OPW
Oifig na nOibreacha Poiblí
Office of Public Works

River Bride (Blackpool) Certified Drainage Scheme

Environmental Impact Assessment Report Addendum

Non-Technical Summary

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NON-TECHNICAL SUMMARY

This non-technical summary forms an Addendum to the non-technical summary presented with the Environmental Impact Assessment Report (EIAR) for the River Bride (Blackpool) Certified Drainage Scheme. The EIAR Addendum provides additional information in response to the request for supplementary information issued by the Department of Public Expenditure and Reform on 07th May 2020.

Unless otherwise specified, any text provided below supersedes the text provided in the original non-technical summary. Text from the original non-technical summary is shown in grey for ease of reference.

Introduction to the River Bride (Blackpool) Certified Drainage Scheme

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). 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.

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.

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 (Figure 1). 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.

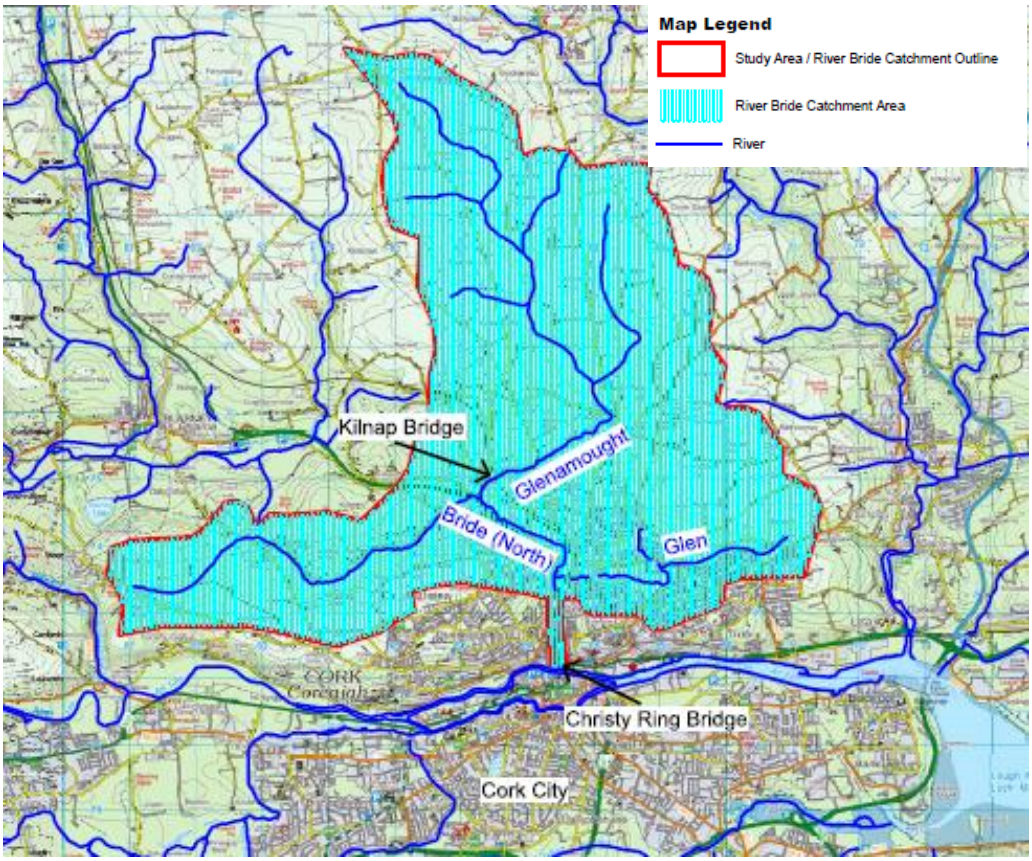

Figure 1 Study Area / Catchment Location

Scheme Background

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 and 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. 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. 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.

Figure 2 River Bride and Glenamought Rivers

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. 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. 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.

The following steps have been completed in the design and assessment process:

- Constraints Study;
- Hydrology Study;
- Hydraulic Modelling;
- Site Investigation;
- Flood Risk Assessments;
- Selection of Preferred Option;
- Appropriate Assessment Screening;
- Cost Benefit Analyses; and
- Environmental Impact 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 (Option 4: Conveyance improvements and direct defences (with culvert through Orchard Court)) was then identified following discussion with the OPW and steering group. 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. 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.

Description of the Scheme

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, and
- Regular maintenance of the river channel and pumping stations.
- Local stonework repairs within an existing masonry arch culvert (Brewery Branch culvert)
- Utility diversions.

The scheme will include construction of new flood walls/ earthen embankments as follows:

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)

Location of Defence	Flood Defence Type	Height of Defence (m)
"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)
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).

Location of Defence	Flood Defence Type	Height of Defence (m)
		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 Centre.	Repair and/or reconstruct existing river wall to flood defence level (49m)	1.53m above existing ground levels (varies)

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 twenty nine months and will be subject to the following programme constraints:

- Instream works (include preparatory work) on all watercourses supporting salmonids shall be undertaken from April 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 September (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.

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.

Human Beings, Population & Human Health

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. The total Study Area has a combined population of 24,195 persons and comprises of a total land area of 53.63 square kilometres. The major settlement within the Study Area is Blackpool, though most of the study area is within the environs of Cork City.

If the proposed development were not to proceed, the opportunity to protect Blackpool and surrounding areas in Cork City from future flooding events would be lost. The construction phase of the proposed development will last approximately 18 months. Potential impacts from the project are both positive and negative, and range both from short term to long term and from insignificant to slight.

A total of 29.6 hectares of land will be safeguarded from flood risk as a result of the proposed scheme. The proposed scheme will also safeguard a total of 293 properties from the risk of flooding, with that number comprising 206 residential properties and 87 non-residential properties. The non-residential

properties include significant employers and properties providing essential services to the community. The overall effect of the protection of these properties is considered to be long-term and significantly positive.

A detailed cost-benefit assessment was undertaken for the proposed scheme, which quantified the cost of the flood damage that would be avoided because of the proposed development in terms of tangible and intangible damages. The cost-benefit assessment includes a cost estimate, benefit assessment and cost benefit analysis, and concluded that the cost benefit ratio of the scheme is greater than 1 in all test scenarios. The proposed scheme would result in a €25.18m benefit for a €18.37m cost in a baseline scenario with a 4% discount rate. The proposed scheme will provide a long-term significant positive impact in this regard.

Many construction workers and materials will be sourced locally, thereby helping to sustain employment in the construction trade, and an increase in household spending and demand for goods and services in the local area. There will also be an influx of skilled people into the area, bringing specialist skills for both the construction and operational phases that could result in the transfer of these skills into the local workforce, thereby having a long-term positive impact on the local skills base. There is also the potential for short term moderate negative impact on economic activity due to the proposed construction activities. This would predominantly be as a result of traffic and access issues which could have the potential to reduce footfall into local businesses, with noise and dust from the works adding to this impact on local businesses. Angling does not form a significant part of the industry in Blackpool, and any impacts the proposed works will have on tourism will be imperceptible. Potential increases in noise and dust levels, traffic issues and temporary impacts on visual amenity related to the works are likely to deter and/or disturb visitors during the construction phase.

A traffic management plan (such as rolling traffic management) will be prepared and implemented for the duration of the works in order to ensure that any impacts on traffic mobility are minimised. This will also result in a minimised potential impact on local businesses, as traffic management will only implement restrictions to local businesses only when necessary and only for the shortest possible time. In addition, works will be limited to normal working hours, and will account for peak business periods, such as the Christmas shopping period. Therefore, the residual impacts will be short term and slight.

There will be an increase in noise levels in the vicinity of the proposed development site during the construction phase, as a result of machinery and construction work. These impacts will be short-term in duration on any particular day and temporary (for the duration of the construction phase). Construction noise at any given noise sensitive location will be variable throughout the construction project, depending on the activities underway and the distance from the main construction activities to the receiving properties. Best practice measures for noise control will be adhered to onsite during the construction phase of the proposed development in order to mitigate the slight short-term negative impact associated with this phase of the development. Impacts on each service will vary, but overall the proposed drainage scheme will have a short-term moderate negative impact on services.

Flora and Fauna

The location of the proposed works is in a largely urbanised area. The upper reaches of the Bride (north), close to its confluence with the Glenamought River and within the vicinity of North Point Business Park are the least urbanised sections of the river. This section of the river is short and features a riparian zone

containing Scrub (WS1), open grassy areas categorised as Dry meadow and grassy verge (GS2), amenity grassland (GA2), improved agricultural grassland (GA1), hedgerow (WL1) and buildings and artificial surfaces (BL3) and Mature treelines (WL2).

Downstream of Commons Inn, the river flows through a series of operational and derelict industrial areas and is typically retained by flood walls. Riparian species here are more typical of waste ground. Further downstream habitats adjacent to the Bride (north) within the works area include recreational parkland including scattered trees and amenity grassland categorised as scattered trees and parkland (WD5).

The Glenamought River is a less modified river than the Bride (North), flowing through rural areas for much of its length. The river downstream of the Glenamought viaduct flows through an area of mixed broadleaved woodland (WD1), amenity grassland (GA2) and built land (BL3).

Small localised stands of *Ranunculus* sp. with very low cover, *Fontanalis* moss with low cover and *Calitriche* sp. with low cover were recorded as present on the River Bride and the Glenamought River. While these examples of Floating River Vegetation habitat exist, the percentage cover is low and therefore they are not considered good examples of the habitat. Within the Bride (north) and Glenamought rivers the Floating River Vegetation was not of Annex I habitat quality given the extent of fragmentation.

Japanese knotweed and giant rhubarb, were recorded in the works area for the Blackpool, Japanese knotweed is common along the Bride (north) and Glenamought river channel.

A low diversity and abundance of fish species was recorded from the study area. River Lamprey were recorded in low numbers in both the Bride River (North) and The Glenamought River. Brown Trout was the most frequently recorded species throughout the Bride (north) and in the Glenamought River this species is abundant. European eel was recorded in the Bride (north) in low numbers.

The river and surrounding vegetation provide Otter and Kingfisher foraging habitat. Kingfisher was recorded on the Glenamought River, whereas Otter was recorded along the Bride (north).

A survey of habitat features along the river included potential roost sites for bats, namely (mature) trees, and structures such as walls, bridges and buildings. Some of the old stone bridges to be demolished and replaced as necessitated by the scheme were found to have moderate potential suitability. A maternity bat roost of Soprano Pipistrelle was discovered near a wooded section of the Glenamought River. All bat species are protected under Annex IV of the EU Habitats Directive and some are likely to use the area for foraging.

The impact of the works on habitats, flora and fauna is considered slight for most species. However, the impact on aquatic species and their habitat namely brown trout, lamprey and eel is significant due to the permanent loss of instream habitat as a result of culverting, sediment trap and maintenance regiments. There will be a potential impact on mammals and birds as a result of the proposal and during the construction phase in particular otter, bats and birds. Impact on otters is considered very significant as the culverting of an extensive length of river potentially results in loss of foraging habitat and increased severance between the Bride and the River Lee. Impact on bats is also considered significant due to the removal of trees to facilitate culverting that will permanently reduce habitat connectivity for bats locally.

Mitigation measures will minimise the impact on fisheries from the construction phase, however the permanent loss of habitat cannot be mitigated in the context of this assessment. Compensatory measures will be carried out in agreement with IFI with regard to salmonid habitat. However, impact on Fisheries within the Bride (North) catchment remains a Permanent Significant Negative Impact.

With mitigation measures in place there is no significant risk to birds, or mammal populations (excluding otters and bats within the study area). Loss of foraging habitat and prey species will result in some loss of terrestrial species using the area. During construction, there will be temporary disturbance to dipper and grey wagtail nesting habitat where they currently use culverts/bridges and seasonal restrictions to the works may apply. In the long term, the impact is considered moderate.

However, there is a significant level of otter activity within the study area. Therefore, there is potential for loss of foraging habitat for otter. The introduction of a new culvert at Blackpool has the potential to result in increased risk of severance of this species from the River Lee and the River Bride (although it is considered that the two-populations identified on the Bride may not cross over). This extension of culverted river may result in reduced success of otters in an already urbanised system. Mitigation in the form of artificial holts, ledges and fisheries enhancement will minimise as much as possible the impact on otters. The residual impact on Otters and bats, in particular Soprano Pipistrelle is considered Significant.

An Invasive Species Management Plan has been put in place by the OPW for the Rivers Bride and Glenamought in Blackpool which outlines the strategy that will be adopted during the construction and operation of the Scheme and taking into consideration the ongoing treatment of the site in order to prevent the spread of invasive species.

A Natura Impact Statement under Article 6(3) of the EU Habitats Directive has been completed. The following summarises the information from the Natura Impact Statement. The nearest Natura 2000 sites (cSAC's or SPA's) are:

- Great Island Channel SAC (Site Code:004219)
- Cork Harbour SPA (Site Code 004030)

Cork Harbour SPA is located >5km downstream of the works area. The SPA site comprises most of the main intertidal areas of Cork Harbour designated for its overwinter bird species which occur there. Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl, for which it is amongst the top five sites in the country.

The Great Island Channel SAC is located >10km downstream of the works area. It stretches from Little Island to Middleton, with its southern boundary being formed by Great Island. The site is a Special Area of Conservation (SAC) selected for Tidal Mudflats and Sandflats and Atlantic Salt Meadows.

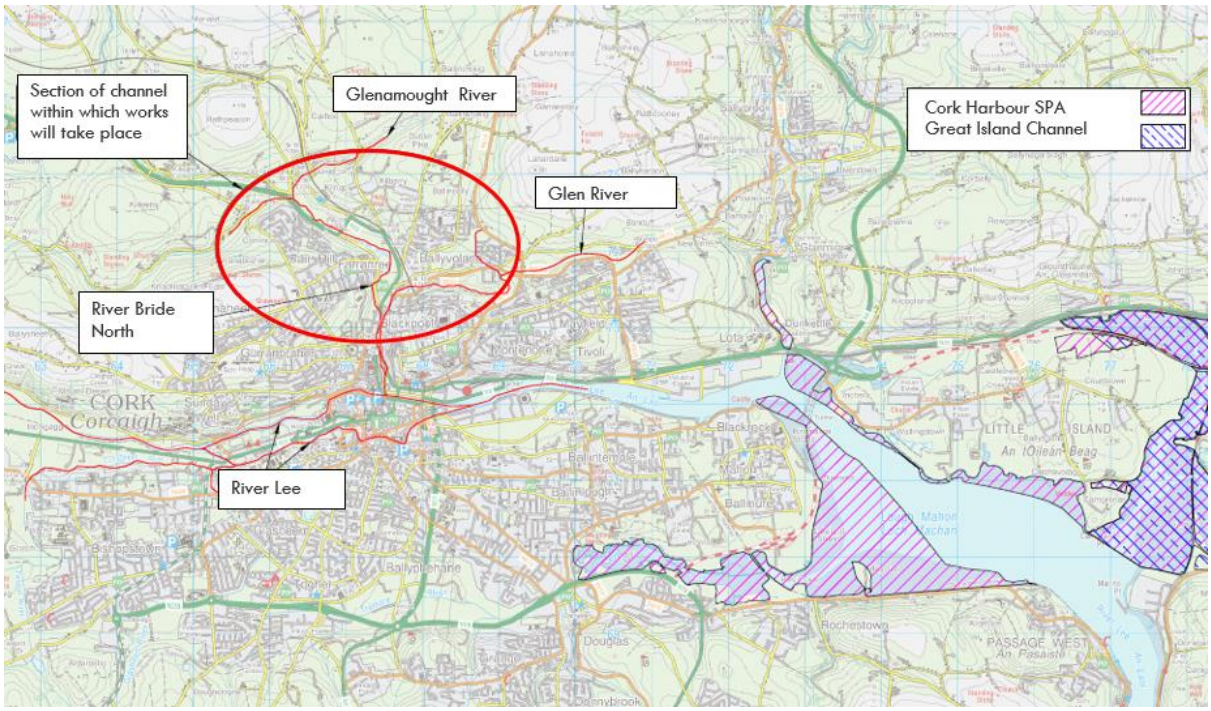

Figure 3 European Sites in proximity to the proposed Scheme

The Natura Impact Statement concluded, in view of best scientific knowledge and on the basis of objective information, that the proposed Scheme, either on its own or in combination with other plans and projects and given adherence to best practice guidelines and implementation of the mitigation measures proposed, would not give rise to any direct or indirect significant adverse effects on any European Site designated for nature conservation.

Soils and Geology

Work carried out to date on the project has included a preliminary ground investigation which consisted of boreholes, trial pits and slit trench excavations spread throughout the Study Area.

The majority of the Study Area is underlain by Devonian "Old Red Sandstone" rocks which comprises the Ballytrasna Formation purple mudstone and sandstone and Gyleen Formation sandstone with mudstone and siltstone. A portion of the Study Area to the north of Blackpool is underlain by Old Head Sandstone Formation which comprises flaser-bedded sandstone and minor mudstone. Another portion of the study area to the south is underlain by Cuskinny Member which comprises flaser-bedded sandstone and mudstone. The bedrock in the Study Area is primarily overlain by made ground, till derived from mixed Devonian sandstones, and alluvium.

There are no active quarries within the Study Area. The findings of the ground investigation, which was carried throughout the proposed Study Area are broadly in line with the bedrock as described above. Bedrock encountered in rotary core boreholes in the study area comprised purple/brown Mudstone and purple Siltstone and Sandstone with quartz veining.

The works will involve excavation of approximately 14,935 m^3, however the permanent impacts on the above soils and geology are considered imperceptible.

Water, Hydrology and Hydrogeology

The study area encompasses three major water courses: The Bride (North), the Glenamought and the Glen. The total catchment area upstream of Blackpool Village is c40km^2.

The Bride (North) rises in the townland of Ballycannon, near Healy's Bridge, before flowing in an easterly direction towards Cork City. It is the most easterly tributary of the River Lee joining it east of Ovens. The Glenamought River rises in Whitechurch and flows in a southerly direction before making an abrupt right-turn in the townland of Ballincrokig. The Bride (North) and the Glenamought meet each other in a culverted system at the North Point Business Park on the N20. The Glen River flows in a westerly direction from Mayfield, through the Glen River Park, before entering a culvert under Spring Lane. It then merges with the Bride (North) in a large culvert junction under Madden's Buildings, 100m downstream of Blackpool Church. Downstream of the confluence of the Bride (North) and the Glen, the watercourse has traditionally been known as the Kiln River. The Kiln River discharges to the River Lee at Christy Ring Bridge.

Surface water quality at sites on the River Bride (North) were indicative of Q3-4 moderate status, slightly polluted water. However, the Glenamought River is rated as Q4 unpolluted, good status water quality. Impact on water quality will be limited to the construction phase and short term in nature. With proper mitigation in place for the protection of watercourse during construction this impact will be minimal.

The Study Area is underlain by Devonian Old red sandstone with dinantian mudstone and sandstsone. The site is locally important aquifer with bedrock which is moderately productive only in Local Zones. Groundwater flows through fractures, fissures or joints in the bedrock. The groundwater body is generally covered by till derived from its sandstone parent material. There are numerous substances that will be used during the construction phase such as fuel, oil, lubricants, cement, silt, soil and other hydrocarbons which have the potential to pollute ground water. Washing of construction vehicles and machinery also poses a risk of polluting ground water. The impacts to hydrogeology as a result of the River Bride (Blackpool) Certified Drainage Scheme are temporary and not significant. Any impacts associated with the scheme will occur during the construction or maintenance phase. Taking into account standard pollution control measures, it is considered that the impact will constitute a Negligible Impact.

There has been a history of extensive flooding in the Blackpool area of Cork City in recent years. The River Bride (Blackpool) Certified Drainage Scheme proposes a combination of flood defence measures at specific locations and a rigorous and organised channel maintenance programme though the reach of the catchment. The River Bride (Blackpool) Certified Drainage Scheme improves flood protection with the provision of a suite of measures including replacement of culverts, embankment works and defence wall improvements and therefore reduces the risk of water levels overtopping the bank and flooding the surrounding area.

The sediment controls will affect the hydromorphology of the river most significantly between the proposed sediment trap at the Sunbeam Industrial Estate and the existing culvert at Old Commons Road, limiting sediment deposition over a distance of approximately 1km incorporating culverts and open channel. In addition, the proposed sediment controls will reduce the sediment contribution from the catchment of the

River Bride to the intertidal zone of the River Lee downstream of the point of confluence at Christy Ring Bridge (N20). The impact on the channel hydromorphology are considered moderate to significant, however the significant negative impact is localised to a 1km section of channel downstream of the sediment trap.

Air Quality & Climate / Noise & Vibration

The proposed works will not have any air quality or noise and vibration impact during its operational phase. As a result, it is only considered necessary to assess the potential noise and vibration impact on the surroundings during the construction phase. The site of the proposed development lies within Zone B, which represents Cork city and its environs. County Cork has a temperate oceanic climate, resulting in mild winters and cool summers.

During the construction phase, noise impacts at all receptors will be temporary and localised. At most of these, impacts will be imperceptible. At a small number of dwellings, particularly those immediately adjacent to dredging or embankment construction works, impacts will range from slight negative to noticeable negative. Given the benefit which will accrue to these dwellings in particular, the overall long-term impact is expected to be positive. Vibration impacts are expected to be imperceptible where pressed-in piles are used. Any other piling methods are likely to result in temporary community-wide impacts, ranging from noticeable negative to substantial negative depending on separation distance. Noise monitoring will be undertaken during the groundworks stage of the construction works involving any excavation, rock breaking, demolition or piling, in parts of the works area where these activities are ongoing. Where a noise survey shows that construction operations exceed specified limits or any other limits imposed, all construction operations will be immediately halted and works will not resume until appropriate mitigation measures have been designed and implemented.

Where piling other than pressed-in piles are used, monitoring of groundborne vibration levels will be carried out at the nearest buildings by competent personnel using calibration equipment. Where vibration levels exceed specified limits, all works will be immediately stopped until appropriate mitigation measures are designed and implemented prior to proceeding.

In order to ensure that no dust nuisance occurs, a series of measures will be implemented which include: cleaning, washing/watering and maintaining roads as appropriate, restricting speeds on hard surfaces and covering any vehicles delivering materials with tarpaulin at all times to restrict the escape of dust. Dust monitoring gauges will be installed at various locations around the site to monitor dust levels and ensure the proposed mitigation measures and effective. The proposed development is expected to have a negligible impact on air quality during the construction phase and an imperceptible impact on air quality once operational.

Impacts on climate as a result of direct and indirect emissions, but will be minimised by ensuring all construction machinery is maintained in good working order and raw materials are locally sourced where possible, resulting in a short-term, imperceptible negative impact.

Landscape

There are a number of proposed types of flood defence works and these types of works and locations vary throughout the Study Area. Likewise, the impacts of these works vary, and range from imperceptible impacts where there is little change, to Moderate impacts in some areas where works are more apparent and result in greater changes to the visual environment.

Impacts are both positive and negative. Negative impacts include vegetation removal and the construction of flood walls and a trash screen. Positive impacts are predicted in areas such as Orchard Court which will benefit from an improved public realm and openness of views while maintaining access to the Old Commons Road. The extended plaza adjacent to Blackpool Church also represents a positive impact on the urban fabric.

The most noticeable locations of the works, where they will be noticed by the largest amount of people are likely to be in the areas of Blackpool Retail Park, Orchard Court and Blackpool Church. The works which occur upstream in the more rural areas will be barely perceptible by the public. The height of the walls allows the retention of views in most areas, and the extent of vegetation to be removed will be minimised where possible. In general, the impacts will be localised and only visible in the immediate vicinity of the works, and in most cases the proposed changes are consistent with the character of the environment.

Cultural Heritage

The proposed scheme will primarily involve a series of interventions along the line of the River Bride and the Glenamought as it extends through a study area covering rural ang agricultural lands, dominated by commercial/industrial premises in the north end of Blackpool while the south end extends through the centre of Blackpool village. Blackpool was developed as one of the main early industrial centres on the outskirts of the city during the 18th and 19th centuries. The siting of various water-powered industries in this area was largely due to the presence of the River Bride, which provided a consistent water supply not afforded by the tidal channels of the River Lee within the low-lying city centre. The study area has been extensively impacted by modern road, commercial and residential schemes during recent decades and these have resulted in the widespread removal of the historical industrial building stock within the area. While the Glenamought remains relatively unaltered, the channel of the River Bride has been subject to widespread modern impacts including the installation of concrete channels/culverts, diversion channels and the replacement of masonry bridges with modern concrete structures. The section of the watercourse within the study area has also been subject to cleaning projects in recent decades many of which were undertaken following flooding events. Three sites within the study area can be found on the Record of Monuments and Places and these are the three former mills (a former flax mill at the site of the current Sunbeam Industrial Estate and a former flour/ corm mill downstream of the Viaduct) and Glen Mill / distillery overlooking Madden's Buildings. In addition to these archaeological sites, Cork City Development Plan lists four protected structures within the study area for the scheme: The Church of the Annunciation (PS1139), Madden's Buildings (PS491), Kilnap Glen House (PS616) and Kilnap Viaduct (PS617). The proposed scheme will not result in any direct physical impacts on or any material alteration to any of these structures although elements of the proposed works will be undertaken in their vicinity. Six of the buildings in the general environs of the proposed scheme are included in the National Inventory of Architectural Heritage (NIAH). The Blackpool Village Architectural Conservation Areas (ACA) as defined in the Cork City

Development Plan 2014 encompasses the area centred on the main thoroughfare running south-north from Old Chapel Lane and Cathedral Street to Thomas Davis Street and the Link Road. It is bounded to the east by the western boundary of Watercourse Road and to the west by the rear of properties fronting onto the area's central spine of Gerald Griffin Street, Great William O'Brien Street and Thomas Davis Street. Generally, the alleviation of flooding events will reduce potential flood damage to Protected Structures and the building stock within the Blackpool ACA, which is considered a positive impact of the scheme on Cultural Heritage in the area. While the proposed scheme will not result in any direct impact to any archaeological features listed in the SMR/RMP, there will be dryland interventions undertaken within the environs of Kilbarry Mill and Kilnap Mill and the former Sunbeam site (HAN 1, 4 and 5). The scheme has the potential to cause negative impact on unrecorded archaeology, for example in proximity to the above-mentioned sites and in the channel of the River Bride and Glenamought. There is a moderate negative impact to other unprotected Cultural Heritage features. The following table identifies sites with predicted negative impacts on heritage assets.

HAN	Status	ADCO ref.	Heritage Asset Type/Name	Intervention	Level of Impact
1	CO063-067----	-	Kilbarry Mill	Embankment within property	Permanent slight indirect negative impact
3	RPS PS616 NIAH 20858003	-	Kilnap Glen House	Flood defences within garden	Permanent slight indirect negative impact
14	-	F07	Masonry Bridge (Kilnap House Access Bridge)	Removal of structure	Permanent Moderate Direct Negative Impact
16	-	F09	Masonry Bridge (Fitz's Boreen)	Removal of structure;	Permanent Moderate Direct Negative Impact
17	-	F10	River Walling	Replace existing channel with concrete culvert	Permanent Moderate Direct Negative Impact
18	-	F11	Bridge Section	Replace existing channel with concrete culvert	Permanent Moderate Direct Negative Impact
19	-	F12	Masonry Culvert	Replace existing culvert with reinforced concrete culvert;	Permanent Moderate Direct Negative Impact
31	-	F23	River Walling/ Revetment	Proposed reinforced concrete wall to be constructed to flood defence level (varies from 35.15mOD - 36.44mOD). Flood wall to tie into existing ground level at both ends.	Permanent Moderate Direct Negative Impact
32	-	F24	Masonry Wall (part of former mill building)	Proposed reinforced concrete wall to be constructed to flood defence level (varies from 37.4mOD - 38.34mOD). Flood wall to tie into the existing bridge structure at the upstream end, and existing ground level at the downstream end.	Permanent Moderate Direct Negative Impact

HAN	Status	ADCO ref.	Heritage Asset Type/Name	Intervention	Level of Impact
33	-	F25	Masonry Bridge (Glen Mill)	Proposed reinforced concrete wall to be constructed to flood defence level (varies from 37.4mOD-38.34mOD). Flood wall to tie into the existing bridge structure at the upstream end, and existing ground level at the downstream end.	Permanent Moderate Direct Negative Impact

Mitigation measures will include archaeological monitoring of the works areas and in the case of the Kilbarry Mill, Kilnap Mill and Sunbeam Industrial Estate, pre-development testing of the works area. In the event that any potential features of architectural and/or archaeological heritage are encountered in any areas the Archaeologist will consult with the appropriate authorities in order to determine further mitigation measures. Following implementation of these mitigation measures, the scheme has the potential to result in no more than a slight permanent negative impact on the Cultural Heritage features described above. The replacement of the masonry bridge structure at Kilnap House will not materially impact on the character of the protected structure. The works will have a neutral impact on the setting and character of the Kilnap Viaduct and Bridge structures, any associated curtilage features. The scheme will not scheme materially impact on the character of the Church of the Annunciation, Madden's Buildings or any associated curtilage features.

Material Assets

Material assets are generally considered to be the physical resources in the environment, which may be of human or natural origin. This chapter details the impact of the proposed River Bride (Blackpool) Certified Drainage Scheme on these resources, namely transport infrastructure, subterranean infrastructure, traffic and the management of waste. The proposed scheme, comprises mainly of works to and in the vicinity of the River Bride North and Glenamought River. As such, potential impacts to material assets are restricted to these areas. The proposed scheme will have potential to impact on the following:

- Roads Network (incl. increased traffic);
- Existing Bridges;
- Drainage Network;
- Water Distribution Network;
- Bord Gáis Distribution Network;
- Electricity Network;
- Broadband Network;
- Telecommunications Network.

The road network within the study area comprises a national road (N20), regional and local roads. The main artery through Blackpool is the national primary route (N20) which conveys traffic from Patrickswell in County Limerick to Cork City.

The construction phase of the proposed scheme will have a temporary impact on traffic volumes in the Blackpool area and their environs. Temporary effects will arise during the construction stage of the scheme, particularly associated with the full and partial road closures that will be required to enable some construction activities. These impacts will be primarily associated with restriction on access to certain portions of the existing road network during ongoing works. The proposals will not result in any residual changes to the existing traffic networks once completed.

Following implementation of mitigation measures, the permanent impact on existing underground and overground utilities (including drainage networks, water and gas distribution networks, electricity supply networks among other utilities) and from waste generated during the construction and operation phases will be imperceptible.

Interactions

All of the potential impacts of the proposed development and the measures proposed to mitigate them have been outlined under the preceding headings above. However, for any development with the potential for significant environmental impact there is also the potential for interaction amongst these impacts. The result of interactive impacts may either exacerbate the magnitude of the impact or ameliorate it.

There was found to be an interaction between Human Beings and both Landscape and Flora & Fauna. The scheme was initially designed to retain as much open channel as possible in order to minimise the impact on the fishery. When modelled, this required high flood retaining walls in Orchard Court which were found by the public to be unacceptable for predominantly visual reasons. Therefore, an alternative option was pursued which involves a pressurised culvert through Orchard Court. 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.

The construction phase of the project will give rise to road closures and restrictions of traffic movements at times and will create some short-term inconvenience for road users. By ensuring that these impacts occur at off-peak times during the summer when possible, this will be mitigated as much as possible.