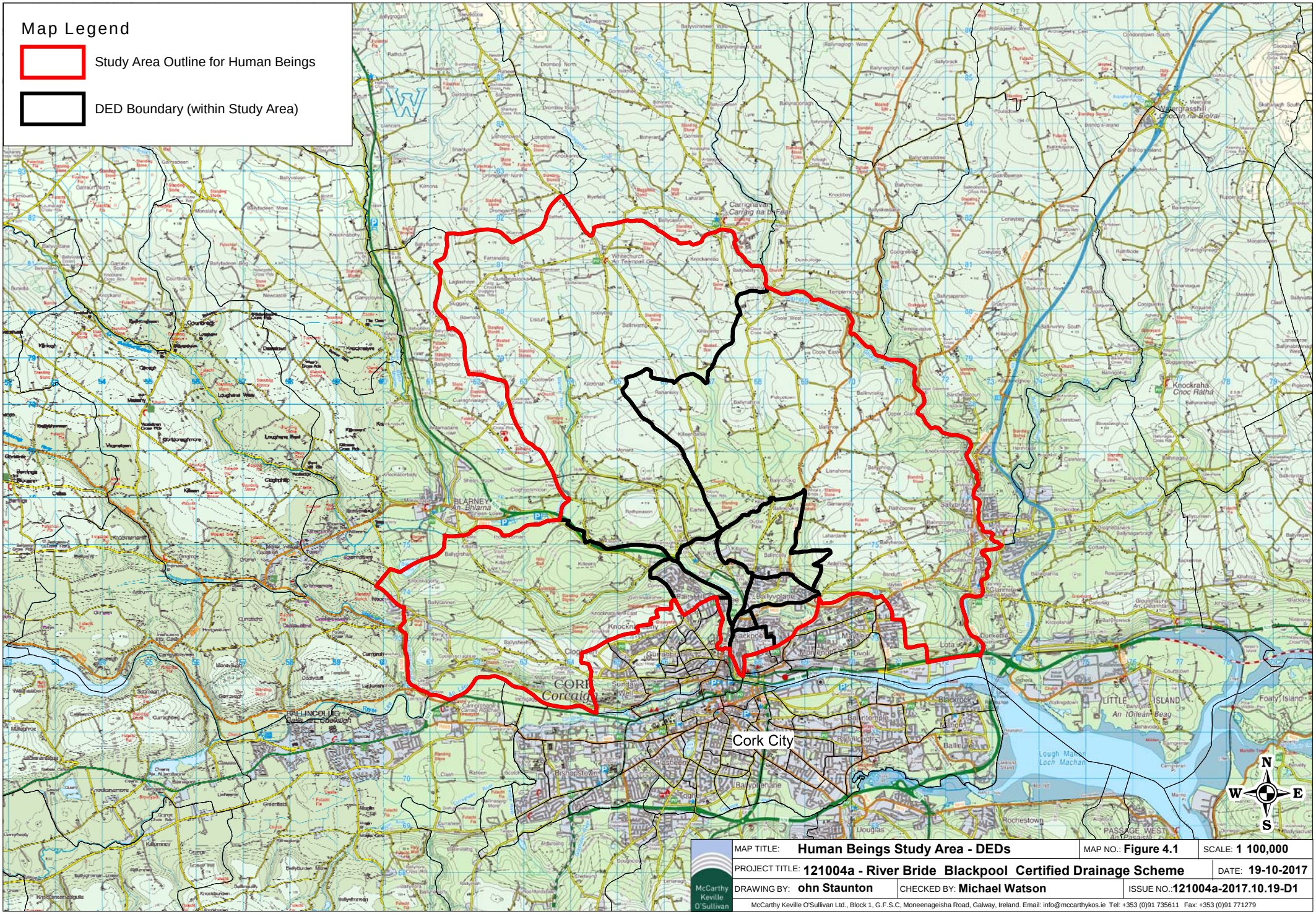
The study included an examination of the population and employment characteristics of the area. This information was sourced from the most recent census, the Census of Ireland 2017, the Census of Agriculture 2010 and from the CSO website, www.cso.ie. Census information is divided into State, Provincial, County, Major Town and District Electoral Division (DED) level.

4.3 HUMAN BEINGS IN THE EXISTING ENVIRONMENT

4.3.1 Study Area

Definition of Study Area

The Study Area for the purpose of the Environmental Impact Assessment (EIA) of the proposed Drainage Scheme consists of the entire catchment of the River Bride (and tributaries) upstream of Blackpool, as shown in Figure 1.1. However, in order to make inferences about the population and other statistics in the vicinity of the proposed development site, the Study Area for the Human Beings section of the EIA was defined in terms of the relevant District Electoral Divisions (DEDs). The Study Area for the EIAR lies within several



MAP TITLE: **Human Beings Study Area - DEDs**		MAP NO.: **Figure 4.1**	SCALE: **1 100,000**
PROJECT TITLE: **121004a - River Bride Blackpool Certified Drainage Scheme**			DATE: **19-10-2017**
DRAWING BY: **ohn Staunton**	CHECKED BY: **Michael Watson**	ISSUE NO.: **121004a-2017.10.19-D1**	

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DEDs, as shown in Figure 4.1. It has been decided to define the Study Area for the Human Beings Section of this EIAR as all those DEDs in which the EIAR Study Area is located. The site of the proposed development lies within the Commons, Fair Hill C, Farranferris A, The Glen A, The Glen B, Blackpool A, Blackpool B, Whitechurch and St. Marys DEDs, as shown in Figure 4.1, the latter two of which are outside the city environs. The total Study Area has a combined population of 24,195 persons, and comprises of a total land area of 53.63 square kilometers. (Source: CSO Census of the Population 2016).

4.3.2 Settlements and Planning Policy

The major settlement within the Study Area is Blackpool, though most of the study area is within the environs of Cork City. Blackpool is identified as a 'key centre' (or 'district centre') and as a 'gateway to the city' within the North Blackpool Local Area Plan (LAP). It is also identified in the LAP as an important employment location and as a 'second-tier retail centre'. The N20 National Primary Road runs through Blackpool from the city centre to the south, towards the northwest, out of the city. The Bride River flows southwards through the centre of Blackpool, with much of the river having been culverted incrementally.

Local area plans were completed for both Blackpool north and Farranferris, both of which are within the study area for the proposed drainage scheme. According to the Local Area Plan for Blackpool North, the main purpose of the plan for the area is as follows:

> '*The purpose of the plan is to set out an integrated land use, transportation and urban design framework to facilitate the sustainable redevelopment of the North Blackpool area, centred on a high quality public transport hub at the proposed Kilbarry/Blackpool commuter rail station.*'

According to the Local Area Plan for Farranferris, the plan aim for the area is as follows:

> '*To promote the social, economic, cultural and physical development of the plan area and create an integrated, vibrant and sustainable living, working and recreational environment.*'

In the period 2011 – 2016 the Cork City Electoral Area population increased from 119,230 to 125,657; an increase of 5.4%. In the same period, the Blackpool District Electoral Divisions (Blackpool A and Blackpool B), experienced positive population growth of 15.5% (from 2,490 2,875 persons).

Overall, the Cork Area Strategic Plan Update (2006 to 2020) proposes an increase in the population of Cork City of 25% (to 150,000 persons) by 2020 from the 2006 population of 119,418. The northeast and northwest of the city have a proposed increase of population by 11% (to 54,302 persons by 2020).

Several areas have been zoned for residential (in addition to local services, institutional uses and civic uses) development in the LAP for North Blackpool. These include the areas north of the Mallow road and east of the Redforge road, Spring Lane, Dublin Street, Dublin Hill and the upper areas on Commons Ridge. The use of this residential zoning means that the problem of local population decline can be addressed.

4.3.3 Population

Population Trends

In the years between the 2006 and the 2011 Censes, the population of Ireland increased by 8.2 per cent, further increasing by 3.8% between 2011 and 2016. Between 2006 and 2011, the population of County Cork grew by 11.4% to 399,802 persons while Cork City decreased 0.2% to 119,230. Between 2011 and 2016, the population of County Cork grew by 4.4% to 417,211 persons while Cork City increased 5.4% to 125,657. Other population statistics for the State, Cork and the Study Area have been obtained from the Central Statistics Office (CSO) and are presented in Table 4.1.

Table 4.1 Population 2006 – 2016 (Source: CSO)

Area	Population			% Population Change	
	2006	2011	2016	2006-2011	2011-2016
State	4,239,848	4,588,252	4,761,865	8.2%	3.8%
County Cork	361,877	399,802	417,211	10.1%	4.4%
Cork City	119,418	119,230	125,657	-0.2%	5.4%
Study Area	21,968	23,002	27,070	4.7%	6.2%

The data presented in Table 4.1 shows that the population of the Study Area increased by 4.7% between 2006 and 2011, and increased again by a further 6.2% between 2011 and 2016. This rate of population growth is lower than that recorded at State and County level during 2006-2011 and higher than State and County level for the period 2011-2016. When the population data is examined in closer detail, it shows that the rate of population increase within the Study Area has been unevenly spread through the District Electoral Divisions (DEDs). The highest rate of population increase between 2011 and 2016 occurred within Blackpool B DED, which experienced a 19.6% population increase. In comparison, the population of the Fairhill C DED decreased by 2.8% during the same time period.

Of the DEDs that make up the Study Area for the purposes of this assessment, the highest population was recorded in St. Marys DED, with 5,538 persons recorded during the 2016 Census. The lowest population was recorded in Blackpool A DED, with 690 persons recorded during the 2016 Census.

Population Density

The population densities recorded within the State, County Cork and the Study Area during the 2016 Census are shown in Table 4.2.

Table 4.2 Population Density in 2016 (Source: CSO)

Area	Population Density(Persons per square kilometre)
State	69.6
County Cork	57.1
Cork City	3244.4
Study Area	451.2

The population density of the Study Area recorded during the 2016 Census was 451.2 persons per square kilometre. This figure is significantly higher than the national and county population densities of 69.6 persons per square kilometer and 57.1 persons per square kilometre respectively. It is also significantly lower than the population density of Cork City, which is 3244.4 persons per square kilometre, though this is likely a result of the inclusion of two county DEDs, Whitechurch and St. Marys, in the Study Area.

Similar to the trends observed in population, the population density recorded across the Study Area varies between DEDs. Whitechurch DED has the lowest population density, at 100.3 persons per square kilometre, while Fannferris A DED has the highest population density, at 8,176 persons per square kilometre.

Household Statistics

The number of households and average household size recorded within the State, County Cork and the Study Area during the 2011 and 2016 Censuses are shown in Table 4.3.

Table 4.3 Number of Households and Average Household Size 2011 - 2016 (Source: CSO)

Area	2011		2016	
	No. of House-holds	Avg. Size (persons)	No. of House-holds	Avg. Size (persons)
State	1,654,208	2.8	1,697,665	2.8
County Cork	172,042	2.32	158,090	2.64
Cork City	55,633	2.14	51,468	2.44
Study Area	9,183	2.17	8,771	2.67

In general, the figures in Table 4.3 show that while the number of households at State, County, City and Study Area level has increased, the average number of people per household has remained steady at state level and increased slightly at other levels, i.e. there are more households and slightly more people per house. Average household size recorded within the Study Area during the 2011 and 2016 Censuses is in line with that observed at State and County level during the same time periods.

Age Structure

Table 4.4 presents the percentages of the State, County Cork and Study Area population within different age groups as defined by the Central Statistics Office during the 2016 Census. This data is also displayed in Figure 4.2.

Table 4.4 Population per Age Category in 2016 (Source: CSO)

Area	Age Category				
	0 - 14	15 – 24	25 - 44	45 - 64	65 +
State	21.1%	12.1%	29.5%	23.8%	13.4%
County Cork	22.9%	11.2%	28.4%	24.6%	13.0%
Cork City	14.3%	16.4%	31.3%	22.3%	15.7%
Study Area	20.4%	13.3%	30.7%	23.6%	12.0%

The proportion of the Study Area population within each age category is similar to those recorded at national, County and City level. The most significant difference occurs where only 12% of the population within the study area falls into the 65+ age category, this may indicate the movement of younger age groups into the area for employment. Within the Study Area, the highest population percentage occurs within the 25-44 age category.

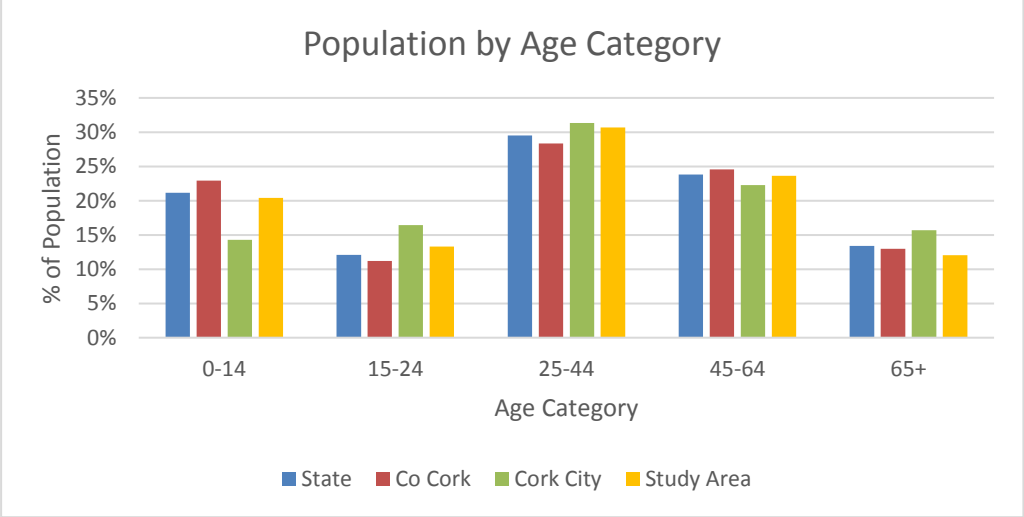

Figure 4.2 Population per Age Category in 2016 (Source: CSO)

4.3.4 Employment and Economic Activity

Sources of Employment

Blackpool is located in the north side of Cork City, which is the second largest city in the state, and is the designated gateway city of the south-west region. This proximity to an employment centre therefore influences the employment opportunities available to inhabitants of Blackpool and surrounding areas. The primary types of employment provided in Blackpool are service and office-based employment, in addition to employment generated by manufacturing industries.

The 2016 census also provided information about the journey time to work, school or college where applicable.

Within the 9 ED Study Area, 66.0% of respondents have a journey time of less than 30 minutes to their work or education, which indicates that the majority of employment and educational facilities are located relatively close by. The 2016 Census data for the EDs in the Study Area shows that the industries which employ the greatest percentage of persons are 'Other' (26.9%), Commerce and Trade (20.8%) and Professional Services (18.2%). A greater percentage of females are employed in the professional services and 'Other' industries; with a larger proportion of males employed in the Manufacturing and Building and Construction Industries.

Proposed Employment

It is estimated that the proposed River Bride (Blackpool) certified drainage scheme will provide employment during the construction phase, which is expected to be approximately 18 months in duration. It is likely that at least some prospective employees will be sourced from the local area, therefore benefitting the local economy and skill base to some extent. There will also be indirect employment during the construction phase of the proposed development such as hauliers and waste contractors among others.

Economic Status of the Study Area

The labour force consists of those who are able to work, i.e. those who are aged 15+, out of full-time education and not performing duties that prevent them from working. In 2016, there were 2,304,037 persons in the labor force in Ireland. Table 4.5 shows the percentage of the total population aged 15+ who were in the labor force during the 2016 Census. This figure is further broken down into the

percentages that were at work, seeking first time employment or unemployed. It also shows the percentage of the total population aged 15+ who were *not* in the labor force, i.e. those who were students, retired, unable to work or performing home duties.

Table 4.5 Economic Status of the Total Population Aged 15+ in 2016 (Source: CSO)

	Status	State	County Cork	Cork City	Study Area
% of population aged 15+ who are in the labor force		61.4%	61.6%	65.1%	**58.8%**
% of which are:	At work	87.1%	90.8%	85.0%	82.9%
	First time job seeker	1.4%	9.9%	1.5%	1.5%
	Unemployed	11.5%	8.3%	13.5%	15.6%
% of population aged 15+ who are not in the labour force		38.6%	38.4%	34.9%	**41.2%**
% of which are:	Student	29.4%	29.1%	51.3%	26.3%
	Home duties	21.1%	22.7%	23.9%	21.6%
	Retired	37.6%	36.9%	53.3%	31.3%
	Unable to work	10.9%	10.5%	21.0%	18.3%
	Other	1.0%	0.8%	1.8%	2.5%

Overall, the principal economic status of those living in the Study Area is similar to that recorded at national, County and City level. The main difference is the 31.3% in the 'Retired' category. This is in line with the low population percentage found within the 65+ age group.

Employment by Socio-Economic Group

Socio-economic grouping divides the population into categories depending on the level of skill or educational attainment required. The 'Higher Professional' category includes scientists, engineers, solicitors, town planners and psychologists. The 'Lower Professional' category includes teachers, lab technicians, nurses, journalists, actors and driving instructors. Skilled occupations are divided into manual skilled, such as bricklayers and building contractors; semi-skilled, e.g. roofers and gardeners; and unskilled, which includes construction labourers, refuse collectors and window cleaners. Figure 4.3 shows the percentages of those employed in each socio-economic group in the State, County Cork, Cork City and the Study Area during 2016.

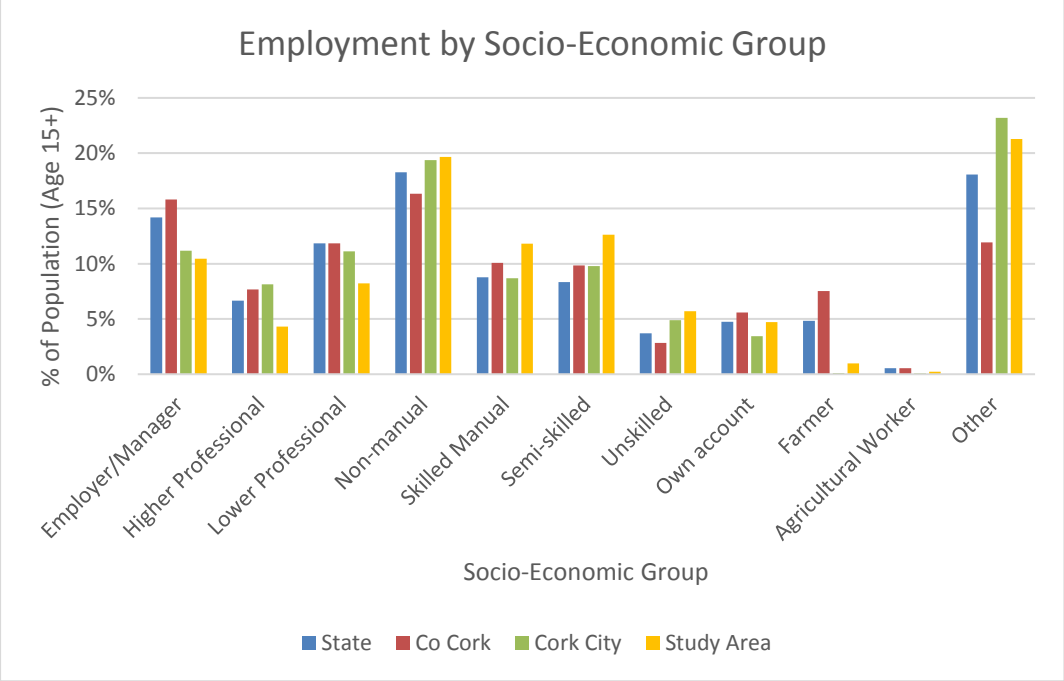

Figure 4.3 Employment by Socio-Economic Group in 2016 Source CSO

The highest level of employment within the Study Area was recorded in the Other category. Approximately 21.3% of those employed within the Study Area form part of this category, in line with the 23.2% of the City population and 18.1% of the national population, though much higher than the 11.9% of the County population. After Other, the next highest levels of employment within the Study Area are in the Non-manual and Semi-skilled categories. The categories in which the lowest percentage of the Study Area population was recorded are Agricultural Worker (0.2% of the Study Area population) and Farmer (1.0% of Study Area population).

The CSO figures for socio-economic grouping have a limitation of including the entire population, rather than just those who are in the labour force. It is likely that this is what gives rise to the high proportion of the population shown to be in the "Other" category in Figure 4.3.

4.3.5 Land-use

Results for the agricultural census are only available for the DEDs located in County Cork. Those within the City environs are excluded to retain the anonymity of landowners. Therefore, the following information relates only to Whitechurch DED and St. Marys DED, both outside the city. The total area of farmland within the Study Area for the Human Beings assessment measures approximately 3,874 hectares or 74.6% of the DEDs from which the data is taken (or 71.4% of the total Study Area including all 9 DEDs), according to the CSO Census of Agriculture 2010. There are 75 farms located within the Study Area (DEDs from which data is taken), with an average farm size of 69.1 hectares. This is slightly larger than the 40.98-hectare average farm size for County Cork. Within the Study Area (DEDs from which data is taken), farming employs 188 people, and the majority of farms are family-owned and run. Table 4.6 shows the breakdown of farmed lands within the Study Area. Pasture accounts for the largest proportion of farmland, followed by silage.

Table 4.6 Farm Size and Classification within the Study Area in 2010 (Source: CSO). Note that 'Study Area' here refers to the Whitechurch and St. Marys DEDs only, as data was not available for DEDs within the city

Characteristic	Value
Size of Study Area	5,180 hectares
Total Area Farmed within Study Area	3,874 hectares
Farmland as % of Study Area	86.7%
Breakdown of Farmed Land	Area (hectares)
Total Pasture	1,883 ha
Total Silage	1,176 ha
Rough Grazing	97 ha
Total Hay	115 ha
Total Potatoes	0 ha
Total Cereals	391 ha
Total Crops	530 ha

4.3.6 Services

The proposed development site is located within the functional area of the North Blackpool Local Area Plan (LAP), 2011 2019 and the Farranferris Local Area Plan 2009. The proposed development site is predominantlypart of the greater Cork City, and the area is described in the North Blackpool LAP as the traditional economic/industrial heart of Cork City's northside.

4.3.7 Education

There are several National Schools located near the proposed development works site including one located approximately 300 metres to the south (in south Blackpool), two located approximately 400 metres to the southwest, one located approximately 500 metres to the east and one located approximately 600 metres west of the proposed development site. The nearest secondary schools are located approximately 400 metres to the southwest and 600 metres to the southeast of the proposed development site.

4.3.8 Access and Public Transport

The proposed development site is accessed via local roads off the N20 National Road, which travels in a general northwest-southeast direction through the proposed development site. The R635 links with the N20 National Route, adjacent to east of the site. The N20 runs in a north-south direction approximately 8km east of the proposed development site. There are several other national roads within a ten-kilometre radius of the site, including the N22, N71, N27, N28, N40, N8 and the M8 Motorway. These generally run from the city centre outwards, with all but the N8 and M8 being on the southern side of the city.

The site of the proposed development is served by public transport. The nearest train station to the proposed development site is Kent Station, located in Cork City Centre, located approximately 1.4 kilometres southeast of the site. Local city bus services operate through the city, including the Blackpool area. From the main bus station, located approximately 900 metres southeast of the site, there are Bus Eireann connections to a significant number of destinations including Dublin, Limerick and Waterford. Cork Airport is located approximately 6.5 kilometres south of the proposed development site.

4.3.9 Amenities and Community Facilities

There are numerous amenities and community facilities, including GAA and other sports clubs, youth clubs and recreational areas available in the Blackpool area and throughout the wider northside of Cork City. There is an artificial sports field located adjacent to the Blackpool Community centre. Glen Rovers GAA club is located to the east of the proposed development site. This has been one of the most successful clubs in Cork, and is a main focal point in the community.

There is a Foroige youth club located in the Blackpool Retail Park. The Glen Amateur Boxing Club is also located in the Blackpool area. Also, nearby are other sporting facilities and groups, including martial arts and soccer clubs.

Retail and personal services within the vicinity are provided in Blackpool, which has a shopping centre adjacent to the proposed development site, in addition to nearby retail park and industrial estates. Blackpool also enjoys some community facilities in the form of public houses, community centres, shops, post offices and Churches.

4.3.10 Tourism

Tourist Numbers and Revenue

Tourism is one of the major contributors to the national economy and is a significant source of full time and seasonal employment. During 2016 (the latest year for which annual Fáilte Ireland figures are available, total tourism revenue generated in Ireland was approximately €8.3 billion, an increase of approximately 8.1% from the previous year. Overseas tourist visits to Ireland in 2016 grew by 8.8% to 8.7 million ('Tourism Facts 2016', Fáilte Ireland, August 2017).

Ireland is divided into seven eight tourism regions. Table 4.7 shows the total revenue and breakdown of overseas tourist numbers to each region in Ireland during 2016 ('Tourism Facts 2016', Fáilte Ireland, August 2017). Figure 4.4 illustrates the total number of tourists per region in 2016.

Table 4.7 Overseas Tourists Revenue and Numbers 2016 (Source: Fáilte Ireland)

Region	Total Revenue (€m)	Total Number of Overseas Tourists (000s)
Dublin	€1,975 m	5,687
Mid-East	€251 m	626
Midlands	€72 m	226
South-East	€273 m	946
South-West	€849 m	2,079
Mid-West	€390 m	1,215
West	€543 m	1,675
Border	€286 m	815
Total	€4,639 m	13,269

The South-West region, in which the site of the proposed development is located, comprises County Cork and County Kerry. This Region benefited from approximately 17% of the total number of overseas tourists to the country and approximately 19% of the total tourism income generated in Ireland in 2015. Table 4.8 shows the breakdown of overseas tourist numbers to the South West Region during 2015 (the most recent data available at the time of writing) and the associated revenue generated ('*Regional*

Tourism Performance in 2015', Fáilte Ireland, October 2016). The regional data shows that County Cork had the highest tourism revenue and the highest number of overseas tourists within the Region during 2015.

Table 4.8 Overseas Tourism to South-West Region during 2015 (Source: Fáilte Ireland)

County	Revenue Generated by Overseas Tourists (€m)	No. of Overseas Tourists (000s)
Cork	558	1,449
Kerry	234	1,026

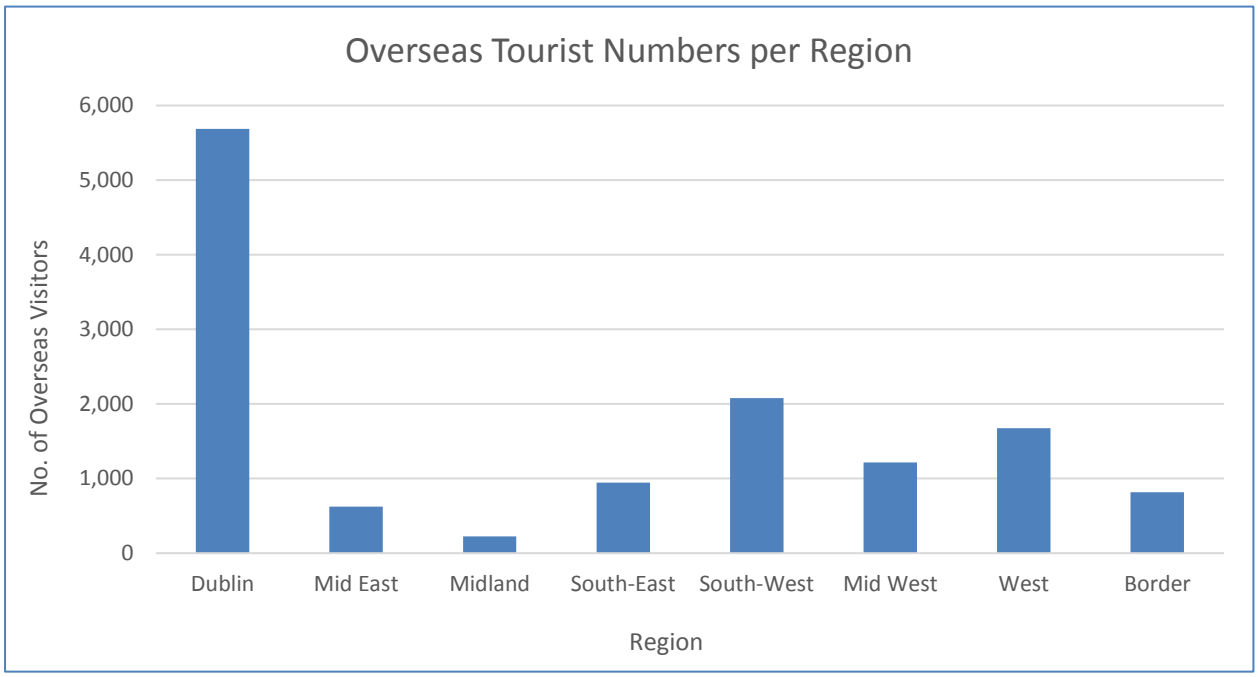

Figure 4.4 Total Overseas Tourists per Region in 2016 (Source: Fáilte Ireland)

Figure 4.5 provides Fáilte Ireland figures showing the type of activities that domestic tourists engaged in during 2016 throughout Ireland. From these figures it can be seen that hiking/walking visits form the majority of all activities enjoyed followed by visits to houses and castles. Activities with the least interest include angling and attending horse racing.

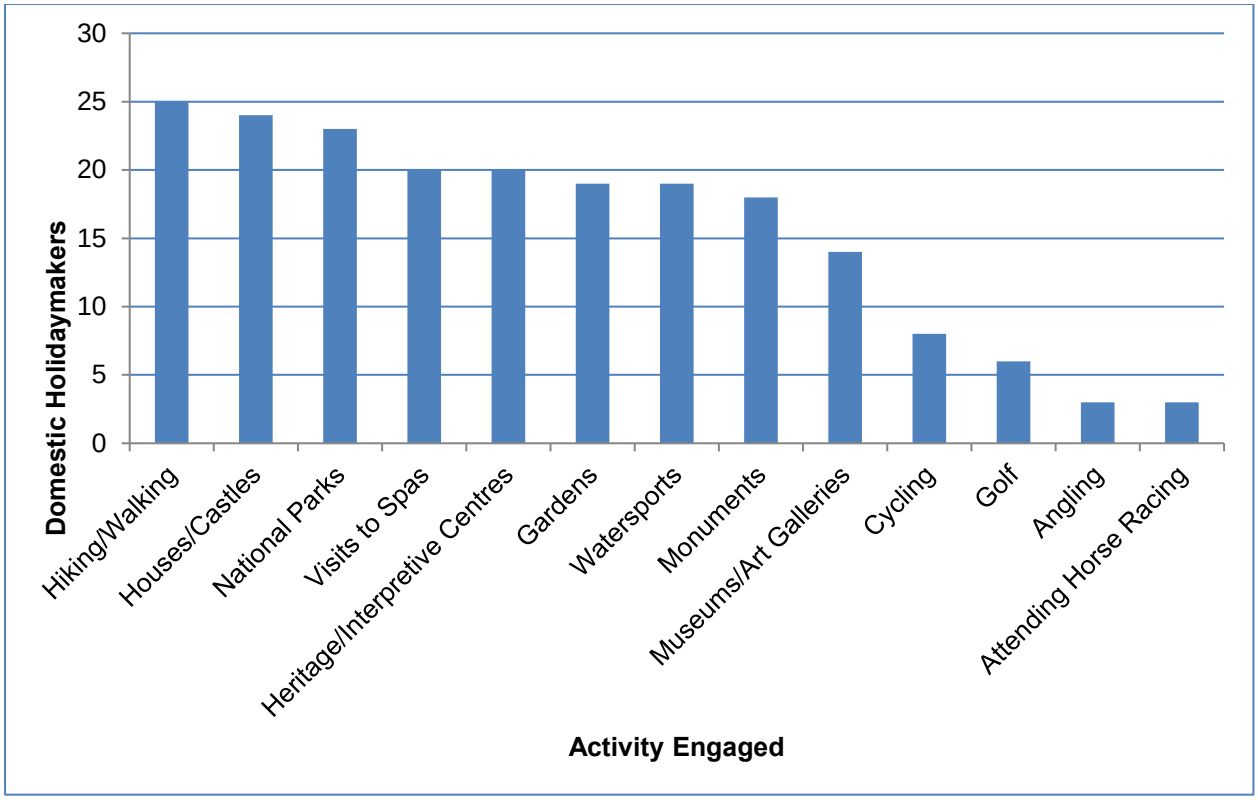

Figure 4.5 Activities undertaken by domestic visitors in Ireland in 2016 (Source: Fáilte Ireland)

Tourist Attractions

The Cork City and County Archive is located adjacent to the proposed development area, which lies on the northern side of Cork City. This contains an extensive archive of various documents relating to all aspects of Cork History. The Cathederal of St. Mary and St. Anne is located just to the south of the proposed development. Known locally as the North Cathederal, it was opened in 1808, with a church on the site since the 1730s. The nearest tourist information centre to the proposed development site is in Cork city centre, located approximately one kilometre south of the site. Tourist attractions within Cork city centre include Crawford Art Gallery, Tigh Fili Gallery, Elizabeth Fort and Red Abbey along with many more listed on the Discover Ireland website. Within the greater area of Cork City golf, horse riding, cycling and angling are available.

The most recent report on Angling tourism in Ireland found that €121 million was spent by the 150,000 angling visitors to the country in 2012. Sections of the river Bride and River Lee further upstream of Cork City are used for angling, particularly the River Lee.

4.3.11 Human Health and Safety

There has been an extensive history of flooding in the Blackpool area of Cork City in recent years. Prior to the early 2000s, the primary source of flood risk came from the Glen River, while after this time main source of flood risk has been the River Bride. Figure 2.4 in Chapter 2 of this EIAR summarises the recent flood history and illustrates the flood risk of both watercourses. Figure 2.4 also shows the dates of culvert construction works as part of what was known as the Glen-Bride-Kiln (GBK) River Improvement Scheme. This work appears to have alleviated the flooding on the River Glen. Appendix 2A shows the existing flood extents in the Blackpool area.