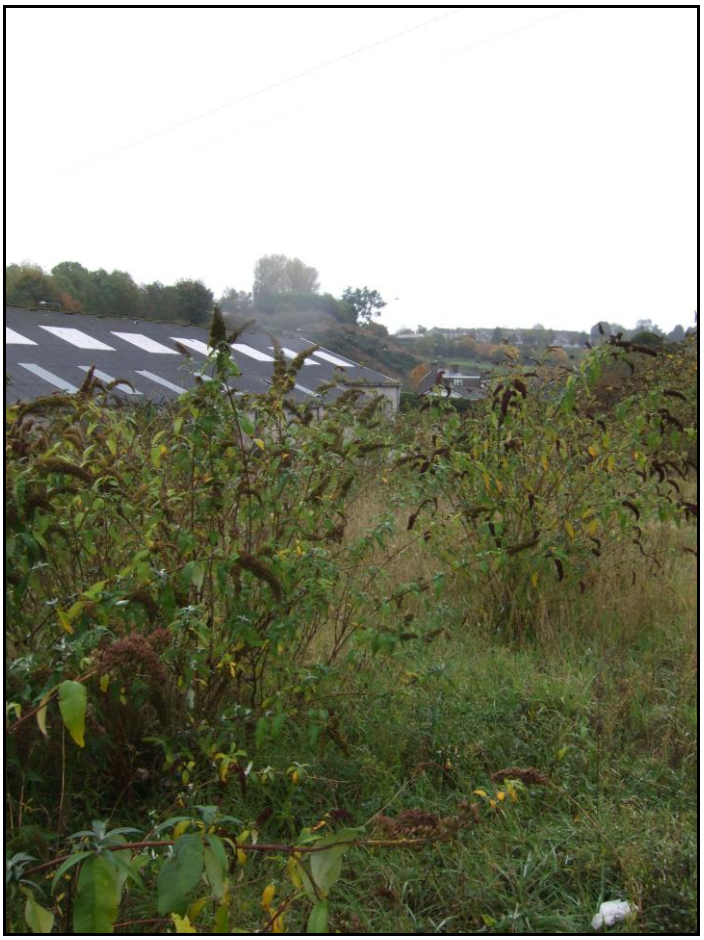

Plate 9.10: Built form (industrial units) and areas of vegetation along River Bride in Blackpool

Further downstream of the Sunbeam Industrial Estate, the river Bride flows through open space at the Blackpool Retail Park where it can be clearly seen from the surrounding paths, bridges and open space as shown in Plate 9.11 below. From the Blackpool Retail Park through Orchard Court, to Blackpool Church and Watercourse Road, the landcover is predominantly hard surfaced and the built form and urban fabric becomes denser, as shown in Plate 9.12 below. The river is culverted in sections but remains open along Orchard Court. Adjacent to Blackpool Church the river is partially culverted and a plaza exists over the culverted sections. To the south of the plaza, there is a section of open channel (as shown in Plate 9. 11).

Plate 9.11: Open Space along the River Bride in Blackpool Retail Park

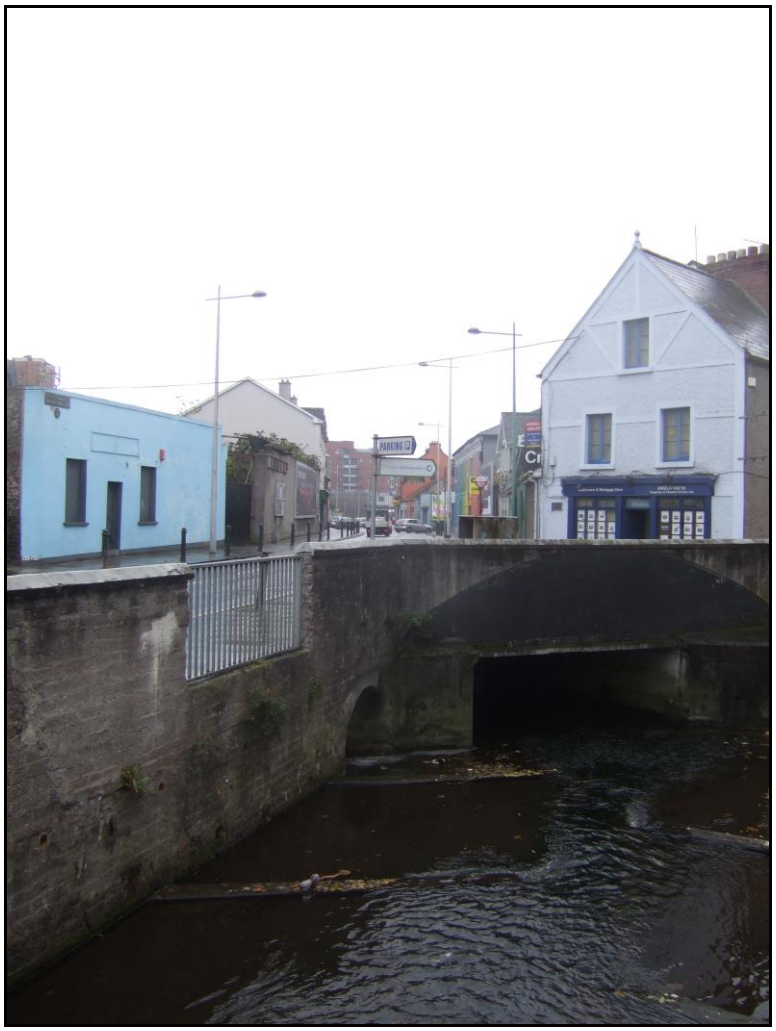

Plate 9.12: Landcover composed of hard surfaces and buildings in Blackpool

Glen River

The study area includes a small section of the Glen River to the east of Blackpool Shopping Centre and south of Spring Lane. A large part of this river is currently culverted, and the landcover in this area varies between hard surfaces - commercial and residential built form and roads – in the area around the shopping centre, to an area of semi-natural vegetation of grass and trees close to the Cork-Mallow railway line and on both sides of the North Ring Road. There is an informal pedestrian path from the North Ring Road along to the east of the railway line which connects with Spring Lane.

Land Use

Land Use, as it is related to landcover, in the Study Area ranges from a small area of residential and agricultural fields in the north of the study area along the City Boundary, while some residential land uses and areas of open space also occur. Further south along the N20 the land uses become urban, and are mostly commercial and industrial units with several business parks and industrial estates, and including the Blackpool Retail Park, which contains some open space also. Residential and commercial land uses are predominant to the south of the study area as the river flows through Orchard court and through Blackpool Village.

9.4.5 Visual Unit

When describing landscape character, physical units can be restricted in terms of visibility due to landform or land cover and may be made up of smaller visual units.

A visual landscape unit is defined by spatial enclosure and pattern, i.e. by landform and landcover. The limits of the views that are available from a particular area are therefore determined by the physical landscape, such as topographical and vegetation boundaries. In addition to the definition of the physical unit of the river valley, the visual unit of the Study Area is further restricted by the development of built form which increases as one moves from the north to the south of the study area.

The visual unit to the north of the site is contained by the topography and vegetation. In general views of the river are restricted, from Kilbarry to the Common's Road, and some views are available from private properties. It should also be noted that a portion of the north part of the study area is visible from the elevated railway viaduct.

As one moves further south, the river itself is screened in many areas due to built form along the east of the River Bride. From the higher ground to the east and west of the River Bride, large areas of the Study Area are visible, while on the valley floor and closer to the river, visibility is restricted due to vegetation and built form. Views to and from the river are described in Section 9.4.7.

Image Unit

An image unit is a feature that acts as a major focal point within the landscape, such as Croagh Patrick in Co. Mayo. Such features contribute to the creation of a strong identity or sense of place. From the south of the study area, on Watercourse Road, there are some views to Ct Anne's Church at Shandon which is a well-known landmark associated with Cork City.

9.4.6 Landscape Value and Sensitivity

The sensitivity of a landscape to development and therefore to change varies according to its character and to the importance that is attached to any combination of landscape values. The sensitivity of a landscape is derived from consideration of designations such as Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Natural Heritage Areas (NHAs) and National Parks, from information such as tourist maps, guidebooks and brochures, and from the evaluation of indicators such as uniqueness, popularity, distinctiveness, and quality of the elements of the area.

An assessment of landscape sensitivity in the vicinity of the Study Area was carried out during a site visit in October 2015. The methodology for this assessment was based on that set out in the Department of the Environment and Local Government (DoEHLG) guidance document '*Landscape and Landscape Assessment – Consultation Draft of Guidelines for Planning Authorities*' (2000). This document recommends an assessment of landscape sensitivity based on an evaluation of individual features, such as the quality, integrity, etc. The results of the assessment are presented in Table 9.3 below.

Table 9 .3 Features of Landscape Sensitivity

Feature	Description
Quality/Condition	The quality of the landscape in this area can be described as somewhat modified, though of higher quality and less modified so in the north of the study area along the eastern section of the Glenamought river. In this area, there are areas of agricultural pasture and semi natural vegetation to the north of the study area, while the majority of the study area is covered by artificial surfaces within the urban settlements.

Feature	Description
Integrity	Much of the Study Area, especially the southern sections, and the river bank in these areas, has been modified by the interaction of man with the natural environment, primarily in the form of urban development and infrastructure and agricultural and general land management.
Distinctiveness	Feature of the landscape which could be described as distinctive include the Commons Ridge. The other landmark seen from the Study Area is St Anne's Church Shandon.
Popularity	A sense of popularity is created where landscape features are widely recognised or appreciated.
Rarity	The closest Natura 2000 sites and pNHAs are more than 5 kilometres downstream form the proposed works – these do not occur within the works area.
Cultural Meaning	A sense of cultural meaning arises where a site or features within a site are deemed to explain, represent or inspire cultural values. There are a number of noteworthy buildings in the Study Area which are detailed in the Cultural Heritage Chapter 10.
Sense of Public Ownership and Importance	In a city it is likely that there are several areas which have a sense of ownership, and these may include the plaza adjacent to Blackpool Church which is used by the public.

9.4.7 Landscape and Site Context - Views

This section of the EIAR describes the views of the surrounding landscape that are available to the Study Area. It describes the existing views towards the Study Area from the surrounding area, with particular reference to the views from roads, houses, and areas of amenity value, and describes the areas of proposed works in more details.

There are glimpses of the River Glenamought through the trees from the public road at Glenamought bridge, as shown in Plate 9.13, but clear views are available from the properties directly adjacent to the river, e.g. at O' Shea's Buildings. Views to the River Glenamought are also available from the Railway viaduct, however in general, views of the river from the local vicinity are restricted. Views of the river are available from the private grounds at Kilnap Glen House, and a view of the river near the entrance to the North Point Business Park as shown in Plate 9.14 below.

Plate 9.15 shows that while relatively open views to the area around the River Bride are available from the higher ground, especially to the northwest of the river, from the Commons Ridge and along the N20, however views to the rivers themselves are intermittent, due to the location, the natural topography and the screening afforded by the built form on both sides of the river but particularly along the N20.


Plate 9.13 and 9.14: View looking west from Glenamought Bridge, and looking south along river near North Point Business Park

Plate 9.15: View looking across the N20- the river is partially screened by vegetation and buildings

Plate 9.16: Intermittent views of the river with screening by vegetation behind the Commons Inn

The river runs to the rear of buildings including commercial, residential and industrial buildings to the east of the N20. Visibility is intermittent, even from areas close to the riverbank as shown in Plate 9.16 above.

More open views are available from close to the junction of the N20 with Fitz's Boreen, where the river and bridges are visible from the public areas and car park as seen in Plate 9.17 below. Further to the south, the river runs to the rear of several industrial areas and is bordered by the Dulux Paints factory to the west and the factory yard and buildings to the east, as seen in Plate 9.18 below. However, some of these areas are not publicly accessible.

Plate 9.17: View of bridges over River Bride from behind the N20 and Fitz's Boreen

Plate 9.18: River Bride in grounds of Dulux Paints to the east of the N20

Further south the river passes through Sunbeam Industrial Estate and then through Blackpool Retail Park where it runs through an area of open space. The river is clearly visible here from the buildings, the open

space and play area and the walkways along the river. Considerable vegetation and trees are also evident. This is one of the areas in the Study Area where the river is most visible to the public.

However only a small section of the river is visible from the N20 as it is at a lower level from the road and screened by vegetation. This is shown in Plate 9.19 below.

Plate 9.19 Views towards the River Bride in Blackpool Retail Park

South of the Blackpool Retail Park, and Shopping Centre, the river is culverted in sections and is visible in the residential development at Orchard Court. Here, views to the river are restricted by dense vegetation along the riverbank, and views of the river itself are intermittent. Built form also restricts views from outside the immediate vicinity, as shown in Plates 9.20 and 9.21 below, with views from the immediate vicinity of the river available. Concrete barriers obstruct the footpath along the river at Orchard Court.

Further downstream, Plates 9.22 and 9.23 show views of the river where the river flows adjacent to Blackpool Church. Plate 9.22 shows the hard-surfaced plaza where the river shows underneath, while Plates 9.21 shows that the river is visible downstream of the plaza. Plate 9.22 illustrates the southern end of the study area, where the river flows under the Watercourse road and is not visible.

Plate 9.20 Intermittent views towards the River Bride in Orchard Court

Plate 9.21 Views from bridge over River Bride in Orchard Court

Plate 9.22 Views from plaza adjacent to Blackpool Church where River Bride flows underneath

Plate 9.23 Views to river downstream of plaza in Plate 9.22 above

Plate 9.24 Views towards junction of Watercourse Rd and N20 where the River Bride flows under the road

In summary, the text and images above illustrate that views of the River Bride, Glenamought and Glen within the study area are intermittent and are confined to the immediate vicinity of the river. There are no long distance views of the river. The river Bride flows largely to the rear of the buildings along the Commons road and many sections of the river are screened by buildings (and some vegetation) along the Commons Road.

Areas where the river Bride is most clearly visible include the area close to the junction of Fitz's Boreen and the N20, as well as the Blackpool Retail Park where the river flows through an open space. The river also is visible but intermittently so through Orchard Court, and a small section it is visible adjacent to the Blackpool Church where it emerges from underneath the plaza.

9.5 PHOTOMONTAGES

9.5.1 Limitations of Photomontages

Photomontages are visualisations that superimpose an image of a proposed development upon a photograph or series of photographs. They are intended as graphical representations of the likely appearance of the proposed development in the existing landscape.

Visualisations such as photomontages are tools that can represent the likely effect of a development at a particular time and are used to inform the viewer's prediction of how that development will appear. In terms of impact quality however, i.e. whether a visual impact is deemed to be positive, negative or neutral, this involves a degree of subjectivity.

9.5.2 Location of Photomontages

A series of 14 photomontages has been prepared as part of the EIS, which show the proposed scheme from different locations in the receiving environment. The photo-locations are illustrated in Figure 9.4.

These locations were chosen to represent a number of views throughout the study area. These represent views from both private and public land, as the works will be carried out on both public and private lands, including areas close to residences.

The photomontages represent views which may be available to a large number of people from public areas such as roads and walkways, and also represent views from retail and industrial parks, including areas in Blackpool Retail Park and outside Blackpool Church. Views which illustrate the potential impacts on residential areas are also included - Orchard Court in the south of the study area and Kilnap Glen House in the north of the study area. Photomontages from areas where public access is restricted such as the Dulux Paints factory are also represented.

Also included area areas such as those represented in Photomontage 4 which are not publicly accessible but where views from residences will be subject to change.

An existing view is shown from each photo-location to provide a representation of the current view, and then a proposed view is presented in order to illustrate the difference. A brief description of each view is also included.

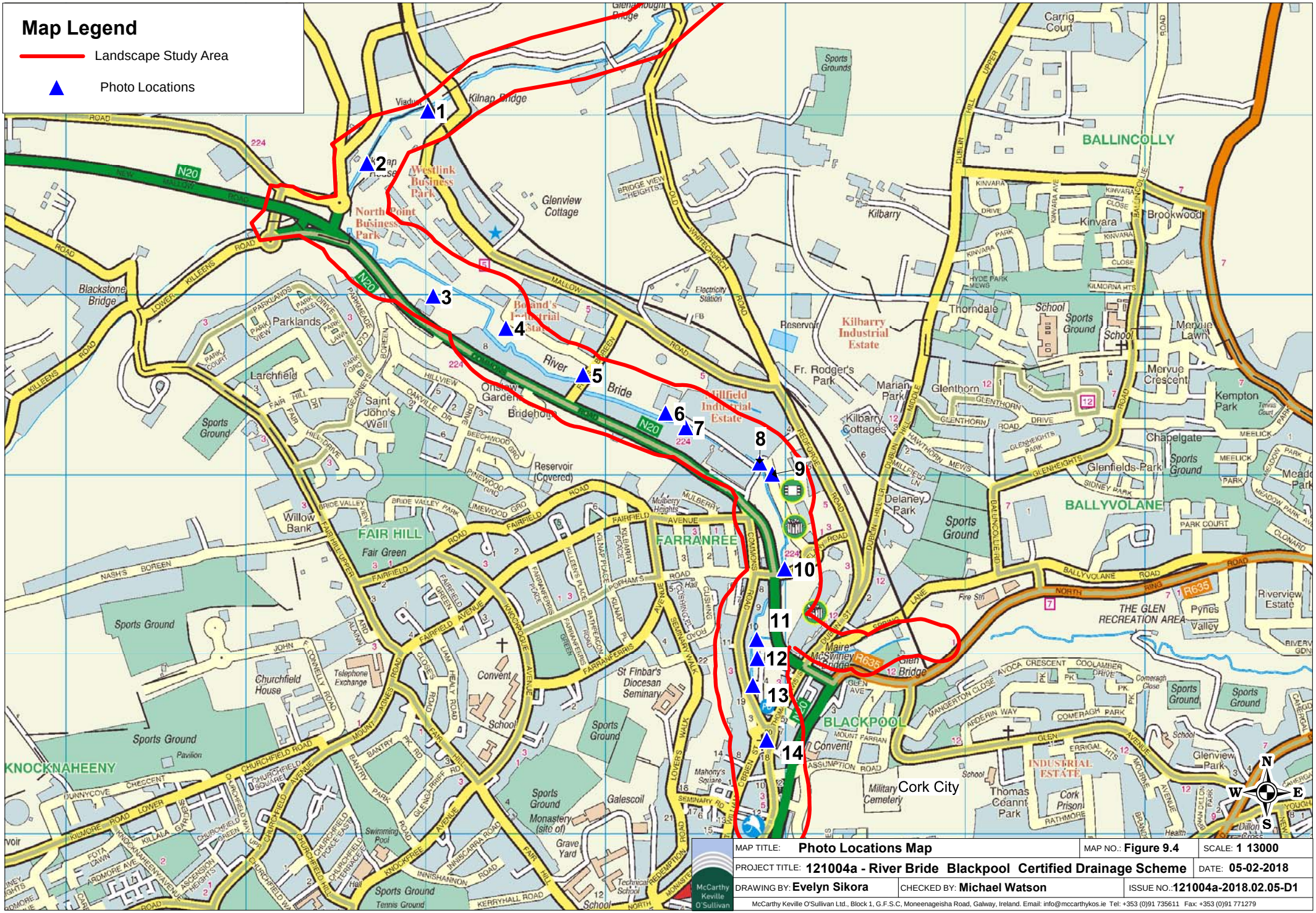

Photo Location 1

Plate 9.25: Photo Location 1 – Existing View

Plate 9.26: Photo Location 1 – Proposed View showing proposed embankment

Photo Location 1 - Existing View

The existing view above shows a view towards Kilnap Glen House and its gardens in the north of the study area. The River Glenamought floes to the right of the image. This area is designated as an Area of High Landscape Value and is characterised by mature gardens, with trees to the left and right of the house, and grass with a gentle slope towards the riverbank and a slight embankment to the right of the house.

Photo Location 1 - Proposed View

The proposed view shows the low grass embankment to the left of the image which wraps around the rear and side of the house. The grass embankment blends in well with the surroundings and represents a minor change in the character of the surroundings, as the Existing View shows that a grass embankment is already a feature of this landscape. There are no significant vegetation removal associated with the proposed embankment and this minimises the visual impact.

Photo Location 2

Plate 9.27: Photo Location 2 – Existing View looking towards bridge in grounds of Kilnap Glen House

Plate 9.28: Photo Location 2 – Proposed view looking towards Replacement Bridge in grounds of Kilnap Glen House

Photo Location 2 - Existing View

The existing view looks towards an existing bridge is an area characterised by mature trees, grass lawns which is relatively private and enclosed in the grounds of Kilnap House, but close to the junction with Sweeney's Hill. The main elements of the view include a grass lawn in the foreground, and a bridge and track with considerable mature trees in the background.

Photo Location 2 – Proposed View

The proposed works will result in the loss of some mature trees along the bridge, and this will result in some opening of views of buildings and landscape beyond. As many trees are to be retained as possible to maintain privacy and the character of the area. The bridge itself is more visible but not considered unduly obtrusive – the main difference is the vegetation removal and the change in level, which consists of re-grading of the ground levels which are then grassed. While these changes will be noticeable, tree loss will be minimised

Photo Location 3

Plate 9.29: Photo Location 3 – Existing View looking towards riverbank and vegetation at Commons Inn car park

Plate 9.30: Photo Location 3 – Proposed View looking towards proposed wall and grass embankment

Photo Location 3 - Existing View

The existing view is towards the riverbank at the rear of the Commons Inn car park. The main elements are the semi mature trees and dense vegetation which line the riverbank. There are considerable areas of grass, and an embankment planted with shrubs to the right of the image. In the background, a glimpse of an industrial unit is visible across the river.

Photo Location 3 – Proposed View

The proposed works will result in the loss of some semi mature trees along the river bank and in the grassed area, however a large number are to be retained and will maintain the screening effect. The proposed embankment will be grassed and will blend in to the surroundings and is low enough to allow visibility. Vegetation re-growth is to be allowed to further minimise visual impact. The proposed wall ties in with the embankment and is relatively low, allowing views. The changes are noticeable but constitute a minor change in the overall character of the environment.

Photo Location 4

Plate 9.31: Photo Location 4 –Existing View

Plate 9.32: Photo Location 3 – Proposed View

Photo Location 4 - Existing View

The existing view is taken from an area of currently disused land which has restricted access but which looks towards the backs of houses along the river Bride. The view shows low and medium vegetation in the foreground, and the River Bride, though not visible, flows to this side of the wall which is topped by a metal railing. Behind this wall, screening vegetation is evident and prevents views to the wider landscape, but some glimpses of buildings are visible through gaps in the screening.

Photo Location 4 – Proposed View

The proposed view shows that the foreground is undisturbed. The vegetation along the river, close to the wall, has been removed, which results in opening up views to the houses and back gardens. However the existing wall is replaced by a concrete wall to assist screening. It should be noted that the side of the wall which faces the read gardens will be clad in sandstone to reduce visual impact. This view is not one which is currently publicly accessible.

Photo Location 5

Plate 9.33: Photo Location 5 – Proposed View looking towards river from Fitz's Boreen

Plate 9.34: Photo Location 5 – Proposed View looking towards river with proposed bridge replacement

Photo Location 5 - Existing View

The existing view shows the view from Fitz's Boreen towards the N20 with the McDonald's Drive Thru and bridge in the foreground. The urban and industrial character of the area is evident, and the Commons Ridge is visible in the background. There are no clear views of the river itself, and the railings allow views of the buildings across the river.

Photo Location 5 – Proposed View

The proposed view shows the replaced bridge and slight re-grading of the road. Low flood walls on the opposite bank (to the rear of the filling station) are barely visible due to the railings. There is a small amount of vegetation removal evident to the right of the filling station along the river, which is due to the proposed flood wall but the majority of the vegetation is to be retained.

The proposed photomontage illustrates that although the changes are noticeable they are not significant and are in keeping with the urban character of the area.

Photo Location 6

Plate 9.35: Photo Location 6 –Existing View

Plate 9.36: Photo Location 6 – Proposed View

Photo Location 6 - Existing View

This view is taken from within the Dulux Paints yard so access to this location is restricted. The view shows a concrete yard in the foreground with an industrial building in the background, and the river, though not actually visible, flows in the middleground, where it flows in a concrete channel. A metal railing and a low concrete wall surrounds the river channel.

Photo Location 6 – Proposed View

The proposed view shows the railing had been removed and the proposed flood defence wall is constructed. There is no change in visibility in this location as the river is not visible in the existing view. The proposed wall is clearly noticeable, however it is entirely in keeping with the industrial character of the yard and does not represent a major change in the character or views at this location.

Photo Location 7

Plate 9.37: Photo Location 7 –Existing View

Plate 9.38: Photo Location 7 –Proposed View

Photo Location 7 - Existing View

The existing view is taken from an industrial location - the Dulux Paints yard - and shows a concrete yard with a concrete wall in the foreground, with concrete post and wire fencing on top of this. The river is behind this wall and not visible from this location. Some vegetation is visible to the right in the foreground. In the background, a concrete yard is visible, with industrial units, dwellings interspersed with trees on the sloping land in the distance.

Photo Location 7 – Proposed View

The proposed view illustrates the proposed works, which show the existing river wall to be retained (subject to assessment). On the opposite river bank, the ramp and walls of the proposed sediment trap are visible from this location. The height wall of the sediment trap will reduce views to the yard behind, and will result in the removal of some vegetation, however views to the river are unchanged as the river is not visible in the existing view. The views to the landscape in the background are unchanged. The character of the proposed works are compatible with that of the industrial character of the location and the changes to this view, while noticeable, are not considered to be major change at this location.

Photo Location 8

Plate 9.39: Photo Location 7 –Existing View looking from bridge in Sunbeam Industrial Estate

Plate 9.40: Photo Location 7 – Proposed View looking from bridge in Sunbeam Industrial Estate

Photo Location 8 - Existing View

The existing view from the bridge in the Sunbeam Industrial Estate shows the river channel in the centre of the view, which is lined with vegetation growing at the water's edge. The river is contained within a concrete channel in the foreground, and further upstream, a culvert is visible, although vegetation partially obscures this. To the right is a concrete yard, while to the left are the buildings to the rear of the sunbeam industrial estate.

Photo Location 8 – Proposed View

The proposed view shows the railings and vegetation along the river channel have been removed. The bridge parapet and flood walls have been removed and replaced with low concrete walls along with railings. The culvert has been removed and replaced with an open channel, so that a greater extent of the river is now visible. The vegetation removal results in a greater amount of the river being visible, and the more informal shape of the river channel along with the vegetation being allowed to grow will soften the appearance of the concrete channel. To the right of the river channel, a new access road is visible The changes, while clearly noticeable, are consistent with the industrial character of the area.

Photo Location 9

Plate 9.41: Photo Location 9 –Existing View from Blackpool Retail Park

Plate 9.42: Photo Location 7 –Proposed View from Blackpool Retail Park

Photo Location 9 - Existing View

The existing view is taken from the open space in Blackpool Retail Park. The view shows a grassed area in the foreground, with a railing and dense vegetation which screen the River Bride from view. Mature trees are visible to the right of the image. The buildings of the Retail Park and Shopping Centre are clearly visible to the left and centre of the image, and the Ballyvolane ridge is just visible in the distance.

Photo Location 9 – Proposed View

The proposed view shows the vegetation and railings along the river are removed, with the result that and the river and proposed trash screen are clearly visible. The removal of mature trees allows views to the wider cityscape.

The open space has been re-graded, and some areas are surfaced in re-inforced grass. Pedestrian access has been re-organised and the bridge in the centre of the view is evident. The changes are clearly noticeable in this area and the addition of the trash screen

Photo Location 10

Plate 9.43: Photo Location 10 –Proposed View towards Blackpool Retail Park

Plate 9.44: Photo Location 10 –Proposed View towards Blackpool Retail Park

Photo Location 10 - Existing View

The existing view shows the view looking north along the river Bride. To the right are the buildings of Blackpool Retail Park, while to the left of the image the B20 road is visible. The river here is a narrow channel with grassed and vegetated embankments, and a pedestrian walkway is visible on the right, separated from the river by a railing. In the background the pedestrian bridge is visible, as well as the trees in the Retail Park.

Photo Location 10 – Proposed View

The proposed view shows the proposed flood wall and metal railing which replaces the railing along the riverbank, while the pedestrian bridge has been removed. Some vegetation has also been removed to allow the construction of the flood wall. The flood wall is of a height that allows views to the river, and views are available through the railing. The wall is clad in sandstone which is a stone found throughout the local area and which assists in improving the appearance of the wall. The width of the pathway has not been affected.

Photo Location 11

Plate 9.45: Photo Location 11 –Existing View looking north from Orchard Court

Plate 9.46: Photo Location 11 –Proposed View looking north from Orchard Court

Photo Location 11 - Existing View

The existing view shows the open space to the north of Orchard Court. This view shows the road in the foreground, with and a concrete barrier and metal railings. To the right, a gate is visible. An open grassed space, surrounded by mature trees, is partially visible. Some dense vegetation is visible behind the railing to the left of the image, and a section of timber fencing is also visible. The backs of houses are partially glimpsed to the left of the image.

Photo Location 11 – Proposed View

The proposed view shows the removal of the concrete barrier and the replacement of the metal railings. Some of the vegetation and trees to the left of the image have been removed, and replaced with grass, and the timber fence has been replaced with a hedge. A paved hard surface is now visible to the left of the image.

The proposed view shows that there is increased visibility of the grassed open space from this location, due to the removal of the barrier and vegetation. The backs of houses are also more visible to the left of the image. These elements and the hard surfaced pedestrian areas combine to create more open feel to the view and can be described as enhancing the character of the open space.

Photo Location 12

Plate 9.47: Photo Location 12 – Existing View looking towards river from Orchard Court

Plate 9.48: Photo Location 12 –Proposed View looking towards culvert from Orchard Court

Photo Location 12- Existing View

The existing view is taken looking towards the existing river Bride in Orchard Court. In the foreground a concrete barrier is visible with metal railings behind, while dense trees and shrubs line the riverbank on both sides. There are no views available to the river itself. Some buildings are visible to the left of the image.

Photo Location 12– Proposed View

The proposed view shows that a considerable amount vegetation along the river has been removed, along with the metal railings and concrete barriers. A new pedestrian hard surface is visible in the foreground which replaces the river (which has been culverted). A wall, with a dense hedge, forms a barrier between the walkway and the backs of the houses which are now visible. Proposed trees and shrubs in planters are also included.

The proposed view shows a much more open area, due to the culverting of the river and the removal of the barrier, railings and vegetation. The area still has an urban character and the proposed vegetation will balance the hard surfaces which are proposed. While this view represents a considerable change in the appearance of the area, it is one which is in keeping with the urban character of the area and which can be seen as improving the quality of the public realm.

Photo Location 13

Plate 9.49: Photo Location 13 –Existing View looking towards Blackpool Church from Orchard Court

Plate 9.50: Photo Location 13 –Proposed View looking towards Blackpool Church from Orchard Court

Photo Location 13- Existing View

The existing view shows a view taken from a bridge between Orchard Court and the Old Commons Road, looking towards Blackpool Church. The river Bride is clearly visible in this view, and it is lined with vegetation. Buildings are visible to the left (at the end of Orchard Court) and to the right, the rear of buildings are visible. Blackpool Church is the focal point in this view.

Photo Location 13– Proposed View

The proposed view shows the view of the river has been replaced with a hard surface for pedestrian use, and the dense vegetation is removed. A hedge with a wall behind is visible to the right, separating the open space from the houses. The proposed changes are clearly noticeable, and create a more open character to the space, while improving the quality of the public realm. The Church remains visible in the centre of the image.

Photo Location 14

Plate 9.51: Photo Location 14 – Existing View looking towards the river from Blackpool Church plaza

Plate 9.52: Photo Location 14 – Proposed View looking towards the river from Blackpool Church plaza

Photo Location 14- Existing View

This view is taken from the existing plaza adjacent to Blackpool Church in the centre of Blackpool. This view shows an open section of the river which is bordered on all sides by walls and some railings. The river then flows under the road in the centre of the image. The riverbed is partially visible as the water is relatively low. The river is visible but the quality of the view is not considered to be high. In the background the buildings of Blackpool are visible, with the Church partially visible to the right of the image.

Photo Location 14– Proposed View

The proposed view shows the plaza adjacent to the Church is extended to the south and covers the river, which is now shown as culverted. A proposed hard surface with seats and planted containers is shown. The river is no longer visible, however the extension of the plaza is in keeping with the character of the urban area and provides a larger areas of public space, and allows views of the surrounding streets and buildings.

9.6 LIKELY AND SIGNIFICANT IMPACTS AND ASSOCIATED MITIGATION MEASURES

9.6.1 'Do-Nothing' Scenario

If the proposed development were not to proceed, the existing river channel would remain as it is, resulting in many of the same potential impacts on human beings as have occurred previously.

There would also be potential for impact on:

- Residential and commercial properties
- Pedestrian walkways
- Open spaces

In the event that the proposed drainage scheme were not to proceed, the landscape of the Study Area would evolve based on current trends and views to and from the Study Area would remain unaltered. In the event of further major flood events, the visual amenity of the area would be temporarily affected as flood levels increase and flood damage affects Blackpool and environs. Potential landscape impacts caused by flooding include flood damage to structures and vegetation as well as erosion.

9.6.2 Impacts During the Construction Phase

The removal of bankside trees vegetation and habitats is dealt with in the relevant sections of the Operational Phase Impacts below.

9.6.2.1 Site Investigation and Construction works -Construction Traffic, Materials and Temporary Site Buildings

Potential Impact

Detailed site investigations have already been carried out. The construction works themselves will last approximately eighteen months and will be subject to the following programme constraints. This will be temporary.

The construction phase of the proposed scheme will involve the movement of construction vehicles into and out of the working area, and a temporary construction works facilities for storage of materials on a brownfield location in the immediate vicinity of the works. This may have to be moved during the construction period. Construction is expected to last approximately 18 months.

The construction phase of the proposed scheme will have a slight negative impact on the landscape character of the Study Area, as construction noise and activity will all impinge on the landscape amenity of certain parts of the Study Area. The slight negative impact on landscape character will, however, be a localised, temporary impact and will decrease with distance from the site. These activities will have a **Temporary to Short Term Slight Negative Impact** on the surrounding area in terms of landscape and visual impact.

Mitigation Measures

Any negative impact associated with the proposed works on the visual amenity and landscape within the study area, will be minimised through the implementation of an Environmental Management Plan (EMP) and a Traffic Management Plan. A construction compound will be used to house materials, plant and machinery, welfare facilities and site offices as part of the EMP and traffic movements will be subject to regulation through the traffic management plan. Best practice measures for noise control will be adhered to onsite during the construction phase of the proposed development, as described in Chapter 8 of this EIS on Air

Quality and Climate/Noise and Vibration. These measures will mitigate the slight temporary to short-term negative impact associated with construction phase noise.

Residual Impact

The residual impact will be a **temporary to short-term slight negative impact**.

9.6.3 Impacts During the Operational Phase

The works described in Chapter 3 with potential landscape and visual impacts are grouped into a number of categories below.

9.6.3.1 Construction of flood defence walls and embankments

Potential Impacts

The proposed drainage works are set out in detail as described in Chapter 3, include the construction of flood defence walls and embankments along several sections of the River Bride, River Glenamought and Fairhill Stream. The height of the proposed flood defence walls, also outlined in Chapter 3, varies throughout the Study Area. In some areas the walls are topped with metal railings.

In most areas the proposed walls are less than 1.34 metres in height, with the exception of Lower Killeens Road where the wall reaches a typical height of 1.7 m In this location, the predicted impacts of the flood defence walls, along with the reinstated boundary wall and vehicle access gate will result in a flood wall to the rear of Rose Cottage on Lower Killeens Road. Some of the wall will be behind the building and partially screened by the existing wall which prevents views to the land behind. The height of the wall varies but will be approximately 1.7 metres in height and will match existing wall height. It is also proposed to reconstruct the existing open wall to the front of the house in solid blockwork to a height of approximately 1.1 metres. Another relatively short section (approximately 45m) of the proposed wall on the left bank will be a height of approximately 1.53 metres above existing ground level between Blackpool Shopping Centre car park and the Commons Road. At the majority of locations therefore the height will allow some visibility.

In the northwest of the study area, along the Glenamought River, flood walls are proposed are in a private residence at Kilbarry, where the wall height will be typically 0.5 metre above existing ground level. Adjacent to O' Shea's Buildings, the proposed walls will be approximately 0.8 metres above existing ground levels, and they will be in an industrial location, and to the rear of existing sheds where they replace existing walls. The impact is also considered to have a **Permanent Imperceptible Neutral impact**. A grassed embankment is proposed in the private residence at Kilbarry, as well as in the grounds of Kilnap House. This will be a low (approximately 1-1.1m high) embankments, blending in with the existing grass lawn, and will have a **Permanent Imperceptible Neutral impact**. Photomontage 1 illustrates the proposed embankment at Kilnap House.

Further downstream, another section of wall behind the Commons Inn is to be constructed (this is shown in Photomontage 3) to tie in with the proposed embankment at this location, at an approximate height of 0.45 metres. While both will be visible from the car park, neither wall nor embankment is not above eye level and these works will result in a **Permanent Imperceptible Neutral Impact.**

A longer section of wall is proposed on the right bank of the River Bride and Fairhill Stream from between the rear of the Commons Inn and the Sunbeam Industrial Estate. This wall will run along the river bank to the rear of some residences, and will vary in height, with a maximum height of up to 1.34 metres. The wall construction will necessitate the removal of some vegetation along the riverbank and the backs of houses

as shown in Photomontage 4. The first section of the wall ends at the McDonald's Drive Thru. Some of this section of proposed works will be visible by the public, from the Fitz's Boreen area, however there will not be much visibility from the N20 and the impacts will be minor. Existing vegetation on the opposite bank of the river from these houses will be retained and will assist in providing screening and minimise the visual impact, which is judged to **be Permenent Slight Negative Impact** where vegetation removal opens up views.

Further downstream, flood defence walls are proposed on both sides of the River Bride, to the rear of the Dulux Paints factory and the Sunbeam Industrial Estate, vary throughout the length to a maximum height of approximately 1.27 metres above ground level. Photomontages 6, 7, and 8 represent the likely appearance of these works. This section of the river is not all publicly accessible, and is screened by the N20 by the buildings so views will be localised. There are some few of vegetation along this section of the river, with most of the adjacent areas hard surfaced. The potential impact here ranges from **Permanent Slight Neutral Impact** in areas seen in Photomontage 7 and 8 where the proposed walls are in keeping with the existing character and the views of the river are not affected, **to Permanent Slight Negative Impact** where the proposed wall restricts views of the river.

An embankment and flood walls are also proposed in Blackpool Retail Park. The embankment will be constructed along the left bank, located in the grassed area, and will appear as a low grassy mound parallel to the river, of a height of approximately 1.15 metres above ground level. In addition, the re-grading of the ground will add to the change in level and character. While the embankment will be clearly visible, it will increase the extent of the river visible. Some re-grading of the ground will also occur. Access to the trash screen is facilitated by the addition of reinforced grass.

The flood wall will be located between the river and the front of the Heron Gate and River House buildings, and there is already existing timber fencing to the rear of some of the buildings. The view of the river will be maintained at all times in this location. Photomontage 10 illustrates the proposed view of this location. The potential impact is judged as **Permanent Imperceptible to Slight Negative Impact .**

A small section of flood wall is to be constructed in front of the Blackpool Shipping Centre carpark, and this will be at a height above ground level of approximately 1.53 metres.

In most locations views will not be obstructed due to the walls. In addition, many of the proposed walls are not in heavily used public areas, and some are in private areas. Views are restricted by built form and vegetation. Although the impacts vary depending on the area, the potential impact of the flood walls and embankments range from **Permanent Imperceptible to Moderate Negative Impact.**

Mitigation Measures

In most public areas (see drawings in Appendix 3A), the proposed walls are to be clad in sandstone, a material which is found in the urban environment of Blackpool and this will lessen the potential visual impact and improve the appearance of the floodwalls. Walls vary between sheet pile and concrete walls. In certain areas, where existing concrete walls exist, the proposed flood walls will match these existing materials. The earth embankments are to be grassed and these will blend in with the vegetation in the surroundings and lessen any potential visual impact.

The section of wall which is proposed along the front of the Heron Gate/River House buildings in Blackpool Retail Park will be integrated with the existing timber boundary fence, which will also reduce potential visual impacts.

Residual Impacts

The residual impacts once the mitigation measures are carried out are **Permanent, Imperceptible to Slight Negative Impact.**

9.6.3.2 Replacement of Bridges and Bridge Parapets and removal of bridges

Potential Impacts

The proposed works include the replacement of a number of bridges, one over the Glenamought River at the entrance to Kilnap House, which will be replaced with e reinforced concrete bridge as shown in Photomontage 2. This will involve the removal of some trees and vegetation during construction but will not change the overall character of the area. Another bridge is to replace pipe culverts close to the entrance to the North Point Business Park. A bridge is also to be replaced on Fitz's Boreen, and a handrail to a height of 1.2 metres will allow views to the river to be maintained. This is shown in Photomontage 5. The bridge to the rear of the Sunbeam Industrial Estate is to be replaced with a reinforced concrete bridge. Another two pedestrian bridges (at Chainage 741 and Chainage 1074) are also to be removed. The proposed bridges over the River Bride will all be located in a largely industrial urban area and will this will assist in absorbing them into the surroundings.

Several bridge parapets are also to be constructed in a variety of locations along the river. This will include repairs to existing parapets, replacement of parapets and construction of parapets. The potential impact is considered **Permanent, Slight Negative impact**.

A number of pedestrian bridges are to be removed or replaced as part of the proposed works. Bridges to be removed include two bridges in the open space at Blackpool Retail Park. One replacement bridge is proposed as part of the works. The removal of the bridge closest to the N20 (visible in Photomontage 10) result in a change of pedestrian circulation. The predicted impacts are **Permanent, Slight Negative Impact.**

Two bridges are to be removed along the river in Orchard Court, where the river Bride is to be culverted, and these are to be replaced with hard surfaced pedestrian areas. Therefore while the views to the river will be lost, the access previously provided by the bridges will remain. The bridge parapets which were previously in poor condition, are to be replaced by a continuous paved surface which will constitute a positive change to the character of these areas. The predicted impacts are **Permanent, Slight Positive Impact.**

Mitigation Measures

The mitigation measures have been included in the design process.

Residual Impacts

The residual impacts range from **Permanent Slight Negative to Slight Positive Impacts.**

9.6.3.3 Construction of new and replacement culverts and backfilling of existing watercourse

Potential Impacts

The proposed works include construction of new culverts, the longest of which (342 metres) is to be constructed downstream of the N20 Blackpool Bypass, at Orchard Court, as far as the Old Commons Road north of Blackpool Church. This will replace the open channel of the river which presently exists. A section of the river Bride to the rear of Goldenvilla Terrace, will also be infilled. The river currently runs close to the green area at Orchard Court, and concrete step barriers are located along the footpath at edge of

the river in Orchard Court, and these along with dense vegetation combine to restrict views. The concrete barriers currently prevent access to the footpath. The proposed culvert will result in a hard surface over the river, which will not be visible due to the culvert. This will result in a noticeable change in the landscape and visual character of the area, and while there will be some vegetation removal along the channel, and result in increased views from and to the houses on the western bank. The bridges parapets will be removed and this will also open up views to the south towards Blackpool Church. On completion of works, the area over the proposed culvert will be hard surfaced and will result in a wider public footpath. Photomontages 11, 12 and 13 represent views of the proposed hard surface on top of the culvert. The potential impact in this area is considered to be **Permanent, Slight Positive Impact** due to the vegetation removal and construction of hard surfacing, however it is noted that the opening of views to Blackpool and the creation of a public footpath are positive impacts.

A culvert is also to be constructed south of the existing plaza adjacent to Blackpool Church. This will be surfaced by a plaza which will be designed to integrate with the existing public plaza. This will result in an improvement in this area as the open section of river is currently in poor condition and the proposed works will have a positive impact in this area.

A number of other culverts are to be replaced and realigned but these will not have noticeable landscape and visual impacts.

Mitigation Measures

Vegetation is to be retained and replanted where possible. Fences to rear gardens are to be constructed where necessary. Pedestrian surfaces are surfaced in a suitable material.

Residual Impacts

The residual impacts are range from **Permanent, Imperceptible to Slight Negative Impacts** due to the loss of the view of the river and increase in hard surfacing, **to Permanent Slight Positive Impacts** due to the increased pedestrian space and open views towards Blackpool church to the south.

9.6.3.4 Construction of Winter Channel

A winter channel is proposed along the River Bride to the east of the Commons Inn, where there is a sharp bend in the river. This is located in the corner of the Commons Inn car park and is bordered by an area of rough grass and scattered trees. This will involve an excavation (to a maximum of 7 to 10 metres) along the right bank only – there are no works to the left bank at this location, as shown in Section CO6.3 in Appendix 3A.

The excavated bank will have a slope similar to the existing slope and a hand rail is to be constructed at the top of the slope. Some vegetation removal will be required to complete the excavation and the potential impact will be **Permanent Slight Negative Impact** due to vegetation removal.

Mitigation Measures

Vegetation is to be where possible. Following the excavation, the surface is to be covered with a biodegradable membrane to protect the exposed soil while vegetation is re-established in the months following completion of works. The vegetation will assist in reducing the visual impact.

Residual Impacts

Following mitigation, the residual impact will be **Permanent Slight Negative Impact.**

9.6.3.5 Restoration of Open Channel and Sedimentation Trap

Potential Impacts

The proposed works involve the removal of a section of culvert (approximately 100m) and the restoration of open channel in the Sunbeam Industrial Estate, which is bordered by a parking area the industrial estate. The proposed works are shown in Photomontage 8. The views of the river will be restored. Additionally, a sediment trap, along with a maintenance platform and access ramp are to be constructed. The proposed reconstructed channel bed is to incorporate pool and riffles, which, along with vegetation, will somewhat lessen the effect of the hard edges and materials.

A sediment trap consists of an excavation in the existing channel, of approximately 25 m wide and 63 m long and (dimensions to be finalised following site hydraulic analysis) and constructed of either reinforced concrete sheet pile walls and concrete floor. Pedestrian and vehicular access is to be provided on the left (north) bank of the river. This area is not a heavily trafficked public area and impacts will be localised. The area is industrial in character and the proposed works and materials will be consistent with the character of the area. The proposed works will have a **Permanent Slight Negative impact, however** the opening of the river channel as well as the associated access on the opposite bank of the river is described as a potential **positive** impact.

Mitigation Measures

Materials used will be appropriate to the industrial character of the area. The shape of the channel will assist in assimilating the works into the existing area, and re-vegetation will be allowed where possible as indicated in Photomontage 8.

Residual Impact

While the vegetation removal can be described as a **Permanent slight negative impact**, the opening of the river channel, allowing of vegetation, growth on the edges and access to the south side of the river is described as a potential **Long Term, Slight Positive impact.**

9.6.3.6 Trash Screen and Roughing Screens

Three roughing screens are proposed as described in Chapter 2, with predicted **Permanent Slight Negative** impacts.

A trash screen in proposed within the River Bride in the open space in Blackpool Retail Park. An illustration of the likely appearance is shown in Photomontage 9 (which is shown without any debris in the trash screen). Along with the trash screen itself, associated works include re-grading of the ground levels in the vicinity and provision for access to the screen for maintenance. In addition, pedestrian access is being redesigned and will include a bridge adjacent to the trash screen.

The proposed trash screen and associated works in Blackpool Retail Park will be noticeable and the predicted impacts is **Permanent, Moderate Negative Impact.**

Mitigation Measures

The screen is to be maintained and debris removed on a frequent basis, once a month as a minimum, and more frequently if necessary.

Residual Impact

Permanent Term, Moderate Negative impact.

9.6.3.7 Removal of Vegetation and bankside habitat

There will be the loss of some vegetation and screening in certain areas. In particular, vegetation is to be removed in the following key areas.

Vegetation will be removed north of the Commons Inn where the proposed (provisional) sedimentation trap is to be located. Replacement planting is to be carried out where possible and the embankments are to be re-vegetated.

Areas of vegetation to be removed include areas along the river to the rear of the Commons Inn and residences along the Fairhill Stream (adjacent to the Commons Inn) however vegetation will be retained wherever possible and in certain areas, replacement planting will be carried out where possible. In these location the vegetation on the opposite bank is to be retained to minimise visual impact.

Removal of vegetation will also occur in Blackpool Retail Park. This will constitute a change in the environment, opening up views and reducing the tree cover. While trees will be retained where possible, and only some are to be removed, this will result in a change in the character of the open space. This will have a **Permanent Moderate Negative Impact.**

Vegetation removal in Orchard Court will also be considerable, consisting of removal of vegetation on both sides of the river along the lone of the proposed culvert.

Some vegetation may be removed in the vicinity of the Glen River ta facilitate the works.

Predicted Impact: **Permanent, Slight to Moderate Negative Impact.**

Mitigation

Trees and vegetation are to be retained where possible and replanting will occur where possible.

In certain locations, walls and hedging are to be constructed to prevent views to houses and the backs of houses and increase privacy.

Residual Impact

Permanent, Slight to Moderate Negative Impact.

9.6.3.8 Other Works

There are a number of other works which have been considered. These include the re-grading of ground levels at various locations, which are considered to have a **Permanent Imperceptible to Slight Impact.**

Other works with potential landscape and visual impacts include the construction of pumping stations in seven locations, which may include an above ground element likely to resemble a kiosk. This is subject to confirmation, but in these locations the pumping stations are considered to have a **Permanent Imperceptible Negative Impact.**

Certain other works described in Chapter 3 such as below surface works and minor works were assessed and these in general have potential **Permanent Imperceptible to Slight Neutral to Negative impacts.**

9.6.4 Conclusion – Landscape and Visual Effects

In conclusion, 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 increase in views due to this, particularly in terms of residential areas, and construction of flood walls and trach screens in certain areas. Positive impacts include 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.

Overall, however, the location of the works are away from public areas, and in locations screened from view behind the Commons Road.

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 height of the walls allow 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.

The proposed works will not conflict with the City Council objectives, or the North Blackpool Local Area Plan, identified in Section 9.3 and as the proposed changes will be localised in nature, they will not affect the landscape characteristics identified in the City Development Plan. It is noted that the Local Area Plan objective includes a linear open space along the River Bride, as well as an improved public space adjacent to the church of the Assumption in Blackpool. The proposed scheme will not conflict with these measures, and the public plaza has integrated into the proposals as shown in in Photomontage 14.

9.6.5 Conclusion – Cumulative Landscape and Visual Effects

Several projects were considered with relation to potential cumulative effects. It is considered that while these projects are themselves large scale projects, the combination of the proposed River Bride (Blackpool) certified drainage scheme will not have a significant negative cumulative landscape or visual effect. The cumulative visual effects of the project with the Lower Lee flood relief scheme, and the proposed Strategic Development Zone at Monard, are likely to be sequential, as opposed to visible from the same location, while the proposed residential development at the Sunbeam factory site will be visible from within the study area, but it is considered that visual effects will range from Imperceptible to Slight, where they do occur.

In terms of cumulative landscape effects, the changes to the landscape character and fabric as a result of this scheme, in addition to the large-scale projects mentioned above, will not be significant and are anticipated to be Imperceptible.

10 CULTURAL HERITAGE

10.1 INTRODUCTION

This chapter assesses the cultural heritage impacts of the proposed River Bride (Blackpool) Certified Drainage Scheme and, based on this assessment, a number of appropriate mitigation measures are presented. The term 'cultural heritage' is used to encompass the archaeological, architectural, historical and folklore heritage resource. As described in Chapter 3, the proposed scheme is largely centred on the channels of the Rivers Bride and Glenamought and will comprise a combination of flood walls, embankments, culverting a section of open channel, bridge replacements and other works.

This chapter was prepared by John Cronin and Tony Cummins of John Cronin Associates. Mr Cronin holds qualifications in archaeology (B.A. (UCC), 1991), regional and urban planning (MRUP (UCD) 1993) and urban and building conservation (MUBC (UCD), 1999) while Mr Cummins holds both a primary degree in archaeology (B.A (UCC) 1992) and a Master's degree in Archaeology (M.A. (UCC) 1994); both individuals have each amassed over twenty years' postgraduate experience in archaeological and cultural heritage assessment. The chapter also incorporates summaries of an underwater survey of the proposed scheme which was undertaken by the Archaeological Diving Company (ADCO).

10.2 ASSESSMENT METHODOLOGY

10.2.1 Introduction

This chapter presents the results of a desk top survey which aims to identify all recorded and potential archaeological, architectural and other cultural heritage sites within the study area. The survey of the river channels was carried out by ADCO, under licences issued by the National Monuments Service (NMS), during two separate phases in 2016 and 2017 (16D0044 and 17D0067). Relevant extracts from the underwater survey are presented in the chapter and full copies of the two survey reports are presented as Appendices 10.2 and 10.3. The figures and plates referred to within this chapter are provided in both reports and when cited are prefixed with the relevant Appendix number.

All identified cultural heritage sites within the environs of the proposed scheme have been assigned Heritage Asset Numbers (HAN) for the purposes of this assessment. These are identified in table format in Appendix 10.1 which provides locational information and cross-references the assigned HANs with relevant legal designations and the ADCO feature numbers assigned during the site surveys.

10.2.2 Desktop Study

The principal sources reviewed for the assessment of the known archaeological resource were the Sites and Monuments Record (SMR) and the Record of Monuments and Places (RMP) for County Cork. These provide comprehensive lists of the known archaeological resource and their legislative basis is outlined below (Section 10.3.2). The Record of Protected Structures (RPS) as published in the Cork City Development Plan (2015) and the National Inventory of Architectural Heritage (NIAH) were the main sources consulted for assessing the recorded architectural heritage resource. The following sources were also consulted:

Database of Irish Excavation Reports

The Database of Irish Excavation Reports contains summary accounts of all archaeological excavations carried out in Ireland – North and South – from 1970 to 2017.

Development Plans

The relevant development plans for the proposed scheme comprise the Cork City Development Plan (2015) and the North Blackpool Local Area Plan (2011). A short section of the proposed scheme to the east of Glenamought Road Bridge extends into the Cork County Council administrative area and the relevant plan is the Cork County Development Plan (2014).

Cartographic and Photographic Sources

The detail on cartographic sources can indicate past settlement and land use patterns in recent centuries and can highlight the increased impact of modern developments. This information can aid in the identification of the location and extent of unrecorded, or partially levelled, features of archaeological or architectural interest. A range of available cartographic sources were examined for the study area and included the 1st editions of the 6-inch OS maps (surveyed and published in the 1830s & 1840s) and the 25-inch OS maps (surveyed and published 1887-1913). A number of photographic sources were consulted as a means of identifying possible cultural heritage sites, including the Digital Photographs database of the National Library of Ireland (http://www.nli.ie/).

Literary Sources

Literary sources are a valuable means of completing the written archaeological, historical and architectural record of study area and gaining insight into the history of the environs of the proposed scheme. A list of all literary sources consulted is provided in the bibliography.

Placenames Database of Ireland

This database provides a comprehensive management system for data, archival records and placenames research conducted by the State. Its primary function is to undertake research in order to establish the correct Irish language forms of the placenames of Ireland and to publish them on a public website (www.logainm.ie).

National Museum of Ireland Topographical Files

An inspection of the NMI topographical files was undertaken and no entries for artefact discoveries in the vicinity of the proposed scheme were noted.

10.2.3 Site Surveys

The surveys of the areas to be impacted by the proposed scheme were undertaken over a number of phases in 2016 and 2017 in order to confirm the presence and extent of known cultural heritage assets and to identify undesignated assets. The results of the surveys are presented within the chapter and the cited photographs and figures are provided in the ADCO reports (Appendices 10.2 and 10.3).

10.2.4 Cultural Heritage Impact Criteria

The assessment of the impacts on identified cultural heritage assets incorporate various criteria guidelines published by the Environmental Protection Agency (EPA, 2017) and the International Council of Monuments and Sites (ICOMOS, 2011).

10.3 THE EXISTING ENVIRONMENT

10.3.1 Introduction

The proposed scheme will primarily involve a series of interventions along the line of the Rivers Bride and Glenamought as they extend through a study area dominated by the margins of farmland in the north end of the scheme, modern commercial/industrial premises in the central area while the south end extends into the core of Blackpool village. As will be described below, this area 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 both river channels, 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 elements of the historical industrial building stock within the area. The channel of the River Bride has also 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 this watercourse within the study area has also been subject to cleaning projects in recent decades many of which undertaken following flooding events.

10.3.2 Legal and Planning Context

The management and protection of cultural heritage in Ireland is achieved through a framework of international conventions and national laws and policies. This is undertaken in accordance with the provisions of the 'European Convention on the Protection of the Archaeological Heritage' (the Valletta Convention) and 'European Convention on the Protection of Architectural Heritage' (Grenada Convention). Cultural heritage can be divided loosely into the archaeological resource covering sites and monuments from the prehistoric period until the post-medieval period and the architectural heritage resource, encompassing standing structures and sites of cultural importance dating from the post-medieval and modern period. In addition, local place-names, folklore and traditions are considered part of our cultural heritage.

The legislation, national policy statements, guidelines and advice notes relevant to this assessment include:

- National Monuments Act 1930 (and amendments in 1954, 1987, 1994 and 2004).
- Heritage Act (1995).
- National Cultural Institutions Act (1997).
- Policy for the Protection of the Archaeological Heritage (Department of Arts, Heritage, Gaeltacht and the Islands 1999).
- Architectural Heritage (National Inventory) and National Monuments (Misc. Provisions) Act (1999).
- Planning and Development Act (2000).
- Department of Environment, Heritage, and Local Government's Architectural Heritage Protection: Guidelines for Planning Authorities (2004).

Archaeological Resource

The National Monuments Acts 1930 to 2004, the Heritage Act 1995 and relevant provisions of the National Cultural Institutions Act 1997 are the primary means of ensuring the satisfactory protection of

archaeological remains. Archaeological monuments are protected under the Register of Historic Monuments, the Record of Monuments and Places (RMP) and the placing of Preservation Orders and Temporary Preservation Orders on endangered sites. There are three recorded archaeological sites within close proximity to the proposed scheme and these comprise three former mills (see Section 10.3.3; Table 10.1).

The Cork City Development Plan 2015-2021 defines the extent of the primary and secondary zones of archaeological potential for Cork city and the study area is located outside these areas. It also outlines a range of objectives in relation to the protection of the archaeological heritage within the city. These objectives include the protection of recorded archaeological sites, industrial archaeological buildings and features as well as underwater and buried archaeological material (Cork City Council 2015).

A short section of the study area located to the east of Glenamought Road Bridge extends into the Cork County Council administrative area and one recorded archaeological site is located within this section (Mill CO063-067----). The Cork County Development Plan also includes various objectives for the protection of the archaeological resource, including the underwater and industrial archaeological resources (Cork County Council 2014).

Architectural Heritage Resource

Protection of architectural heritage is provided for through a range of legal instruments that include the Heritage Act, 1995, the Architectural Heritage (National Inventory) and National Monuments (Misc. Provisions) Act, 1999, and the Local Government Planning and Development) Act 2000.

The Planning and Development Act 2000 obliges planning authorities to keep a Record of Protected Structures (RPS) of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. The Cork City Development Plan (2015) lists four Protected Structures within the environs of the proposed scheme: The Church of the Annunciation (PS1139), Madden's Buildings (PS491), Kilnap Glen House (PS616) and Kilnap Viaduct (PS617). The Cork County Council Development Plan 2014 does not designate any of the buildings within the environs of the short section of the proposed scheme that extends into the county administrative area.

As described below, the proposed scheme will not result in any direct physical impacts to these Protected Structures although elements of the proposed works will be undertaken in their vicinity. Potential indirect impacts on the Protected Structures and associated curtilage features are assessed below (Section 10.5).

The Architectural Conservation Areas (ACA) within Cork City are defined in the City Development Plan 2015 as a place, area, group of structures or townscape that is of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest or contributes to the appreciation of protected structures. The Blackpool ACA as defined in the Cork City Development Plan 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 (Figure 10.1). The south end of the proposed scheme extends into the Blackpool ACA.

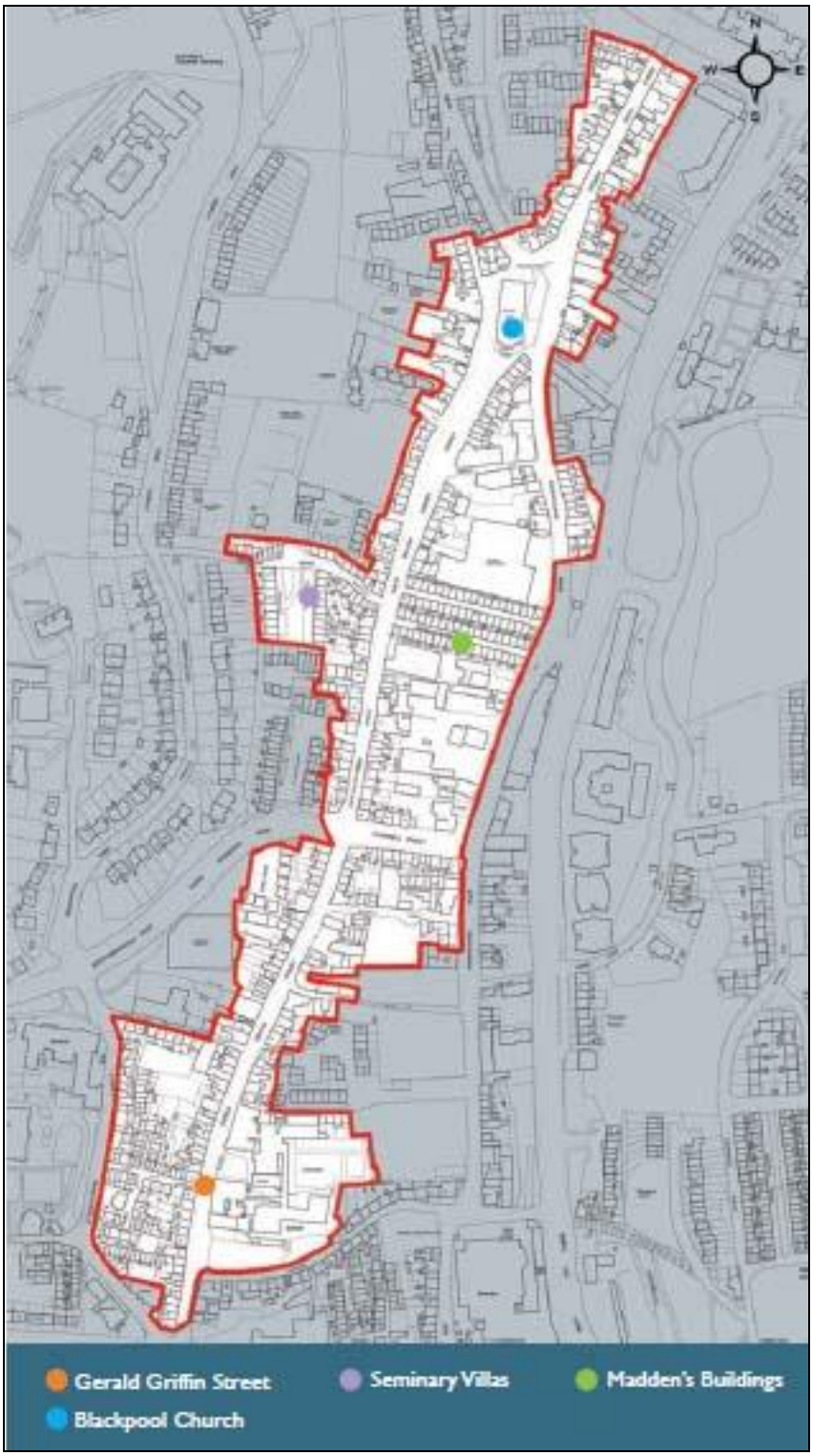

Figure 10.1: Boundary map of Blackpool ACA

The Architectural Heritage Act 1999 (National Inventory) established the National Inventory of Architectural Heritage (NIAH) to record built heritage structures within the Republic of Ireland. While inclusion in the NIAH does not provide statutory protection to a structure the inventory is used to advise local authorities on compilation of a Record of Protected Structures (RPS). Six structures within the environs of the proposed scheme are included in the NIAH and the published inventory descriptions of these

buildings are presented below (Section 10.3.3). The Cork City Development Plan (2015) undertakes to protect structures listed in the NIAH and other structures of built heritage interest (Objective 9.28). As described below (Section 10.5), the proposed scheme will not result in any direct impacts to the NIAH structures within the study area although elements of the proposed works will be undertaken in their vicinity.

10.3.3 Desktop Study

The following section presents the results of a desktop study on the archaeological, architectural and historical heritage within the environs of the scheme which was undertaken in order to inform assessment of the impacts of proposed works. The study aims to provide a context for the development of the general area since prehistory and to identify the recorded/protected archaeological sites in close proximity to proposed works locations. The available published inventory descriptions of these sites are provided within this section while further descriptions are also presented in the survey section of the chapter (Section 10.3.4).

There are three recorded archaeological sites within close proximity to the proposed scheme and these comprise three former mill sites (Table 10.1). It should be noted that it is possible that further unrecorded archaeological sites and artefacts still remain undetected below the present ground surface or river sediments.

Table 10.1 Recorded Archaeological Monuments within environs of scheme

HAN	RMP/SMR ref.	Classification/Townland	National Grid Ref.
1	CO063-067----	Mill/Kilbarry	167278, 75299
4	CO074-115----	Mill/Kilnap	167369, 74120
5	CO074-112----	Mill/Kilnap	166479, 74960

There are no recorded prehistoric sites within the study area although there is evidence that the lands surrounding the area now occupied by Cork City have been settled by human communities since the Stone Age. While it is probable that the development and expansion of the urban area in recent centuries has removed the surface traces of prehistoric sites the potential presence of unrecorded sub-surface prehistoric features and/or artefacts within the environs of the scheme cannot be discounted.

While there are no surviving traces of early medieval settlement sites within the environs of the scheme, the Gaelic origins of a number of place names in the area indicate that it was occupied during this period, e.g. Kilnap (*Cill a nAp* - the church of the abbots) Kilbarry, (*Cill Bharra* - 'Barra's church') and Rathpeacon (*Ráth Phéacáin* - Becan's ringfort) while the Blackpool area was known as *Foithrigh Aedha* ('place of the wooded glen') (Hurley *et al* 2006).

The Shandon area in the lands to the south of the proposed scheme developed as a borough outside the city during the 13th and 14th centuries and there is no evidence that this settlement had expanded into Blackpool during that period. There are references to the northern suburbs being abandoned by 1400 AD and historical deeds indicate that the Shandon area was subsequently occupied by gardens and orchards until the late 16th century (*ibid*). The city began to spread back into Shandon during the 17th century and the detail on 18th century maps indicates that the outer suburbs had begun to extend into the Blackpool area by the second half of that century. While the majority of the study area remained within the agricultural hinterland of the city during the 19th century the detail on the 1st edition 6-inch OS map (Appendix 10.2: Figure 8) demonstrates that the existing streetscape in Blackpool village was present by the 1830s.

The natural topography and drainage of the study area comprises a sloping valley setting which contains the confluence of a number of non-tidal watercourses and these provided a consistent flow of water that was highly advantageous for the water-powered industries that began to develop in the area during the 18th century. By the 19th century the Blackpool area and its environs contained several mills, distilleries and tanneries and had developed into one of the most important industrial centres in Cork city. The dramatic increase in the amount of industries all feeding of the same rivers and streams in this area began to result in water shortages as the 19th century continued and this coincided with the widespread adoption of steam powered machinery at the same time. The Blackpool industries went into decline towards the end of the century as the presence of suitable water supply became less critical to factories and mills and allowed the development of new industrial centres closer to the loading areas on the River Lee docks.

The following section presents a summary of the notable 18th and 19th century industrial, residential and infrastructural sites and structures sited in close proximity to the proposed scheme and includes their published inventory descriptions.

Kilbarry Mill (HAN 1)

The east end of the proposed scheme along this river will entail the construction of dryland flood defences in close proximity to the fragmentary ruins of the Kilbarry mill site (CO063-067----). The following description of this site has been published in the *Archaeological Inventory of Cork: Vol. II* (Power 1994):

> On S bank of Glenamought River. Indicated on 1842 OS 6-inch map as three separate buildings, structure at NE end named 'Corn Mill'. Range of three buildings survive built into NW-facing slope with access on SE side at upper floor levels. Central 2-storey, rectangular structure (int.: 11.05m SW-NE; 6.2m NW-SE) appears to be remains of earliest structure with later mill attached at NE end: roofless rectangular 4-storey mill (int.: 13.3m NE-SW; 8.14m NW-SE) of 4 bays; brick-arched opes to windows. Wheel-pit (Wth 1.78m) along NE wall which housed high breastshot or overshot waterwheel. Arched opes in NE wall of mill suggests power was transferred into mill via pinion wheel. Support stones for machinery and two conglomerate millstones survive within. Mill race (dry) approaches from SW. Residential structure attached to SW end central structure; 2-storey, 3-bay. According to local information, house abandoned in 1973.

Glenamought Road Bridge (HAN 37)

This bridge is located to the west of Kilbarry mill and is present on the 1st edition 6-inch OS map (Appendix 10.3: Figure 3). While this bridge is not a protected structure it is listed in the NIAH (20906320) which has published the following description of the structure:

> Date 1800 - 1840
>
> Townland KILBARRY
>
> Coordinates 167206, 75282
>
> Categories of Special Interest ARCHITECTURAL TECHNICAL
>
> Rating Regional
>
> Description: Single-arch rubble limestone bridge, built c. 1820, carrying road over Glenamought River. Vertical coping stones to parapet walls. Round arch with dressed voussoirs.
>
> Appraisal: Long low parapet walls visible from winding approach road to north and south, bringing architectural interest to rural landscape, with vertical copings. Carefully designed and executed arch evidence of skill of stonemasons and stonecutters involved in construction.

Glen Mill/Distillery (HAN 2)

This complex is located to the west of Glenamought Road Bridge and was originally a flour mills, owned by John Power, which is shown on the 1st edition 6-inch OS map (Appendix 10.3: Figure 3). It was converted into a whiskey distillery in 1882 and this continued in operation until the 1920s (Rynne 1999, 74). The distillery drew water from a dammed millpond to the east and cooling pipes were installed in the bed of the adjacent river. An auction inventory dating to 1884 listed a 40 foot diameter iron overshot waterwheel as part of the mill stock and in 1887 the associated granaries had a storage capacity of 7,000 barrels (*ibid*). Much of the site has been redeveloped as a modern commercial property and it is not listed in the RPS, NIAH, SMR or RMP.

Kilnap Road Bridge (HAN 8)

This bridge spans the Glenamought River in the area to the west of the Glen Distillery and is present on the 1st edition 6-inch OS map (Appendix 10.3: Figure 3). While this 19th century road bridge is not a protected structure; it has been included in the NIAH (ref. 20858004) which describes it as follows:

Reg. No.: 20858004

Date: 1820

Townland: CARHOO

Coordinates:166578, 75046

Categories of Special Interest ARCHITECTURAL SOCIAL TECHNICAL

Rating: Regional

Description: Six-arch road bridge, built c.1820, to carry Cork to Mallow road over valley of Glenamought River. Coursed rubble stone walls with squared stone voussoirs to round-headed arches. Putlog holes and corbels to walls of barrels. V-shaped buttresses to spandrels. Coursed rubble stone parapets with soldier coping and drainage holes at lower level to west. Parapet repaired to east. Tarmacadam carriageway with footpath to east. Appraisal: This substantial road bridge, spanning a deep river valley, represents a major feat of engineering on the part of its builders. Interestingly, the technology utilised in the construction of the towering spandrel walls is clearly visible in the surviving putlog holes

Kilnap Viaduct (HAN 10)

This located immediately to the west of the road bridge and is listed as a protected structure in the City Development Plan (PS617) and is also included in the NIAH (ref. 20858005). This rusticated stone viaduct structure was constructed to form a rail crossing over the Glenamought River in the 1840's and a number of its tall masonry footings extend across the river valley. The NIAH has published the following description of the structure:

Date 1840 - 1850

Townland CARHOO

Coordinates 166514, 75015

Categories of Special Interest ARCHITECTURAL SOCIAL TECHNICAL

Rating: Regional

Description: Eight-arch railway viaduct, built 1845, carrying Great Southern & Western Railway line to Cork over valley of Glenamought River and Mallow Road. Rock-faced ashlar limestone piers with cut stone impost supporting

squared coursed limestone spandrels with dressed limestone string course. Rock-faced limestone voussoirs to round-headed arches. Ashlar limestone vaults to barrels. Squared coursed limestone parapet with cut stone coping.

Appraisal: This impressive viaduct is among a group of railway structures dating to the mid nineteenth-century which attest to the high standard of engineering and stone masonry employed in their construction. The viaduct forms an impressive addition to the landscape with the variety of stone treatments used adding a sense of permanence and robustness. The development of a vast railway network across Ireland during this era brought a revolution in the transport of people and goods, and consequently great social change.

Kilnap Glen House (HAN 3)

The property to the west of the viaduct contains Kilnap Glen House which is a still-inhabited 19th century structure listed in the NIAH (20858003) and is present on the 1st edition 6-inch OS map (Appendix 10.2: Figure 8). The Cork City Development Plan also refers to a Protected Structure in this townland named 'Kilnap House' (PS616). This is the name of a house formerly located in a property to the south which was demolished during the 20th century. It is probable that the Development Plan has used its name to refer to Kilnap Glen House and it is concluded that the house in this property is Protected Structure PS616. The NIAH for County Cork has published the following description of the house:

Date 1820 - 1850

Townland KILNAP

Coordinates 166434, 74971

Categories of Special Interest ARCHITECTURAL ARTISTIC

Rating: Regional

Description: Detached three-bay two-storey house, built c.1830, with advanced end bays having canted bay windows added to west (front) elevation c.1880 and advanced central bay to east (rear) elevation. Hipped slate roof with smooth-rendered chimneystacks. Projecting timber battened eaves with replacement rainwater goods. Roughcast-rendered walls with raised plinth, moulded render continuous sill course to centre bay west elevation and east elevation and cornice with fascia above to eaves. Decorative render plaques with hood mouldings to west and east elevations. Square-headed window openings with splayed sills timber mullions and transoms and timber four-over-four sliding sash windows c.1880. Pointed arch sliding sash windows to canted bays with decorative overlights. Square-headed openings flanking main door and to east elevation with timber mullions and transoms, pointed-arch sliding sash windows having decorative overlights and hood mouldings with label stops. Tudor arch door opening with chamfered reveals, hood moulding with decorative stops and limestone threshold. Timber double doors with stained glass lights and carved lower panels set in carved timber architrave. Door accessed via limestone steps flanked by piers surmounted by limestone flower pots. House set on own grounds.

Appraisal: This distinctive house displays a well-proportioned design accentuated by the varied treatment of its fenestration. The timber windows with decorative tracery add artistic interest, which is enhanced by the decorative render plaques, moulding stops and stained glass to the door

The detail on the 1st edition 6-inch OS map indicates that the existing open garden area surrounding the immediate environs of the house was also undeveloped open area during the 19th century (Appendix 10.2: Figure 8). The existing access to the property is via a driveway extending from the public road to the east, which includes stone-built bridge over the channel (HAN 14). This small bridge is not a protected structure and it is not present on the 1st edition 6-inch map, which shows the access to Kilnap Glen House extending along the area to the north of the river in an area now occupied by a modern dwelling house. A crossing point is shown at this location on the 25-inch map and this is on the line of a new access road to the mill property to the south of the house. This indicates that the bridge post-dates the construction and use of

Kilnap Glen House during the first half of the 19th century. It appears to have been built to provide access to the neighbouring mill property, perhaps when the original Shaw's mill was replaced with a new structure during the late 19th century.

Kilnap Mill (HAN 4)

The Kilnap Glen House property contains the roofless remains of a mill building which has been designated as a recorded archaeological monument (CO074-112----). This is located adjacent to the southeast end of the garden and comprises the ruins of a 19th-century corn mill which was built on the site of any earlier structure known as Shaw's Mill. The detail on the 1st edition 6-inch OS map (Appendix 10.2: Figure 8) indicates that the mill was confined to the south end of the property and did not extend into the existing extent of the house garden. This site has been described as follows in the *Archaeological Inventory of Cork: Vol. II* (Power 1994).

> On S side of Kilnap Glen, site of Shaw's flour mills, built in 1830s, replaced in late 19th century by present mill, marked 'Corn Mill (disused) 'on 1902 OS 6-inch map, taken over shortly thereafter as sculpture works. Roofless square 2-storey red sandstone building with rusticated limestone quoins. N elevation of 6 bays, camber-headed brick-arched window opes, wide arched ope at N end of E wall with date '1871'. W wall removed when 2-storey addition built onto W side. Earth-filled pit in narrow yard outside E face; probably housing downward axial flow or pelton wheel turbine (Rynne pers. comm.) fed by cylindrical vertical duct. Iron water tank above shaft fed by brick-lined head race via lintelled culvert. To S, bed for cross compound steam engine; flywheel attached to crank driven eccentric rod which transmitted power to well preserved stone saw to N (Rynne pers. comm.). Arch at base of W wall of pit probably channelled tail race under mill. Interior of mill filled with rubble. S wall of earlier structure (long axis E-W) survives to S, revetting hillside; low brick-arched ope at E end leads at angle into earth-filled tunnel; according to local information flue led to octagonal brick chimney (H c. 10m) atop hill c. 50m to S. Second arch may be for boiler. One-storey gabled structure (long axis E-W) to E of mill, 6 bays on N elevation; second steam engine bed and remains of saw to E. Parts of retaining wall to S date from pre-1842 mill; no trace of wheel pits for two water wheels in use in 1860s (Rynne pers. comm.). Mill pond to E, substantially enlarged in late 19th century. Massive rusticated stone railway viaduct (constructed c. 1849) crosses E edge of site.

Fitz's Boreen road bridge (HAN 16)

The proposed scheme will entail the removal of an existing masonry road bridge on a local road known as Fitz's Boreen. A roadway and bridge over the river channel are shown on the 1st edition 6-inch OS map (Appendix 10.2: Figure 10.1) demonstrating at least an early 19th century construction date. The existing bridge comprises a two-arched structure of random rubble construction and the parapets have been replaced by a combination of modern railings and a concrete wall along a pedestrian footpath on the west side. This bridge is not listed in the RPS or NIAH and further details on the structure, including a drawn and photographic record, are presented in the 2016 ADCO report (Appendix 10.2).

Dulux Paints Factory and Former Sunbeam site (HAN 5)

The channel extends through the Dulux Paints Factory in the area immediately south of the road bridge. This factory was initially developed as the Shandon Chemical Works in the 19th century and was then extensively modernised during the 20th century. The slightly meandering channel indicated on the historic OSI mapping (Appendix 10.2: Figure 8) is no longer evident within the concreted section of the channel that now extends through the factory boundary, indicating that this section of the channel was extensively impacted during the 20th century. The former Sunbeam complex included a 19th century flax mill (HAN 5) that is listed as a recorded archaeological site (CO074-115----). The north end of the property, which was known as Millfield, was initially developed as a distillery by Morgan Coldwell in 1783. The site was then re-developed as a flax mill, built 1864-66, which initially operated as the Cork Flax Spinning and

Weaving Co. and latterly as Sunbeam Wolsey. The operation was centred on a main brick-built mill building in the area to the north of the river channel while ancillary structures, including offices, stores and residences were gradually expanded throughout the site into the 20th century. The mill continued in use into the 1920's and was re-opened as the Sunbeam Wolsey garment factory in the 1930's. This operated until the 1990's and, while there were attempts made to keep the factory in use beyond this time, it was extensively damaged during a fire in 2003. The fire-damaged building remains have been cleared and no surface traces of the 19th mill buildings survive within the open brownfield area on the north side of the channel. The historic OS maps indicate that none of the 19th century mill buildings were located within 40m of the nearest element of the proposed scheme and also indicate that the existing line of the channel comprises a 20th century diversion (Appendix 10.2: Figure 8).

Blackpool Village

As previously noted, this area appears to have formed part of the rural hinterland of the city until it was developed around the milling industries that began to develop in the area during the 18th and 19th century. Areas of the historic core of Blackpool were extensively altered during the late 20th century when many of the industrial complexes were demolished during the construction of the Blackpool Bypass and the development of extensive residential and commercial estates. This work also saw the removal of various elements of the historic streetscape including former laneways; boundary walls and the replacement of stone bridges with modern concrete structures.

The City Development Plan lists two protected structures within the environs of the section of the proposed scheme within Blackpool: The Church of the Annunciation (HAN 6; PS1139) and Madden's Buildings (HAN 7; PS491). The south end of the scheme also extends into the Blackpool Architectural Conservation Area (Figure 10.1). The 20th century redevelopment of Blackpool and its northern outskirts also had significant impacts on the watercourses that flow through the study area as they also involved extensive channel diversions and the creation of culverts under the modern streetscape. The south end of the scheme extends into the Blackpool ACA and the City Development Plan describes the surviving building stock within this area as follows:

> (it) ranges from the eighteenth to twentieth centuries, but is mainly characterised by the nineteenth century residential two and three-storey buildings that line the principle thoroughfare. Several examples of eighteenth century buildings are also evident, identified by their steeply pitched roofs and narrower openings on the upper floors. As is traditional in the area, buildings are generally constructed of rubble-stone or brick, usually rendered and painted. Smaller one and two storey dwellings are located in the laneways off the main street, indicative of the type of building and plot layout prevalent in the eighteenth and nineteenth centuries. The Church of the Annunciation dominates the streetscape of the village centre and is significant as the work of the sculptor Seamus Murphy who served his apprenticeship in a Blackpool stone yard. There are a number of traditional timber shopfronts in the area that have been retained even in cases where the buildings no longer serve as commercial premises. Where buildings have retained their original features and finishes, they have painted plastered facades, roofs of natural stone slate, cast-iron rainwater goods, and painted timber doors and sash windows.

The NIAH has published the following description of the Church of the Annunciation (HAN 6):

> Reg. No. 20862036
>
> Date: 1940 – 1950
>
> Townland: FARRANFERRIS
>
> Coordinates: 167434, 73263
>
> Categories of Special Interest: ARCHITECTURAL ARTISTIC SOCIAL

Rating: Regional

Description: Freestanding gable-fronted Roman Catholic church, commenced 1945, having three-stage square-plan entrance tower to south, two towers to the rear (north) elevation forming transepts, eight-bay nave side elevations, east and west aisles and flat-roofed sacristy to north. Pitched pantiled roofs, copper-clad pyramidal roofs to towers, copper crucifix finial to front tower, profiled metal rainwater goods. Painted stippled render walling with smooth render dressings, smooth render crucifix to south tower wall. Paired round-headed window openings to clerestory, square-headed openings to side aisles, in smooth render block-and-start surrounds with splayed sills and leaded stained glass windows. Square-headed door opening in round-headed dressed limestone surround having carved Portland stone tympanum and timber matchboard double doors, accessed via set of steps from street level. Interior with painted coffered ceiling, painted stippled render walls, carpeted flooring. Choir to south, round-headed arches to side aisles, central aisle between timber pews, marble altar and rails to side chapels. Street-fronted, located in central island between streets.

Appraisal: The Church of the Annunciation is a notable example of mid-twentieth-century ecclesiastical architecture. Designed by noted Irish sculptor and Blackpool native, Seamus Murphy, along with architect E.P. O'Flynn, it is of concrete block construction and very characteristic of its period. Built on the site of a former church, St Nicholas', dating from the 1890s, it was built with funds donated entirely by William Dwyer, Managing Director of Sunbeam Ireland and his staff. The contribution to its design and the striking stonework, tabernacle, lamp, candlesticks and other brasses designed by Seamus Murphy and stained glass windows by the Harry Clarke Studios contribute to its artistic significance. Prominently sited, this church forms a local landmark in the area.

Excavations Database

The database lists eleven archaeological site investigations undertaken within the townlands in the environs of the proposed scheme. These range in scale from small test trench investigations within individual properties to the archaeological monitoring of the extensive ground works undertaken during the construction of the Blackpool Bypass. The majority of these site investigations uncovered nothing of archaeological significance although a number of industrial heritage features were recorded in advance of the construction of the road bypass. Two of the site investigations listed in the Database are of particular interest to the present assessment. A program of archaeological investigations adjacent to a section of the River Bride within the study area (Kilnap townland) included a metal-detecting survey of the channel (Purcell 2003). Nothing of archaeological significance was uncovered and the only inclusions noted within the channel comprised modern rubbish material. Archaeological monitoring of the construction of a residential house to the south of the Kilnap Glen House property, within the zone of potential surrounding Kilnap corn mill (HAN 4; CO074-112----), also uncovered nothing of archaeological significance (Cummins 2007).

It is possible that unrecorded, sub-surface archaeological sites and artefacts may still remain undetected below the present ground surface and river sediments within the study area. Irish riverine locations have been utilised as food and transport resources since the arrival of the first hunter-gatherer groups in the early prehistoric period while they were also occasionally used as the sites of ritual deposition during the Bronze and Iron Ages. As noted above, the presence of the watercourses within the Blackpool area has resulted in the area been exploited as a milling centre in recent centuries and there is the potential for the survival of unrecorded features associated with the early industrial activity. The absence of archaeological remains noted during many of the archaeological investigations previously carried out within the study area indicate that this potential may be limited in part due to the extensive 20th century interventions within the lands adjacent to the channels, which included diversions of sections of the River Bride channel.

Placename evidence

The boundaries and nomenclature of the Irish townlands were recorded and standardised by the Ordnance Survey of Ireland during the 19th century. The Irish roots of townland names often refer to natural topographical features but some name elements may also give an indication of the presence of past human activity within the townland, e.g. dun, lios, rath indicate the presence of a ringfort while names such as temple, saggart, termon, kill suggest an association with a church site. A number of the townland names within the study area indicate the presence of secular and ecclesiastical early medieval activity within the study area, i.e. Kilnap, Kilbarry and Rathpeacon.

Table 10.2 Translation of townland names in vicinity of study area (Source: www.logainm.ie)

Townland	Translation
Kilnap	Coill Chnap (church of the abbot)
Commons	An Coimín (associated with Fair Hill)
Ballyvollane	Baile Uí Mhaoláin (O'Bolands town)
Kilbarry	Cill Bharra, 'Barra's church' (associated with a holy well)
Farranferris	Fearann Phiarais (Pier's land)
Rathpeacon	Ráth Phéacáin (Becan's ringfort)
Carhoo	An Cheathrú (quarterland)

10.3.4 Survey

This section presents the combined results of the field and underwater surveys of the proposed scheme which were undertaken during a number of phases in 2016 and 2017. The survey description begins at the east end of the proposed works along the Glenamought River and then continues westwards to the confluence with the River Bride which it then follows southwards to Blackpool village. The majority of the proposed flood defence works will be centred on the river channel and banks and the following description of the survey works is primarily sourced from the ADCO reports presented as Appendices 10.2 and 10.3.

The on-site underwater survey work of the comprised systematic non-disturbance waded inspection of the two river channels, their attendant bank structures, and any associated riverine features, including bridge structures (piers and foundations), weirs, culverts, river-walling, and any natural features encountered. Particular attention was paid to the assessment of two masonry bridge structures, located at Kilnap Glen House and Fitz's Boreen, which are to be removed as part of the proposed scheme. The underwater survey included the compilation of drawn records of both of these structures (Appendix 10.2: Figures 30 and 31).

The River Bride, including its tributary the Glenamought River, has witnessed successive alteration/adaption of the waterway with the development of milling and other industrial activity in the nineteenth-century. In addition, the area has undergone extensive modern alterations as a result of the twentieth-century development of the surrounding landscape. Cartographic evidence supports the findings from the in-water survey that two substantial sections of the present day River Bride, running adjacent to the Commons Road, are created watercourses of twentieth-century date; running northwest to southeast at a distance of between c. 10m to c. 70m from the original line of river. The historic watercourse has been maintained along the southernmost section of the river, as it flows through Blackpool Village itself. The Glenamought River course remains largely unaltered by twentieth-century intervention.

The underwater survey identified a series of twenty-nine known or previously unrecorded features of historic significance within the original courses of the two river channels (Features HAN 8-HAN 37). The

features include: six bridge structures (HAN 8, HAN 10, HAN 14, HAN 16, HAN 33 and HAN 37); multiple sections of river walling (HAN 11, HAN 15, HAN 17, HAN 22, F18, HAN 28, HAN 29, HAN 31, HAN 34 and HAN 36); three masonry culverts (HAN 20, HAN 21 and HAN 23); two rubble stone weirs (HAN 12, HAN 26 and HAN 35); section of a bridge arch (HAN 18); a masonry culvert arch (HAN 19); a millrace (HAN 14), a tailrace (HAN 27), a millpond (HAN 24), sections of mill walls (HAN 30 and HAN 32) and the remains of a dam/ weir structure (HAN 9). In addition, numerous cut-stone pieces (see Appendix 10.3; CS01-15) were encountered in the riverbed, along the upstream section of the Glenamought River survey area. The masonry pieces are associated with the construction of the Railway Viaduct in 1849 (HAN 10) and other stone-cutting activity that took place within the grounds of Kilnap Glen House (HAN 3) in the nineteenth-century. Currently there is no in-water work planned for this section of the Glenamought River. However, in the event that potential impacts such as in-channel maintenance works, do arise as part of any additional in-river works, these architectural pieces will be recovered and recorded more fully at that point. Two further cut-stone pieces were identified at separate locations along the River Bride (see Appendix 10.2; CS16 and CS17).

The River Bride and its tributary the Glenamought River were sub-divided into six survey areas to allow the systematic discussion of the river topography present along their extent. These river areas are geographically delineated as follows:

Table 10.3: River Survey Topographical Areas

Area	National Grid Ref.	Location
River Area 1	166591E, 75068N to 166295E, 74689N	Glenamought River as it flows through the grounds of Kilnap Glen House to its confluence with the River Bride Note: a section of Rathpeacon Stream is included in this area.
River Area 2	166001E, 74679N to 166920,74242N	River Bride as it flows from Rose Cottage to a Masonry Bridge located at Fitz's Boreen.
River Area 3	166920,74242N to 167453E, 73652N	River Bride from downstream side of a Masonry Bridge at Fitz's Boreen to point adjacent to Springview Terrace, Blackpool Village.
River Area 4	167453E, 73652N to 167447E, 73240N	River Bride as it flows past Orchard Court to a point adjacent to the Church of the Annunciation in Blackpool Village.
River Area 5	167423E, 72757N to 167435E, 72620N	Section of the River Bridge located adjacent to Watercourse Court and the North Link Road.
River Area 6	1665121E, 75025N to 167261E, 75328N	Additional works in section of the Glenamought River extending east from Kilnap Viaduct

The main underwater survey of the river channels was undertaken in 2016 while a second survey of proposed additional works in the Glenamought River (River Area 6) was carried out in 2017. The following descriptions of these surveys are directly sourced from the ADCO reports which are presented as Appendices 10.2 (2016 survey) and 10.3 (2017 survey). The assigned Heritage Asset Numbers referred to in the following section should be cross-referenced with the ADCO feature numbers as outlined in Table 10.4 below. The ADCO feature numbers run consecutively in the two underwater survey reports with HAN features 8-23 identified in the 2016 survey (Appendix 10.2) and HAN 25-37 in the 2017 survey (Appendix 10.3). The figures and photographic records compiled during the ADCO surveys are also presented in these Appendices. The figure and plate numbers begin at No. 1 in each report and where they are referred to within the following sections the relevant report is identified by its Appendix reference.

River Area 1 (Appendix 10.2: Profiles P1-P12, Figures 11-12)

This area contains Kilnap Glen House (HAN 3) which is a 19th century structure listed in the RPS (PS616) and the NIAH (ref. 20858003). The south end of this property also contains the roofless remains of Kilnap Mill (HAN 4); a recorded archaeological site (CO074-112----). Kilnap Viaduct (HAN 10) extends along the east end of the property and this structure is listed in the RPS (PS617) and NIAH (ref. 20858005). Kilnap Road Bridge (HAN 8) is located to the east of the viaduct and, while not a protected structure, it is included in the NIAH (20858004). Proposed flood defences, comprising a combination of embankments and a flood wall, in the garden area of this property around the house will not directly impact on the house, mill site, viaduct or any associated curtilage features.

The Glenamought River has been subject to considerable nineteenth- and twentieth-century intervention. The river channel has been straightened and bankside consolidation measures are evident along much of its extent. The basal deposit that forms the natural riverbed is frequently exposed to reveal a compact silty-clay which is sterile in nature. Overlying deposits are large with pebbles, cobbles, and boulders forming much of the visible riverbed. Pockets of gravels were noted, although in general there is and little deposition taking place. Given the compact nature of the riverbed, coupled with the fast flowing character of the watercourse, a very poor holding content can be ascribed to the stretch of the Glenamought River under assessment.

The riverbed upstream of Kilnap Road Bridge is composed of angular to sub-angular pebbles, interspersed with fragments of shale (>20cm). Pockets of coarse-sand and gravel are also present. Water-rolled nodules of silty-clay were noted within the sand/gravel pockets. This section of river is fast-flowing and a water depth of 0.20m was measured. The base of the riverbed is exposed in places and is composed of a compact silty-clay (sterile), light-brown in colour. The south bank is ill-defined and measures 0.30m-0.40m in height. In contrast, an almost vertical bank (subject to recent erosion) forms the north bank at this location. This structure is composed of compact-clay with frequent shale (boulder) inclusions. A degree of deposition is active along south side of the river, c. 7m upstream of Kilnap Road Bridge. Shale bedrock is exposed across the riverbed beneath the bridge, providing a platform upon which its foundations have been constructed.

The section of river between Kilnap Road Bridge (HAN 8) and Kilnap Viaduct (HAN 10) comprises deposits of gravel and sub-angular pebbles, interspersed with fragments of shale (>20cm), that overlie a base layer of compact silty-clay. In addition, large pieces of limestone masonry are present within the riverbed, measuring up to 0.60m in length x 0.40m in width. Exposed bank sections are composed of compact clay with shale inclusions forming a layer of glacial-till. Water depth increases to 0.30m, with occasional deeper pockets being present. Rock armour has been placed on the outer side of the meander and includes the use of cut-stone masonry recovered from the riverbed. From a point c. 26m upstream of Kilnap Viaduct, both riverbanks have been subject to modern protection measures, including the placement of stone-filled gabions; extending 50m along the north side of the river and 127m on the south. Beneath the viaduct, river-flow is increased as the natural topography falls to the south. The riverbed is composed of large shale boulders, interspersed with sub-angular shale cobbles. In addition, frequent limestone masonry associated with the construction of the railway bridge is present along this section of riverbed. As previously noted, the riverbed is exposed in places to reveal a base deposit of compact silty-clay.

The stone-filled gabions, placed along the south side of the watercourse, terminate adjacent to Kilnap House. The northern side of the river is delineated by a 78m section of river-walling (HAN 1). A small flood embankment has been placed on the south side of the river, between Kilnap Glen House and river

channel (Appendix 10.2: Plate 17). The riverbed comprises a sterile clay base with overlying boulders and sub-angular cobbles (Appendix 10.2: Plate 18). Water depth is increased (0.40m-0.50m) along this stretch of the river and is due to the presence of a small weir structure (HAN 12) which located a short distance downstream (Appendix 10.2: Plates 19-20). A degree of deposition was noted for the riverbed immediately upstream of the weir. The north side of the river becomes wooded (small trees, laurels and rhododendron) at this location and a number of mature trees line the southern bank. A modern water feature has been constructed on the north side of the river, downstream of the weir (Appendix 10.2: Plate 21). This comprises a series of wide steps, built into the side of the river channel, designed to accommodate water-flow from a small pond located 10m to the north. A large bedrock outcrop is also located on the north side of the river, a short distance downstream from the aforementioned water feature (Appendix 10.2: Plate 22). Riverbed composition remains similar to that observed upstream and frequent pieces of limestone masonry, red-brick, and modern breeze blocks were encountered within the riverbed (Appendix 10.2: Plate 23-24). The river channel is delineated, starting from a point downstream of the weir, by a concrete wall to the south and eroded sections of river-walling to the north (HAN 11) (Appendix 10.2: Plate 25). Further downstream, the watercourse is defined by steep-sided bank structures measuring 1.2m in height to the south, and 1.8m in height to the north (Appendix 10.2: Plates 26-27).

The Glenamought River flows beneath a 'clapper' style bridge (HAN 11) which crosses the watercourse at the entrance to Kilnap Glen House (Appendix 10.2: Figure 11 and Plate 28). This small structure consists of three random rubble in-channel piers spanned by flat stone slabs which are sealed by road gravels. There is no parapet and the north side is lined with a metal railing while a number of mature trees have been planted along the south side. A detailed drawn record of this structure has been compiled and is presented in Appendix 10.2 (Figure 30). The riverbed on the upstream side of bridge structure is composed of small cobbles and pebbles (<50mm, shale composition) with frequent gravel deposits. A concrete retaining wall, measuring 20m in length, runs along the northwest side of the river on the upstream side of the bridge (Appendix 10.2: Plate 29).

The riverbed, on the downstream side of the bridge, is composed of sub-rounded pebbles, boulders, and fine gravel deposits that overlie compact clay (Appendix 10.2: Plate 30). A millrace (HAN 13) conjoins with the river channel on its eastern side (Appendix 10.2: Plates 31-32). Deposition of waterborne sediment is evident across a 14m section of the river channel, a short distance downstream of the access bridge. This area comprises a c. 0.30m deposit of gravel and coarse sand with frequent inclusions, including pieces of water eroded red-brick and fragments of earthenware pottery (Appendix 10.2: Plates 33-34). A 5.8m section of river-walling (HAN 15) is located on the northwest side of the channel, adjacent to this area of deposition.

As the river flows downstream, it passes light industrial units to the east and a roadway to the west, its attendant banks increase in size and become artificial in nature (Appendix 10.2: Plate 35). Substantial rock armour has been placed along the base of the western bank to protect the structure from flood-water erosion. The riverbed is composed of large boulders and cobbles (shale composition) with occasional pieces of dislodged rock armour. A modern culvert is located 75m downstream of the entrance to Kilnap Glen House, allowing road access into Northpoint Business Park (Appendix 10.2: Plates 36-37). Three large concrete pipes (1.45m diameter) accommodate river-flow, with poured-mass-concrete cut-waters and retaining walls to the sides (both upstream and downstream of the structure). The façade is composed of concrete block-work. In addition, a concrete sill extends from both sides of the culvert.

The general topography encountered for the remaining section of the Glenamought River, as it continues southward to its confluence with the River Bride, is also defined by the aforementioned modern

developments; a roadway to the west and business park to the east (Appendix 10.2: Figure 12). The west side of the channel comprises a steep (2.5m+) earthen bank which is built upon a rock armour base. The east bank measures 1.5m in height and is composed of compact clay, exposed by recent flood-water activity.

In addition, a section of Rathpeacon stream (120m), located to the west of Glenamought River was inspected (Appendix 10.2: Plates 38-39). The watercourse at this location does not retain any of its original character, the development of the surrounding road network resulting in extensive remodelling of the watercourse. The watercourse is defined by artificial bank structures that rise at a 50° angle from the riverbed. The riverbed is flat bottomed and composed of angular shale boulders and cobbles with an overlying deposit of silty-sand (<0.30m depth). A concrete culvert and associated deflector-wall is located on the western side of the watercourse, approximately halfway along the surveyed extent (Appendix 10.2: Plate 40). Water depth ranges from 0.50 – 0.90m. Frequent modern debris was encountered.

River Area 2 (Appendix 10.2: Profiles 13-24 and Figures 12-13)

There are no recorded archaeological sites or any structures listed in the RPS or NIAH in proximity to this section of the proposed scheme. Survey of the River Bride commenced at a location 246m upstream from its confluence with the Glenamought River (Appendix 10.2: Figure 12) and at this point the river flows through a semi-rural setting, adjacent to the Lower Kileens Road (Appendix 10.2: Plates 41-42). Rough pasture land is located to the north, with a dwelling house (Rose Cottage) and scrubland to the south. The watercourse is narrow (3.8m in width), steep-sided (85° angle), and appears to have been subject to past dredging activity; sterile clay-banks extending to a clay river-bed. A number of reed beds with well-established rhizome matts are present along the north side of the channel. A water depth of 0.80m was recorded.

The river is truncated, immediately downstream of Rose Cottage, and a concrete culvert channels river-flow beneath the N20 roadway (New Mallow Road) and associated slip roads (Appendix 10.2: Plate 43). The watercourse re-emerges 240m downstream to continue its path along the eastern side of the N20 (Appendix 10.2: Plate 44). As noted for the Glenamought River, the construction of the roadway has affected river topography, the watercourse being delineated by artificial bank structures built upon a rock armour base (Appendix 10.2: Plate 45). At a point c. 40m downstream, the N20 veers to the west and the river enters an area of scrubland to the west of the North Point and West Link Business Parks. This area of scrub extends for a distance of approximately 160m and three well developed river-meanders characterise the waterway within this area.

Both bank structures are almost vertical in profile and measure between 1m and 1.2m in height (Appendix 10.2: Plates 46-47). The banks are composed of sterile clay and the riverbed is composed of a shallow deposit (<0.20m depth) of shale pebbles and gravel, beneath which a clay-bed is located. Rock armour has been placed along the west side of the river, downstream of the first river-meander. A concrete encased pipe crosses the river, 7m upstream of this meander.

The outer-face of each meander has undergone severe erosion, where flow rates are increased; undercutting of the riverbank as much a 0.60m at these locations. In contrast, deposition is taking place on the inner-face of each meander, where flow is decreased (Appendix 10.2: Plate 48). These deposition areas are composed of small, rounded, cobbles and pebbles interspersed with coarse gravel. Frequent modern debris was noted within the matrix of this deposit and included water-worn ceramic fragments, animal bone, miscellaneous iron pieces, and red-brick fragments.

Downstream from the third river-meander the channel splits into two arms to flow around a small island located within the centre of the channel (Appendix 10.2: Plate 49). The island is composed of an oval shaped clay-bank. Below this the channel straightens to run in a northwest to southeast direction past the Commons Inn Hotel and North Link Business Park for a distance of 250m (Appendix 10.2: Plates 50-51). Once again the watercourse is delineated by steep-sided, artificial, bank structures, measuring 2m+ in height (Appendix 10.2: Plates 52-53). The riverbed is composed of river cobbles (>70mm) overlying a solid clay base, which was frequently exposed due to erosion of the riverbed. Water velocity is greatly increased along this section and water depth measures up to 0.50m.

A short distance downstream of the Commons Inn carpark, the river turns abruptly to the south (almost at right angles) (Appendix 10.2: Figure 13). Bank height at this location is 3m+ and rock armour is visible protruding from its base (Appendix 10.2: Plate 54). A large piece of cut-stone masonry is located on top of the west bank at NGR: 16680E, 74454N (SC16; see Appendix 10.2: Plate 55). The river channel changes elevation once again and flow rates increase, creating rapids over an area composed of large cobbles and boulders (Appendix 10.2: Plate 56). A small stream, Fairhill Stream, discharges into the main channel immediately below these rapids, on the western side of the river (Appendix 10.2: Plate 57). The stream measures 4.2m in width and has a water depth of 0.30m. There is little flow within the stream and the streambed is composed of deep deposits of silty-sand (0.40m+). Downstream of the stream, the channel once again turns abruptly, this time flowing towards the east. Residential properties back onto the southern side of the river at this location. Modern river-walling and rock armour has been inserted along south side of the channel in an attempt to protect these dwellings (Appendix 10.2: Plates 58-60). Scrubland delineates the northern side of the river. The north bank is formed of a vertical clay bank, which is subject to erosion and is undercut in places (Appendix 10.2: Plate 61). The riverbed is composed of angular pebbles (<50mm) and cobbles (<100mm) overlying a sterile clay bed which is frequently exposed. This section of channel is broader and measures up to 6m in width. Water depth is 0.90m along the southern side of the channel, where flow is increased, and 0.50m along the north.

A tight river-meander is located 83m downstream, creating a narrow channel that loops to the north and then back southward within a distance of 25m. The channel narrows considerably (3m) and deposition is active on the inner-face of the meander (Appendix 10.2: Plate 62). On leaving the meander, the river flows in a south-southeast direction through scrubland which is bordered by industrial units. A concrete revetment delineates the north side of the river as it flows past an adjacent car-lot (Noel Deasy car sales) (Appendix 10.2: Plates 63-64). The south side of the river is delineated by large slabs of rock armour protection, behind which a petrol station is located (Appendix 10.2: Plate 65). A large concrete encased pipe crosses the river immediately upstream of the aforementioned revetment wall (Appendix 10.2: Plate 66). On the downstream side of the revetment, the river flows beneath a modern culvert measuring c. 15m in width (Appendix 10.2: Plate 67). The channel then re-emerges for a short distance (14m) before flowing under a second culvert for a distance of 15m (Appendix 10.2: Plate 68). Both culverts structures are of identical construction and are most likely associated with the development of the adjacent McDonald's restaurant. A masonry Bridge (HAN 16) which carries a local access road (Fitz's Boreen) is located 23m downstream (Appendix 10.2: Figure 14, Appendix 10.2: Plate 69). This structure marks the southern extent of River Area 2.

The exposed sections of channel, located between the two culverts and the masonry bridge, are composed of steep-sided grass-covered banks that rise at a 45° to 50° angle (Appendix 10.2: Plate 70). The riverbed is composed of rounded to sub-rounded shale pebbles and cobbles with occasional boulders (Appendix 10.2: Plate 71).

River Area 3 (Appendix 10.2: Profiles 25-29 and Figures 14-17):

This area runs from the masonry bridge (Feature F09) at Fitz's Boreen, to a point approximately 1.3km downstream. This stretch of the River Bride is almost entirely formed of modern-cut river channel and is the result of the successive development of neighbouring lands. It includes the construction of the Dulux Factory, the Sunbeam Industrial Estate, the Blackpool Retail Park, and the Blackpool Shopping Centre. The Sunbeam complex occupies the former site of a flax mill listed as a recorded archaeological monument (CO074-115----) which was burnt during a fire in 2003. The site has been cleared and no surface traces of the mill buildings survive.

The River Bride as it flows through River Area 3 has been significantly impacted by the construction of the local road network to the west and the development of a number of business parks to the east. Little of the river's natural character remains and the watercourse is largely defined by its modern bank structures and the placement of culverts along its course. The riverbed is compact/hard in nature and has an extremely poor holding content; deposition being minimal and restricted to specific areas. Moreover, the erosional effect of increased flow during flood-water events is clearly visible with the frequent stripping of overlying deposits and exposure of the underlying sterile clay bed.

Concrete walls, measuring up to 3.2m in height, delineate the channel as it flow through the Dulux Factory site (Appendix 10.2: Plates 72-73). Two modern culverts provide vehicular access between factory units within the complex (Appendix 10.2: Plate 74-75). The riverbed is composed of rounded pebbles and small cobbles interspersed with river gravels (Appendix 10.2: Plate 76). Frequent boulders are also present. Exposed bedrock is present in places, the largest section being located beneath the first of the two modern culverts (Appendix 10.2: Figure 14, Appendix 10.2: Plate 77). Water depth ranges between 0.40m and 0.60m. Grass-covered areas (composed of a fine silty-clay) have formed on alternating sides of the channel, as indicated on Appendix 10.2: Figures 14-15, and measure up to 0.70m in height (Appendix 10.2: Plates 78-81).

A modern weir, with overhanging footbridge (disused), is located at NGR: 167250E, 74126N, at a point 50m from the most southerly limit of the factory complex (Appendix 10.2: Plates 82-84). A sluice-gate empties into the channel on the south side of the river and a possible winding mechanism is located on the north, both situated downstream of the weir. Concrete walls continue to delineate the river channel until reaching a 70m-long culvert (modern), which accommodates the river as it flows past the Sunbeam Industrial Estate, located to the south (Appendix 10.2: Plates 85-87). Concrete walls also extend from the downstream side of the culvert, along a further a 55m section, before the river flows beneath another modern culvert (9m long) located off the southeast corner of the industrial estate (Appendix 10.2: Plates 88-89).

The river channel narrows substantially on the downstream side of the culvert, as the river starts to flow through a parkland area constructed as part of the development of the adjacent Blackpool Retail Park. As it traverses the parkland area, the river is delineated by rock armour and/or stone-filled gabions (Appendix 10.2: Plates 90-92). The riverbed is composed of large shale cobbles (>10mm) and boulders (>300mm). Water depth varies between 0.30m and 0.70m. Two modern bridges cross the river channel and provide pedestrian access through the parkland (Appendix 10.2: Plates 93-94). The channel base is visible in places, and is cut into a deposit of sterile clay (Appendix 10.2: Plate 95). A small weir, 4.2m-wide, is located at NGR: 167476E, 73859N. The weir is composed of boulders that appear to overlie an exposed section of bedrock (Appendix 10.2: Figure 16 and Plate 96).

A 24m-long concrete culvert accommodates a road bridge on the downstream side of the parkland area (Appendix 10.2: Plates 97-98). On emerging from the culvert, the river channel is delineated by four tiers of stone-filled gabions (Appendix 10.2: Plate 99). These extend for a distance of c. 34m before reaching another culvert structure (Appendix 10.2: Plate 100-101). This culvert accommodates river-flow beneath the main road (N20), as the river channel swings to the southwest. The river emerges at a point 42m downstream, opposite the back gardens of Vaudeville Terrace.

The final 53m stretch of this river area is characterised by steep-sided banks composed of rubble stone, concrete, and modern debris, interspersed with bank sections that have been lined using stone-filled gabions (Appendix 10.2: Plates 102-103). The riverbed is composed largely of sub-angular to angular cobbles and boulders which overlie compact sterile clay. A natural weir feature, formed from the accumulation of riverbed boulders, is located at a point 34m downstream of the culvert (Appendix 10.2: Plate 104). An iron pipe crosses the river 20m downstream at NGR: 167423E, 73608N (Appendix 10.2: Plate 105).

In conclusion, River Area 3 is largely composed of modern-cut watercourse and its riverine archaeological potential is extremely limited. The masonry bridge at Fitz's Boreen (HAN 16) is the only visible feature surviving from the original, historic route of the watercourse. A detailed drawn record of this structure has been compiled and is presented in Appendix 10.2 (Figure 31).

River Area 4 (Appendix 10.2: Figures 17-18)

In contrast to River Areas 2 and 3, this section of the River Bride appears to maintain its original course and, while subject to modern intervention, it still retains some features of historic interest. River Area 4 encompasses the river as it flows southward, adjacent to the Commons Road and Brockelsby Road, to a point located opposite the Church of the Annunciation (approximately 300m downstream). The river is for the most part bounded by terraced houses to the west and new housing developments (Goldenvilla Terrace/ Orchard Court) to the east. The south end of this section of the scheme extends into the Blackpool ACA and is within close proximity to the Church of the Annunciation (HAN 6) which is listed in the RPS (PS1139) and the NIAH (20862036).

The first 40m of this section of the channel is restricted to between 2.4- 2.6m in width, as it flows past Goldenvilla Terrace. A poured mass-concrete retaining wall (3m+ in height) delineates a 20m section of the channel on its western side, while rock armour has been placed along the east bank (Appendix 10.2: Plate 106). As the river enters Orchard Court, it broadens to 9m in width, although the channel sides continue to be defined by modern flood protection measures; stone-filled gabions (32m section) to the east and an old concrete wall (40m section) to the west (Appendix 10.2: Plates 107-108). Approximately half-way along the survey area, the concrete wall gives ways to an historic section of river-walling (HAN 17; see Appendix 10.2: Figure 17). A rubble bank, rising at a 45° angle, delineates the west side of the river channel for much of its course through Orchard Court (Appendix 10.2: Plates 109-110). Rock armour can be seen protruding from the base of the rubble bank and the structure is likely to be contemporary with the development of the adjacent housing estate. However, it is likely that the modern bank could retain the original bank structure within its core.

The riverbed has a more natural appearance along this section and is composed of rounded pebbles, cobbles, and small boulders. Pockets of coarse sand and gravel were also evident. The underlying clay-bed is exposed in places along the base of the east bank. The riverbed is littered with modern debris, dumped by the neighbouring houses, and includes general refuse, building material, and items such as bicycles, car parts, and broken pieces of furniture.

A short distance downstream from the terminus of river wall HAN 17 a home-constructed waterwheel (now disused) protrudes from a section of modern river-walling at NGR: 167404E, 173455N (Appendix 10.2: Plate 111). A modern culvert crosses the river channel at a point 32m downstream of the water-wheel (Appendix 10.2: Plate 112). This structure provides pedestrian access form the housing estate to the Commons Road and is built upon the location of an historic crossing; the residue of this bridge feature (HAN 18) being found beneath the existing structure. A second culvert crosses the river at a point 66m downstream and also facilitates pedestrian access to/from the housing estate (Appendix 10.2: Plate 113). The section river running between these structures is defined by modern walling to the west and rock armour and stone-filled gabions to the west.

At a point 25m downstream of the second pedestrian crossing, the river enters a large modern culvert that extends 68m under Blackpool Bridge, to emerge adjacent to the Church of the Annunciation (HAN 6) (Appendix 10.2: Plates 114-115). Two short sections of masonry walling are located either side of the culvert opening (Appendix 10.2: Figure 18) and a small historic culvert drains into the channel on its west side (HAN 19). Poured mass-concrete slabs extend across the width of the channel to cover this feature. At a distance of c. 8m within the culvert, masonry walls are replaced with mass-concrete box sections that encompass the culvert walls, ceilings, and floor (Appendix 10.2: Plate 116). Another small culvert (modern) drains into the river on its east side, within the larger culvert at a location approximately 30m downstream (Appendix 10.2: Plate 117).

The river emerges only briefly, for a distance of 19m, before entering another longer culvert structure that runs beneath Watercourse Road for approximately 520m. A concrete sill extends across the riverbed at this location and encompasses a series of concrete flow deflectors, designed to slow down water-flow across the sill area. The channel side comprises concrete block walls, topped with metal railing to prevent ingress to the watercourse.

A small culvert drains into the channel on its eastern side, immediately upstream of the downstream culvert opening (Appendix 10.2: Plate 118). An older (masonry) culvert is located a short distance within this structure, and is recorded as HAN 20 (Appendix 10.2: Figure 18). Inspection progressed for a distance of c. 40m into the culvert that runs beneath Watercourse Road (Appendix 10.2: Plate 119). The structure is of identical construction to that observed for the upstream culvert, comprising box-sections of poured mass concrete.

In part, River Area 4 retains some antiquity, as much of the channel follows its course as recorded in the nineteenth-century. The majority of features associated with the historic waterway (bridges, culverts, river-walling), however, have been replaced. The riverbed itself, where exposed, remains compact and comprises of shallow pebble/cobble deposits that overlie a sterile clay base. As such, a poor holding content can be ascribed to the riverbed along this section of the River Bride. In contrast, it is likely that the attendant bank structures may retain elements of interest and the sections of modern river-walling may obscure earlier structures behind.

River Area 5 (Appendix 10.2: Figure 19)

This section of the River Bride is located adjacent to the North Link Road, at a point c.520m downstream, where the river re-emerges from the Watercourse Road culvert system. Inspection of a 20m-section of this culvert was undertaken, travelling upstream into the structure. The surveyed section of culvert identified two historic culvert sections, HAN 21 (Appendix 10.2: Figure 19).

The riverbed is composed of rounded shale pebbles and small cobbles with occasional larger rocks and collapsed elements from the adjacent river-walls (Appendix 10.2: Plate 120). The first c. 18m of this area comprises 3m+ high river-walling of drystone construction. These are likely to represent consolidation measures carried out across this section of watercourse in the nineteenth century (HAN 22). Downstream of these structures, the river-walling is replaced modern concrete walls and brick-work from houses that back onto the watercourse (on west side of the channel). In addition, the eastern side of the channel has undergone modern intervention with the placement of a 63m section of river-walling (Appendix 10.2: Plates 121). A modern culvert, constructed from red-brick, drains into the channel (west side), at a point approximately 32m from the main river culvert located upstream (Appendix 10.2: Plate 122). The river channel re-enters an historic culvert (HAN 23) at a point 87m downstream.

As noted for River Area 4, Area 5 retains its historic route and a number of features relating to the nineteenth-century adaptation of the river. A low to medium holding content can be ascribed to the riverbed, due to the increased level of deposition observed for this stretch of the River Bride.

River Area 6 (see Appendix 10.3)

This section of the Glenamought River flows through a narrow, steep-sided, river valley (Appendix 10.3: Plate 4). It is traversed by four historic bridge structures; Kilnap Viaduct (HAN 10), Kilnap Road Bridge (HAN 8), an unnamed bridge upstream of the Glen Distillery site (HAN 33) and Glenamought Road Bridge (HAN 37). Mature trees line the valley walls, while green-field sites occupy much of the adjoining land. Modern development is concentrated to the south of Kilnap Viaduct (Kilnap and Rathpeacon Tds.) and across land to the north of Glenamought Road Bridge (Kilbarry and Kilcurry Tds.). In contrast, the remains of 19th century development is focused along the valley floor which contains Kilnap Glen House (HAN 3) and three mill sites: Kilnap corn mill (HAN 4); the Glen Mill/ Glen Distillery site (HAN 2); and Kilbarry corn mill (HAN 1).

The section of river between Kilnap Road Bridge and the Kilnap Viaduct comprises deposits of gravel and sub-angular pebbles, interspersed with fragments of shale (>200mm), that overlie a base layer of compact silty-clay. In addition, large pieces of limestone masonry are present within the riverbed, measuring up to 600mm in length x 400mm in width. Exposed bank sections are composed of compact clay with shale inclusions forming a layer of glacial-till. Water depth increases to 300mm, with occasional deeper pockets being present. Rock armour has been placed on the outer side of the meander and includes the use of cut-stone masonry recovered from the riverbed. From a point c. 26m upstream of Kilnap Viaduct, both riverbanks have been subject to modern protection measures, including the placement of stone-filled gabions; extending 50m along the north side of the river and 127m on the south.

The remains of a weir or possible sluice structure thought to form part of a Dam Feature (HAN 9), was encountered within the riverbed at NGR: 166524E, 75025N (Appendix 10.3: Figure 5; thumbnail, and Plates 5-6). The structure was not visible during the 2016 survey and it is likely that the feature became exposed as a result of subsequent flood water events; increased flow having stripped away the riverbed overburden across this section of the watercourse. The structure comprises thirty-two pieces of limestone masonry, twenty-seven of which lie flush with the riverbed; extending across a 2.4m (north-south) x 2.50m (east-west) area of the riverbed (Appendix 10.3: Figure 8; Profile 34 and Plate 7). These constitute foundation stones of the structure. The remaining masonry protrudes from the base of the adjacent stone-filled gabion baskets that line this stretch of the channel. The upstream extent of this masonry is raised 440mm above the riverbed and slopes at a c. 30° angle to the west (downstream) (Appendix 10.3: Figure 8; Profile 35). The angled masonry is thought to form part of the main body of the structure.

Moving upstream of Kilnap Bridge, the riverbed is composed of angular to sub-angular pebbles, interspersed with fragments of shale (>200mm) (Appendix 10.3: Plates 8-9). Pockets of coarse-sand and gravel are also present. Water-rolled nodules of silty-clay were noted within the sand/gravel pockets. This section of river is fast-flowing and a water depth of 200mm was measured. The base of the riverbed is exposed in places and is composed of a compact silty clay (sterile), light-brown in colour. The south bank is ill-defined and measures 300mm-400mm in height. In contrast, an almost vertical bank (subject to recent erosion) forms the north bank at this location. This structure is composed of compact-clay with frequent shale (boulder) inclusions (Appendix 10.3: Plate 10). A degree of deposition is active along south side of the river, c. 7m upstream of Kilnap Bridge (Appendix 10.3: Plate 11). Shale bedrock is exposed across the riverbed beneath Kilnap Bridge, providing a platform upon which the bridge's foundations have been constructed.

A small section of collapsed/displaced river walling is located on the south bank, lying at right angles to the channel (Appendix 10.3: Plate 12). The structure measures 1.62m in length x 300mm in height x 240mm in width. It is composed of two courses of roughly-shaped shale of varying size and shape, bonded using a coarse-grained mortar. Subsequent re-pointing using cement is also evident. The structure is thought to have originally extended from the adjacent bridge pier, on the south side of the channel, and perhaps formed part of a revetment wall at that location. The wall is of twentieth-century date, built sometime after the removal of the downstream dam structure.

Continuing upstream, riverbed composition remains unchanged, with the attendant bank structures retaining a similar profile to that previously observed; remaining low (< 500mm) in height along the south side of the channel, and ranging between 1.5m-2m in height along the north side. However, exposed sections of bedrock and associated boulder are now frequently encountered within riverbed, forming localised areas of rapids within the channel (Appendix 10.3: Plate 13-14). In addition, bankside areas become increasingly overgrown with trees (sycamore, ash, beech, lime, and hawthorn) and low-lying vegetation (brambles, nettles, and ferns) (Appendix 10.3: Plate 15). A flat, grass-covered, area is located on the north side of the river, running between NGR: 166624E, 75089N and NGR: 166670E, 75125N (Appendix 10.3: Plate 16). This area is situated at the downstream extent of the millpond depicted on the OS First Edition Map. The observed ground conditions at this location, coupled with the examination of exposed sections of the northern bank (containing frequent modern debris at depth), support the theory that this area represents an in-filled section of the millpond (Figures 3 & 5).

A tight meander in the river is present a short distance upstream, located at NGR: 166671E, 75112N (centre-point). This river feature defines the eastern limit of the aforementioned grassy area. Water depth increases rapidly at this location, reaching a maximum depth of 1.05m on the apex of the meander; where riverbed erosion is at its greatest (Appendix 10.3: Figures 5-6; Profiles 30-31, Plates 17-18). Undercutting of the western bank structure is also evident across this section, undercut to a maximum of 690mm in depth. The west bank measures 1.70m in height and is composed of a light-brown silty-sand (approximately 70%/30% mix). The riverbed is composed of sub-angular shale cobbles and pebbles, overlying a substratum of compact clay which forms the underlying bed-level (Appendix 10.3: Plate 19). The east bank forms a grass-covered structure that measures1m in height and slopes at a 45° angle towards the river. The water column along this side of the river measures up to 500mm in depth.

An area of riverbed deposition is located immediately upstream of the aforementioned meander, extending across a 16.50m x 3m area (Appendix 10.3: Figure 5, Plate 20). This deposition comprises river gravel (<5mm), interspersed with sub-angular pebbles (<40mm) and cobbles (<160mm). Occasional boulders (<400mm) were also noted. Moving upstream, the watercourse flows close to the north side of the

valley; a steep-sided slope, rising at a c. 70° angle, forming the valley wall. Frequent sections of shelving bedrock were noted protruding from the valley wall.

To the south, the valley floor stretches southward for a distance of approximately 100m. An oval-shaped pond, (HAN 24) is located 4.29m to the south of the river channel, located at NGR: 166707E, 75126N (centre-point) (Appendix 10.3: Figure 5 and Plate 21). This feature measures approximately 27m in length x 6.5m in width and is thought to be the remnant of a millpond that once extended across this area, as depicted on the OS First Edition Map.

A section of river walling (HAN 25) is located on southern side of the river, running parallel to the aforementioned millpond (Appendix 10.3: Figure 5). Only the bottom course of this structure remains in situ, comprising a series of vertically-set stones that formed the base elements of a revetment wall of drystone construction (Appendix 10.3: Plate 22). The wall section measures 20m in length and survives to a maximum height of 450mm.

The remains of potential weir structure (HAN 26) are located at NGR: 166736E, 75135N, crossing the watercourse at a point 12m upstream of HAN 25 (Appendix 10.3: Plate 23). This feature comprises disarticulated pieces of masonry and does not retain any bonded elements. Upstream of this feature, the riverbed is composed of sub-angular cobbles and pebbles, with pockets of sand and gravel (Appendix 10.3: Plate 24). A clay sub-stratum is exposed in places, and exposed sections of bedrock are also evident. Both banks remain relatively low along this stretch of the watercourse, ranging between 650mm and 800mm in height, and form almost vertical structures composed of compact clay. Frequent bankside collapse is also evident along their extent. Mature trees line both sides of the riverbank. This topography continues unchanged for a distance of c. 80m, before reaching the western (downstream) extent of the former site of the Glen Mills/ Glen Distillery complex (HAN 2).

The partial remains a tailrace (Han 27), associated with the Glen Mills/ Glen Distillery site, is located along the southwest limit of the mill complex. The structure comprises a 44m long x 2.5m wide tailrace, running between NGR: 166854E, 75094N and NGR: 166818E, 75119N. The tailrace emerges from a small culvert at its south-eastern extent; this culvert once accommodating flow from the upstream headrace. The culvert measures 1m in width x 700mm in height (Appendix 10.3: Plate 25). A 7m section of side-wall survives on the north side of the tailrace, with a 5m section on the south. The structures side-walls are composed of roughly coursed and un-bonded rubble-stone. The best preserved section, retaining its original elevation, measures 2.5m in height. The first 1.5m of the structure is composed of masonry measuring up to 450mm length x 250mm width (Appendix 10.3: Plate 26). In contrast, the upper part of the structure (1m height) is of lighter construction, comprising smaller stones that measure up to 200mm length x 70mm width (Appendix 10.3: Plate 27). The base of the tailrace is not exposed, having silted up to a sediment depth of 500mm. However, it is likely that the base of the structure is also stone-lined and remains buried in situ beneath the sediment built-up.

Upstream of the tailrace discharge-point, the watercourse is composed of sub-angular cobbles, pebbles, and patches of gravel (Appendix 10.3: Plate 28). The partial remains of river-walling (drystone construction) occupy either side of the river channel (HAN 29 and 30), located along a c.40m section of the watercourse. Only the lower components of these two, opposing, structures survive and comprise up to four courses of roughly-shaped limestone (Appendix 10.3: Plate 29); measuring up to 500m length x 270mm width. In addition, frequent collapse from these wall structures was observed, strewn across the adjacent riverbed areas.

A c. 9m long section of mill boundary wall (HAN 30) is located on the south side of the river, a short distance to the east of HAN 26 (Appendix 10.3: Figure 5). The boundary wall is composed of random-coursed limestone of varying size and shape; ranging in size between 300mm length x 200mm width (smallest) and 600mm length x 300mm width (largest) (Appendix 10.3: Plate 30).

The river, as it flows past the Glen Distillery Business Park (former Glen Mills site: HAN 2), forms an artificially straight channel (Appendix 10.3: Plate 31-32). The riverbed is composed of a deposit of coarse sand (<2mm) and gravel (<5mm) interspersed with frequent sub-angular pebbles (<40mm), cobbles (<160mm), and boulders (<300m) (Appendix 10.3: Plate 33). Riverbed deposits are minimal in depth (<70mm) and overlie a bedrock sub-stratum. Exposed sections of shelving bedrock are frequently visible, both within the riverbed and protruding from the channel sides (Appendix 10.3: Plates 34-35).

A large rectangular building (c.70m long x 10m wide), built as part of the conversion of Glen Mills to a distillery in the late nineteenth century (1882), is located at NGR: 166919E, 75122N (centre-point) (HAN 2). The structure lies parallel to the river channel, at a distance of 2.44m south of the watercourse (Appendix 10.3: Plates 36-37). The building's northern façade (river-facing) is neatly presented and comprises a random-coursed, rubble stone, wall; bonded using a coarse lime mortar. Brick-work adorns the corners of the building and forms part of the original build. The adjacent strip of land, located between the mill building and watercourse, constitutes made ground (Appendix 10.3: Figure 7; Profile 32, Plate 38). This area measures 2m in height x 2.44 m in width. It comprises a mix of modern and historic components, both of which are visible along its channel-side façade (Appendix 10.3: Plates 39-40). Sections of shelving bedrock and overlying boulders form the base components. Above this, four courses of rough-cut limestone (sub-rectangular in shape) are present (>400mm in length) and survive to a height of 640mm. These are thought to be the foundation stones from a section of river-walling (HAN 31), constructed to channel river-flow past the adjacent mill site. A single course of poured, mass-concrete has been placed above, after which four courses of breeze-block have been laid to from the topmost part of the channel side area.

Further upstream, the aforementioned river-walling (HAN 31) is found in a better state of preservation and survives in a number of places to its original height of c. 2.8m (Appendix 10.3: Plate 41). As noted for the downstream section, the wall is built upon four courses of rough-cut limestone, the largest stones measuring up to 600mm in length. The main body of the structure comprises smaller, irregular-shaped, masonry with an average size of 350mm x 250mm (Appendix 10.3: Plates 41-42). The wall is roughly-coursed and retains vertically-set capping stones, where the full extent of the structure remains intact. A small drain is positioned at the base of the wall, located at NGR: 166974E, 75148N (Appendix 10.3: Figure 5, Plate 43). The drain is stone-lined and measures 590mm in width x 620mm in height. Immediately downstream of the drain feature, NGR: 166973E, 75148N, three limestone blocks have been set-into the wall's façade; placed at right angles to the structure to form a set of river-access steps (Appendix 10.3: Plate 44). The topmost step measures 1.3m in length and protrudes 660mm from the wall. The middle step measures 620mm in length and protrudes 500mm from the wall. The lowest step measures 110mm in length and protrudes 300mm from the wall.

Continuing upstream, the river-walling has suffered substantial collapse (c. 14m section) at a location approximately 10m east of the aforementioned river-access steps; collapse material from the wall extending across the adjacent riverbed, between NGR: 166973E, 75148N and NGR: 166992E, 75158N (Appendix 10.3: Plate 45). Modern concrete block-work has been used to reconstitute the wall at this location (Appendix 10.3: Plates 46).

The northern side of the river, as it flows past the Glen Mills/ Glen Distillery site, is heavily overgrown with mature trees that include Laurel, Beech and Ash. Foundation stones from river-walling are also evident in a number of places along this side of the channel (Appendix 10.3: Plate 47). It is likely that a section of river wall also delineated the north side of the channel, forming an opposing structure of similar construction to that found on the southern side of watercourse. Active erosion of the north riverbank was noted with frequent undercutting of the riverbank area being observed.

A section of masonry wall (HAN 32) is located on the south side of the river channel; immediately downstream of an unnamed mill bridge (HAN 33) (Appendix 10.3: Plates 48-49). The wall structure does not extend to its original height and has been subject to partial collapse of on its downstream side. A modern block-work wall abuts the downstream side of structure. River wall HAN 31 is constructed using randomly coursed, rubble-stone, and is bonded using coarse lime mortar (Appendix 10.3: Plate 50). The structure measures c. 4.5m height (max.) x c. 5m length and has been tied/keyed into the southern side of the bridge structure; obscuring the lower part of the bridge's arch-ring and haunch at that location (Appendix 10.3: Plate 51). The wall's foundations slope from its base at a 45°-50° angle for a distance of c. 1m. The foundations are composed of a heavily mortared rubble-stone core, covered with a mortar-wash to prevent the ingress of water. The upper parts of river wall HAN 32 are very similar in build to that observed for the northern façade of the aforementioned mill building, located 50m downstream. It is thought that it constitutes the remains of the northern façade of a mill building that once stood at this location. Two riverside buildings were constructed in the late nineteenth-century as part of the mill sites conversion to a distillery complex; as depicted on the OS 25-inch Edition map (Appendix 10.3: Map Items 10-11). Only the downstream structure (Appendix 10.3: Map Item 10) remains standing today.

The mill bridge (HAN 33) comprises a single-arched masonry bridge that crosses the Glenamought River at NGR: 167000E, 75163N, on the upstream side of the Glen Mills/ Glen Distillery site (Appendix 10.3: Plates 51-52). The structure is depicted on the OS First Edition Map (1841) and is thought to date to the latter part of the eighteenth- or early part of the nineteenth-century. The bridge is not currently listed in the NIAH or the SMR/RMP. The bridge arch measures 3.8m in height x 3.4m in width. Its arch-rings are segmental in form; comprising thirty-nine (39) visible arch-stones (voussoirs) on the downstream side, and thirty-eight (38) visible arch-stones on the upstream side of the bridge. The arch-stones are fairly uniform in size and shape, with a size range of between 460mm length x 83mm width and 510mm length x 120mm width.

The arch-walls are composed of roughly-coursed limestone blocks, varying in both size and shape across much of their extent; ranging from 200mm length x 60mm width to 290mm length x 200mm width (Appendix 10.3: Plate 53). In contrast, the first 1m of each arch-wall is composed of rectangular masonry measuring up to 570m in length and 100mm in width.

Two buttresses have been added to the upstream side of the bridge, designed to provide additional support to the structure. These features run the full length of the bridge façade and measure up to 1.2m in depth. The buttresses have been keyed into, rather than abutting, the bridge structure. The northern buttress has separated slightly from the main body of the bridge, while the southern buttress remains firmly in place (Appendix 10.3: Plates 54-55).

A stone-lined apron has been placed beneath the bridge structure; covering the riverbed from a point c. 500mm upstream of the bridge to a point c. 12m downstream (Appendix 10.3: Plates 56-57). The apron appears to be contemporary with the bridge-build; the arch-walls extending above the apron stones on either side of the river. Downstream of the bridge, the apron slopes at a slight angle (c. 20°) to

accommodate river-flow for a distance for c. 10.5m (Appendix 10.3: Plate 58). At its downstream limit the apron falls away, creating a vertical drop in the bed-level of 380mm. Downstream of the apron feature, the riverbed has been eroded to form a deep pool, up to 1m in depth at its centre (see Appendix 10.3: Plate 48). The riverbed at this location is composed of deep deposits (>300mm) of coarse sand and gravel, overlying a dipping bedrock shelf in the substratum (Appendix 10.3: Plate 59). Further downstream the underlying bedrock is located closer to the surface and, as a result, water depth decreases to 200mm.

A section of river-walling (HAN 34) abuts the downstream side of the bridge, on the north side of the river channel (Appendix 10.3: Plate 60). This feature measures up to 1.3m in height and extends along a c. 11m section of the watercourse. The wall is of drystone construction, built using limestone of varying size and shape; ranging between 200mm length x 100mm width and 500mm length x 180mm width (Appendix 10.3: Plate 61). This wall section is built upon the aforementioned bridge apron and is likely to have been constructed as part of river-channelling works associated with the establishment of the Glen Mills.

The riverbed upstream of HAN 34 is composed of sub-angular cobbles and pebbles, interspersed with gravel and coarse sand (Appendix 10.3: Plate 62). The attendant bank structures are low-lying (<500mm in height) and formed of a light brown silty-clay. Approximately 50m upstream, the river channel broadens slightly and the riverbed changes composition to form a sand-covered bed with occasional cobble inclusions (Appendix 10.3: Plate 63).

A short distance (23m) upstream, the river channel turns sharply, at right angles, to the south. The remains of a weir structure (HAN 35) were encountered immediately downstream of this change in river-course, located on the northern side of the channel at NGR: 167061E, 75210N. The structure measures 11m in length x c. 7m in width and comprises of a series of poured-mass concrete sections, now displaced, that once formed a sizable weir structure at this location (Appendix 10.3: Plate 64). The structure is of relatively modern date, early- to mid-twentieth century, and is likely to have replaced an older weir structure at the same location; as depicted on the OS 25-Inch map.

Upstream of the weir, the western side of the river channel is delineated by a 31m section of river-wall, HAN 36 (Appendix 10.3: Plate 65). This structure is contemporary with the establishment of the Glen Mill and originally formed the downstream extent of the millpond for that site; as depicted on the OS First Edition map (Appendix 10.3: Map Item 5). The structure does not survive to its original height and is upstanding to a maximum height of 2.5m along its best preserved section. The wall is heavily bonded using lime mortar and is of rubble-stone construction.

At the southern end of HAN 36, the watercourse turns sharply to the northeast and continues in that direction for a distance of 98m, before reaching a double meander in the watercourse. The channel is delineated by vertical bank structures, ranging in size between 500mm and 1.5m in height. These are composed of silty-clay and are subject to frequent collapse from flood-water erosion (Appendix 10.3: Plate 66). The riverbed is composed of angular cobbles and pebbles with occasional boulders. In addition, shelving bedrock traverses the watercourse in several locations to from localised rapids (Appendix 10.3: Plate 67-68). Upstream of the double meander, the watercourse extends a further 52m before reaching the downstream side of Glenamought Bridge (HAN 37). This comprises a large single-arched bridge structure of rubble-stone (limestone) construction (Appendix 10.3: Plates 69-70). The arch-rings are semi-circular in form and comprise a series of neatly cut arch-stones (voussoirs) that are roughly uniform in size and shape. Keystones adorn the apex of both arch-rings. The arch-ceiling (intrados) remains in a good state or repair and retains much of the original lime mortar pointing. A deposit of angular cobbles is

located beneath the bridge, extending from the north wall to cover the full (east-west) width of the bridge (Appendix 10.3: Plate 71).

Upstream of Glenamought Bridge, the river channel is delineated by artificial bank structures measuring up to 1.60m in height. In addition, modern building material has been re-used as rock-armour protection along much of the southern bank (Appendix 10.3: Figure 7; Profile 33, Plates 72-73). Water depth ranges between 200mm and 400mm along this upstream stretch of the Glenamought River. The riverbed is composed sub-angular cobbles (<150mm) and pebbles (<40mm) with frequent boulders (<300mm) and occasional pockets of course sand/gravel (Appendix 10.3: Plates 74-75).

A modern, detached-house, is located a short distance to the south of the river channel, lying within the site of a former corn mill listed as a recorded archaeological site (HAN 1). Little remains of the mill buildings that once occupied the site, only the north façade of one of the mill building remaining in situ (Appendix 10.3: Plate 76). There are no extant structures or now levelled buildings associated with the mill on the footprint of proposed dryland flood defences within this property.

10.4 PREDICTED IMPACTS

Do-Nothing Scenario

A 'Do Nothing Scenario' will see to the continued preservation of recorded and potential cultural heritage features within the study area albeit with the continuation of potential flooding risks to the Heritage Asset buildings within the proximity of the subject area and the wider streetscape.

Construction Phase

The following section presents the assessment of construction phase impacts on the cultural heritage resource within the environs of the proposed scheme.

In summary, the proposed scheme will not have any likely significant adverse impacts on the cultural heritage resource.

The alleviation of flood events impacting on the Protected Structures within the environs of the proposed scheme, i.e. Kilnap Glen House (HAN 3), the Church of the Annunciation (HAN 6) and Madden's Buildings (HAN 7), as well as within the overall Blackpool ACA, is assessed as resulting in a permanent slight indirect positive impact on these elements of the cultural heritage resource.

Impacts associated with the proposed flood alleviation scheme are localised to specific areas within the surveyed extent of the River Bride and its tributary the Glenamought River. Of the twenty-nine riverine features of historic interest identified during the ADCO surveys, it is understood that direct impacts will only take place at the location of eight of these features (Features F07, F09, F09-F12 and F23-25). Planned maintenance work undertaken to culvert Features F14A/F14B and F16 will constitute Permanent Slight Direct Positive Impacts. While the proposed scheme will not result in any direct impacts to any archaeological sites/features listed in the SMR/RMP, there will be dryland interventions undertaken within the environs of three examples: Kilbarry Mill, Kilnap Mill and the former Sunbeam site (HAN 1, 4 and 5). As the presence and extent of any unrecorded, sub-surface archaeological features within the environs of these mill sites is unknown it is not possible to assess the level or nature of these potential impacts. As noted below (Section 10.5), pre-construction archaeological testing will be undertaken on the footprint of proposed works to determine if any such features exist within areas to be impacted

The following table lists the identified Heritage Assets in the vicinity of the scheme and provides the proposed nature and levels of construction phase impacts at each feature.

Table 10.4: Predicted impacts to identified 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
2	-	-	Glen Mill/Distillery	None	Neutral
3	RPS PS616 NIAH 20858003	-	Kilnap Glen House	Flood defences within garden	Permanent slight indirect negative impact
4	CO074-112----	-	Kilnap Mill	Flood defences within adjacent garden and re-instatement of existing access road	Neutral
5	CO074-115----	-	Former mill (Sunbeam)	Access road	Neutral
6	PS1139	-	Church of Annunciation	None	Neutral
7	PS491	-	Madden's Buildings	None	Neutral
8	NIAH 20858004	F01	Masonry Road Bridge (Kilnap Bridge)	None	Neutral
9	-	F02	Weir/Dam Structure	None	Neutral
10	PS617 NIAH 20858005	F03	Railway Bridge (Kilnap Viaduct)	None	Neutral
11	-	F04/F04B	River Walling/Revetment; five sections	None	Neutral
12	-	F05	Weir Structure	None	Neutral
13	-	F06	Millrace	None	Neutral
14	-	F07	Masonry Bridge (Kilnap House Access Bridge)	Removal of structure	Permanent Moderate Direct Negative Impact
15	-	F08	River Walling / Revetment	None	Neutral
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
20	-	F13	Masonry Culvert	Replace existing open channel with concrete culvert	Neutral

HAN	Status	ADCO ref.	Heritage Asset Type/Name	Intervention	Level of Impact
21	-	F14	Masonry Culvert	Local Masonry Repairs to culvert be carried out	Permanent Slight Direct Positive Impact
22	-	F15	River Walling /Revetment; two opposing sections	None	Neutral
23	-	F16	Masonry Culvert	Local Masonry Repairs to culvert be carried out	Permanent Slight Direct Positive Impact
24	-	F17	Millpond	None	Neutral
25	-	F18	River Walling/ Revetment	None	Neutral
26	-	F19	Weir	None	Neutral
27	-	F20	Tailrace (mill)	None	Neutral
28	-	F21A	River Walling (north side of channel)	None	Neutral
29	-	F21B	River Walling (south side of channel)	None	Neutral
30	-	F22	Mill Boundary Wall (masonry)	None	Neutral
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
34	-	F26	River Walling	None	Neutral
35	-	F27	Weir (site of)	None	Neutral
36	-	F28	River Walling/ Revetment	None	Neutral
37	20906320	F29	Glennamought Masonry Bridge (road)	None	Neutral

Operational Phase

The implementation of the mitigation measures outlined in Section 10.5 shall provide for either the avoidance of the cultural heritage resource or the proper and adequate recording of this resource (including currently unknown archaeological features). The proposed scheme will result in a slight positive indirect impact to the Heritage Asset buildings in the vicinity of the subject area by the alleviation of flooding events (HAN 1, 2, 3, 6, 9 and 7).

10.5 MITIGATION AND MONITORING

Archaeological test trenching will be undertaken in dryland areas to be impacted by ground reduction works within the environs of Kilbarry Mill (HAN 1), Kilnap Mill (HAN 3) and Sunbeam sites (HAN 4) during the pre-construction phase. In the event that any unrecorded features of archaeological significance are encountered the Archaeologist will consult with the OPW Project Archaeologist, the Cork City Council Archaeologist and the NMS in order to determine further mitigation measures. A report detailing the results of the archaeological site investigations will be submitted to the NMS and the completion of works as part of the process of monitoring potential impacts during the scheme.

Archaeological mitigation measures proposed for the features identified during the river surveys are tabulated in Table 10.5 which also presents monitoring strategies to be enacted to ensure that mitigation systems are operating as intended. However, archaeological monitoring is required where direct impacts are to take place which includes the removal of HAN 14 (Kilnap House access bridge), Feature HAN 16 (Masonry Bridge, Fitz's Boreen), HAN 17 (River Walling), HAN 18 (Bridge Section), and HAN 19 (Masonry Culvert). The removal of these features should be undertaken in a systematic manner, under archaeological supervision, allowing the archaeologist to obtain additional information and undertake supplementary recording. In addition, key masonry elements from these structures, including any other pieces identified as being of interest by the monitoring archaeologist, should be retained as part of that process. Drawn and

photographic records of Bridges HAN14 and HAN 16 have been compiled by ADCO as part of the impact assessment and are presented in Appendix 10.2.

Table 10.5: Mitigation measures and monitoring of process for Heritage Assets

HAN	Feature Type	Intervention	Mitigation	Monitoring of Process
1	Kilbarry Mill	Embankment within property	Pre-construction test trenching	Testing to be carried out under licence issued by NMS. A report will be compiled and submitted to NMS and OPW Project Archaeologists
2	Glen Mill/Distillery	None	No additional mitigation required	None required
3	Kilnap Glen House	Flood defences within garden	Pre-construction test trenching	Testing to be carried out under licence issued by NMS. A report will be compiled and submitted to NMS and OPW Project Archaeologists
4	Kilnap Mill	Re-instatement of existing access road	Archaeological Monitoring; extant remains to be cordoned off during construction phase	Monitoring to be carried out under licence issued by NMS. A report will be compiled and submitted to NMS and OPW Project Archaeologists
5	Former mill (Sunbeam)	Access road	Pre-construction test trenching of any areas to be subject to ground reduction works	Testing to be carried out under licence issued by NMS. A report will be compiled and submitted to NMS and OPW Project Archaeologists
6	Church of Annunciation	None	No additional mitigation required	None required
7	Madden's Buildings	None	No additional mitigation required	None required
8	Masonry Road Bridge (Kilnap Bridge)	None	No additional mitigation required	None required
9	Weir/Dam Structure	None	No additional mitigation required	None required
10	Railway Bride (Kilnap Viaduct)	None	No additional mitigation required	None required
11	RiverWalling/Revetment; five sections	None	No additional mitigation required	None required
12	Weir Structure	None	No additional mitigation required	None required
13	Millrace	None	No additional mitigation required	None required

HAN	Feature Type	Intervention	Mitigation	Monitoring of Process
14	Masonry Bridge (Kilnap Glen House Access Bridge)	Removal of structure	Archaeological Monitoring; structure to be removed under archaeological supervision.	Monitoring to be carried out under licence issued by NMS. Drawn and photographic record of structure has been compiled and submitted to NMS. A report on supervision of works will be compiled and submitted to NMS and OPW Project Archaeologists
15	River Walling / Revetment	None	No additional mitigation required	None required
16	Masonry Bridge (Fitz's Boreen)	Removal of structure	Archaeological Monitoring; structure to be removed under archaeological supervision.	Monitoring to be carried out under licence issued by NMS. Drawn and photographic record of structure has been compiled and submitted to NMS. A report on the supervision of works will be compiled and submitted to NMS and OPW Project Archaeologists
17	River Walling	Replace existing channel with concrete culvert	Archaeological Monitoring; structure to be removed under archaeological supervision. This is to include the recovery cut stone CS17.	Monitoring to be carried out under licence issued by NMS. A report on the supervision of works will be compiled and submitted to NMS and OPW Project Archaeologists
18	Bridge Section	Replace existing channel with concrete culvert	Archaeological Monitoring; structure to be removed under archaeological supervision.	Monitoring to be carried out under licence issued by NMS. Drawn and photographic record of structure has been compiled and submitted to NMS. A report on the supervision of works will be compiled and submitted to NMS and OPW Project Archaeologists
19	Masonry Culvert	Replace existing culvert with reinforced concrete culvert	Archaeological Monitoring; structure to be removed under archaeological supervision.	Monitoring to be carried out under licence issued by NMS. A report on the supervision of works will be compiled and submitted to NMS and OPW Project Archaeologists
20	Masonry Culvert	Replace existing open channel with concrete culvert;	No additional mitigation required	None required
21	Masonry Culvert	Local Masonry Repairs to culvert be carried out	No additional mitigation required	None required
22	River Walling /Revetment; two opposing sections	None	No additional mitigation required	None required

HAN	Feature Type	Intervention	Mitigation	Monitoring of Process
23	Masonry Culvert	Local Masonry Repairs to culvert be carried out	No additional mitigation required	None required
24	Millpond	Neutral	No additional mitigation required	None required
25	River Walling/ Revetment	Neutral	No additional mitigation required	None required
26	Weir	Neutral	No additional mitigation required	None required
27	Tailrace (mill)	Neutral	No additional mitigation required	None required
28	River Walling (north side of channel)	Neutral	No additional mitigation required	None required
29	River Walling (south side of channel)	Neutral	No additional mitigation required	None required
30	Mill Boundary Wall (masonry)	Neutral	No additional mitigation required	None required
31	River Walling/Revetment	Removal to facilitate new flood defence wall	Additional archaeological recording and archaeological supervision of removal process.	Monitoring to be carried out under licence issued by NMS. A report on the supervision of works will be compiled and submitted to NMS and OPW Project Archaeologists
32	Masonry Wall (part of former mill building)	Removal to facilitate new flood defence wall	Additional archaeological recording and archaeological supervision of removal process.	Monitoring to be carried out under licence issued by NMS. A report on the supervision of works will be compiled and submitted to NMS and OPW Project Archaeologists
33	Masonry Bridge	Tie-in to bridge impacted by tie-in for flood defence wall	No additional mitigation required	None required
34	River Walling	Neutral	No additional mitigation required	None required
35	Weir (site of)	Neutral	No additional mitigation required	None required
36	River Walling/ Revetment	Neutral	No additional mitigation required	None required
37	Masonry Bridge (road)	Neutral	No additional mitigation required	None required

10.6 RESIDUAL IMPACTS

All identified impacts will be addressed by mitigation during the pre-construction and construction phases of the proposed scheme which will provide for the avoidance or recording of recorded and potential

cultural heritage features as part of the proposed scheme. As a result, there shall be no likely significant adverse residual impacts on the cultural heritage resource.

10.7 CUMULATIVE IMPACTS

A review of a number of developments and development plans identified for assessment of cumulative impacts was undertaken. This included a consideration of the combined direct/indirect impacts of the proposed scheme, consulting with online planning documents for identified developments and a review of the Excavations Database to ascertain if any previously cultural heritage features were impacted at any of the identified subject sites. No potential accumulation of impacts resulting in a combined significant adverse cumulative impact on the cultural heritage resource was identified.

11 MATERIAL ASSETS IMPACT ASSESSMENT

The Study Area, for the purposes of this Chapter, refers to the area in which works are proposed for the River Bride (Blackpool) Certified Drainage Scheme as described in Chapter 3.

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 impact assessment is based on a desk study, with details of major utilities taken from information supplied by Cork City Council, Cork County Council, Arup and the service providers. The road network was identified using Ordnance Survey Ireland (OSi) discovery series mapping along with an examination of aerial photography.

A number of documents were consulted in the preparation of this assessment, as follows;

(i) Cork City Development Plan, 2015 – 2021

(ii) Cork County Development Plan, 2014

(iii) Cork City Waste Management Plan, 2004

(iv) Cork County Council, Waste Management Plan, 2004

(v) EPA, Guidelines on the information to be contained in Environmental Impact Statements

11.1 RECEIVING ENVIRONMENT

The River Bride (Blackpool) Certified Drainage Scheme, described in Chapter 3, 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.

11.2 TRAFFIC AND ROADS

The construction phase of the River Bride (Blackpool) Certified Drainage Scheme will have a temporary impact on traffic volumes in Blackpool and its environs. Hauling of excavated material which is not reused on site, combined with the delivery of materials and work force traffic will be assessed in relation to existing traffic volumes and mitigation measures proposed.

11.2.1 Description of Project and Roads Network

The majority of the proposed works under the River Bride (Blackpool) Certified Drainage Scheme are contained within a 3.5 km stretch of the River Bride. The proposed works are located in the vicinity of the river and comprise the following as detailed in Chapter 3:

- Construction of new culverts,
- Replacement of four 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 100m of existing culvert and restoration of open channel (River Bride) at this location,
- Construction of a new trash screen, and replacement of an existing trash screen on the River Glen with a roughing screen,
- Modifications to the existing foul and surface water collection networks in the vicinity of the proposed works 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 to facilitate pedestrian/ vehicular access around flood defences, and
- Regular maintenance of the river channel and pumping stations.

Detailed site investigation will also be required at the location of all proposed works. These proposed works are detailed in the scheme drawings in Appendix 3A.

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 River Bride (Blackpool) Certified Drainage Scheme, as described above and detailed in Chapter 3, is mainly concerned with works to and in the vicinity of the River Bride (North), and therefore generally will not have any permanent impact on the road network. The potential impacts of the River Bride (Blackpool) Certified Drainage Scheme on the road network are as follows:

- Temporary impact during construction due to the replacement of two existing bridges/culverts on the Glenamought River with new reinforced concrete bridges between Sweeney's Hill and the North Point Business park;
- Temporary impact during construction due to the replacement of two existing bridges/culverts on the River Bride with new reinforced concrete bridges between the North Point Business Park and Commons Road (N20);

- Temporary impact during construction due to the construction of 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;
- Temporary impact during construction due to the 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;
- Temporary impact during construction due to the rehabilitation of 17m of existing culvert on Old Commons Road upstream of Blackpool Church and 163m of existing culvert on Watercourse Road upstream of Madden's Buildings;
- Temporary impact during construction due to the 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;
- Temporary impact during construction due to the 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 modifications to the existing weir structure within the 'Brewery' culvert, which runs under Watercourse Road.

A further impact on the road network as a result of the proposed works is a temporary increase in traffic volumes as a result of construction activity. This section assesses this impact on the traffic in the study area and provides associated mitigation measures.

11.2.2 Existing Traffic

Traffic data for routes within the study area was obtained from traffic surveys carried out by Cork City Council and Transport Infrastructure Ireland. The traffic surveys provide a baseline for the traffic impact assessment of the River Bride (Blackpool) Certified Drainage Scheme. The Cork City Council traffic survey locations are shown on drawing TA001 in Appendix 11A.

The annual average daily traffic (AADT) data and the percentage of heavy goods vehicles for the N20 between Blarney and Blackpool is presented in Table 11.1.

Table 11.1 Traffic flows on the N20 between Blarney and Cork (Source: www.nratrafficdata.ie)

	2015	2014	2013
AADT	20997	20748	20652
% HGV	4.5%	4.5%	4.6%

A traffic survey carried out on 04/12/2014 on the North Ring Road/N20 Junction is presented in Table 11.2

Table 11.2 Traffic flows on the North Ring Road/N20 Junction

Road Name	Daily Traffic Count	Peak Hourly Flow (8 – 9 am)	Peak Hourly Flow (5 – 6 pm)
North Ring Road (R653)	25059	2073	1911
Blackpool Bypass (N20) towards New Mallow Road	30325	2441	2407
Blackpool Bypass (N20) towards Carroll's Quay	23396	2407	1810

Traffic surveys were carried out on the 21/11/2013 at the Commons Road/Bolands Industrial Estate Junction and the Mallow Road/Bolands Industrial Estate Junction. The results of the traffic surveys are provided in Tables 11.3 and 11.4.

Table 11.3 – Recorded Traffic Flows on the Commons Road/Boland Industrial Estate Junction

Road Name	Traffic Count (7am – 7pm)	Peak Hourly Flow (8 – 9 am)	Peak Hourly Flow (5 – 6 pm)
Commons Road Junction: Towards Bolands Industrial Estate (Fitz's Boreen)	4725	380	509
Commons Road Junction: Commons Road West	20483	2082	2250
Commons Road Junction: Commons Road East	19278	1932	2061

Table 11.4 – Recorded Traffic Flows on the Mallow Road/Boland Industrial Estate Junction

Road Name	Traffic Count (7am – 7pm)	Peak Hourly Flow (am)	Peak Hourly Flow (pm)
Mallow Road Junction: Towards Bolands Industrial Estate (Fitz's Boreen)	4116	386 (9 – 10am)	419 (1– 2 pm)
Mallow Road Junction: Mallow Road West	3741	319 (8 – 9am)	438 (5 – 6 pm)
Mallow Road Junction: Mallow Road East	5829	521 (8 – 9am)	624 (5 – 6 pm)

The busiest area recorded during the traffic surveys was the Commons Road section of the N20 from the North Ring Road/N20 junction towards the New Mallow Road.

11.2.3 Construction Traffic

Construction related traffic will be used for delivery of materials to site, removal of surplus excavated material from site and transport of employees to/from site and throughout the site. The main materials to be delivered include concrete, clay, stone, pipes and culvert sections. The estimated number of round trips (to/from site) for delivery of materials is approximately 1,570 spread over the anticipated construction period of 24 months.

The removal of surplus material will comprise principally of material excavated for foundations for walls and embankments and material excavated from culverts and the sediment trap. The estimated number of round trips to/from the site for the removal of surplus material is 1,177 over the anticipated 24 month programme.

The estimated number of round trips for construction personnel employed on site is approximately 20 round trips per day over the construction period. It is estimated that construction of the scheme will take 360 working days (24 month programme working 5 day weeks) to be completed.

Table 11.5 gives a breakdown of the estimated construction traffic.

Table 11.5 – Estimated Construction Traffic

Description of Trip	Total Round Trips	Round Trips Per Day*
Delivery of Materials	1,440	4
Removal of Excavated Material	1,080	3
Workforce	7,200	20
Total		**27**

**Trips per Day calculated based on total works programme of 360 working days*

11.2.4 Potential Impacts on Traffic and Transport Infrastructure

11.2.4.1 Potential Impact on Transport Infrastructure

Potential Temporary Moderate Impact

The proposed scheme has the potential to impact on the transport infrastructure in the area, most significantly during the construction phase. This impact is likely to occur in the following areas;

1. Replacement of two masonry bridges on the Glenamought River between Sweeney's Hill and the North Point Business Park (C08-B01 and C08_B02)
2. Replacement of two masonry bridges on the River Bride between the North Point Business Park and Commons road (C06_B01 and C06_B02)
3. Culvert at the northern end of Orchard Court, constructed off line of existing open channel (C06-B04)
4. Culvert replacement at Blackpool Church (C06_B08)
5. Culvert replacement on the Old Commons Road (C06_B06)
6. Culvert reconstruction at the junction at Watercourse Road and the Blackpool Bypass (C01_B03)

The proposed replacement of the four masonry bridges with reinforced concrete bridges will result in a temporary negative impact during the construction phase of the drainage scheme. It will be necessary to limit vehicular and pedestrian access across the river during the construction stage to facilitate the construction of the new culvert. These access points will be fully restored on construction of the works and will result in a permanent slightly positive impact following the construction phase of the drainage scheme.

The new proposed culvert of the existing open channel from downstream of Blackpool Bypass through Orchard Court will have a temporary negative impact due to temporary restriction of access to Orchard Court. Access will be reinstated over the culvert following completion of the works.

The replacement of the existing culverts will have a temporary impact on transport in these areas during the construction phase. The proposed works will not have a permanent impact as the transport infrastructure should be backfilled or reinstated completely.

Mitigation Measures

The construction of the reinforced concrete bridges will be carried out by a suitably qualified and experienced contractor who will be supervised to ensure that the works are carried out correctly. This will ensure that the bridges will be constructed safely and ensure the structural integrity of the structure.

Excavation and reinstatement of the Watercourse Road and Blackpool Bypass culvert trenches will be carried out in consultation with the Local Authority, and will also follow the Department of Transport, Tourism and Sport published document entitled 'Guidelines for Managing Openings in Public Roads'. These works will be designed and supervised by a suitably qualified and experience professional to ensure they are carried out correctly.

Residual Impacts - Potential Temporary Slight Impact

Taking into account the abovementioned mitigation measures, the residual impact of the proposed scheme on the transport infrastructure will be imperceptible.

11.2.4.2 Potential Impact of Construction Traffic

Neutral Impact

Taking into account the large numbers of existing vehicles using the road network in and in the vicinity of Blackpool, it is unlikely that traffic generated during the construction phase will have a significant impact on traffic flow in the town.

It is possible to quantify the predicted impact the construction traffic will have on the flow of traffic by calculating maximum hourly flows of construction traffic. These calculations are based on a working day of between 8am and 6pm. It was also assumed that the workforce will arrive during peak morning traffic and leave during peak evening traffic (10 round trips morning and evening). A conservative value of 2 deliveries in any one hour was taken as these trips are not likely to be spread evenly throughout the day. A conservative value of 2 removals of surplus materials in one hour was taken. Each round trip was calculated as two trips, to site and from site.

Table 11.6 compares the construction traffic generated to the existing traffic flows.

Table 11.6 – Recorded Traffic Flows on Anticipated Construction Traffic Routes

Road Name	Existing Maximum Hourly Traffic Flow	Construction Traffic	
		Maximum Hourly Traffic Flow*	As a Percentage of Existing Traffic
North Ring Road/N20 Junction: N20 Commons Road towards New Mallow Road	2441	28	1.1%
North Ring Road/N20 Junction: N20 Commons Road towards Carroll's Quay	2407	28	1.2%
Commons Road Junction: Towards Bolands Industrial Estate (Fitz's Boreen)	509	28	5.5%

Commons Road Junction: Commons Road West	2250	28	1.2%
Commons Road Junction: Commons Road East	2061	28	1.4%
Mallow Road Junction: Towards Bolands Industrial Estate (Fitz's Boreen)	409	28	6.8%
Mallow Road Junction: Mallow Road West	438	28	6.4%
Mallow Road Junction: Mallow Road East	624	28	4.5%

**Maximum construction hourly traffic flow based on working day from 8am to 6pm, with workforce arriving during morning peak flow and leaving during evening peak flow.*

Of the locations for which traffic data is available, it is predicted that the largest increase in traffic volume as a result of the River Bride (Blackpool) Certified Drainage Scheme will occur on Fitz's Boreen. The predicted increase is as a result of the relatively low volume of traffic currently using this road and not as a result of a larger volume of construction traffic in this area. Similar increases in traffic volumes can be expected on minor roads with relatively low traffic volumes, such as Sweeney's Hill.

It is not anticipated that the construction traffic will significantly affect the flow of traffic through Blackpool village. The impact of construction traffic will be short term.

11.2.4.3 Potential Impact of Works in the Vicinity of Road Network

Potential Temporary Slight Impact

Localised traffic disruption is also likely to occur at locations of proposed works on, or in the immediate vicinity of the road network. These works include the replacement of existing masonry bridges upgrading of existing culverts. Detailed site investigation works will also be carried in the vicinity of all proposed works.

Mitigation Measures

The localised traffic disruptions as a result of other proposed works throughout the scheme will be mitigated through the use of industry standard traffic management measures. These traffic management measures should be designed in accordance with the 'Guidance for the Control and Management of Traffic at Roadworks – Second Edition'.

Residual Impact – Potential Temporary Imperceptible Impact

Relatively short, localised delays are likely to be encountered by motorists at the locations of proposed works in the immediate vicinity of the road network. This impact will be a short term impact and there will be no residual impact on completion of the proposed works.

11.2.4.4 Potential Impact of Road Closures

Potential Temporary Significant Impact

It is likely that temporary road closures will be required during the construction phase of the works at the following locations:

- Private access to O'Sheas Buildings (C08_L03) – the road closure is envisaged to last approximately 2-3 months. An alternative temporary access with be provided to facilitate the property owners.
- Private access to Woodview House (C08_B01) – the road closure is envisaged to last approximately 2-3 months. An alternative temporary access with be provided to facilitate the property owners.
- Access to North Point Business Park (C08_B02) – a temporary bailey bridge will be put in place if it is not possible to keep one lane open during construction.
- Commons Inn – access to the hotel may be impacted temporarily during construction works, a temporary alternative access will be put in place.
- Dulux/AkzoNobel – a temporary access and traffic management measures will be required to the site from the Commons Road during the construction works.
- Sunbeam Industrial Estate (C06_B02) – the existing alternative accesses from the Redforge Road and the main shopping centre access will be used to mitigate the temporary closure of the bridge during construction.
- Orchard Court Bridge (C06_B03) – temporary closure of the bridge for a period of 1 to 2 months may be required to facilitate the construction of the proposed pumping station and culvert. A temporary vehicular access to Orchard Court will be provided over the new culvert near the existing pedestrian bridge downstream of the works.
- Thomas Davis St. and Old Commons Road Junction (C06_B08) – closure of one lane of Watercourse Road outside Blackpool Church is likely to facilitate the construction of the new culvert section is envisaged.
- Madden's Buildings – partial closure of the Watercourse Road at Madden's Buildings is envisaged to facilitate the proposed replacement of the concrete culvert. The construction will be phased to allow at least one lane of traffic to remain open at all times. The partial closure will result in temporary traffic disruptions in the area

The partial closures of the Watercourse Road at Blackpool Church and at Maddens Buildings will cause significant disruption to the traffic flow in the Blackpool area.

Mitigation Measures

Construction works in the vicinity of Blackpool Church and Maddens Buildings along Watercourse Road will be planned to take place over the summer in order to minimise traffic disruption. Any road and lane closures will be timed to minimise the impact to the flow of traffic, and if possible work will be carried out at off peak times to reduce the impact, particularly on heavy goods vehicles. All residents and interested parties should be consulted when planning these road closures to optimise the timing of same. A complete schedule of road closures should be published in advance of the works commencing to facilitate residents in making alternative arrangements where necessary.

Residual Impact – Potential Temporary Moderate to Significant Impact

The closure of the Watercourse Road at Blackpool Church and Maddens Buildings to facilitate the proposed works is likely to cause a moderate to significant temporary impact to the flow of traffic in Blackpool. However, there will be no residual impact once the proposed scheme is completed.

11.3 POTENTIAL IMPACTS ON SERVICES AND PROPOSED MITIGATION MEASURES

The majority of proposed works pertaining to the River Bride (Blackpool) Certified Drainage Scheme, described in detail in Chapter 3, are located in or in the vicinity of River Bride. This section will explore the potential impact the scheme could have on existing services, and propose necessary mitigation measures.

Detailed Site Investigation will also be carried out in the vicinity of all proposed works. These works have the potential to impact existing services however standard industry methodologies will mitigate this impact. As such, the detailed site investigation has not been assessed in the individual sections below.

11.3.1 Potential Impacts on Drainage Network

Potential Temporary Significant Impact

The drainage network currently includes fifteen locations where pipes cross under or in close proximity to the proposed works locations. These crossings are detailed on Table 11.7 below and shown on Drawing MA001 in Appendix 11A.

Table 11.7 – Drainage Network Crossings

Crossing Type	Diameter	Location	Works Schedule Ref.
Interceptor	300mm	X=166402.2, Y=74933.3	C08_L04
Interceptor	450mm	X=166537.2, Y=74514.3	C06_E01
Interceptor	450mm	X=166675.7, Y=74423.4	C06_C01
Storm	450mm	X=166535.;1Y=74401.7	C07_R01
Interceptor	450mm	X=166878, Y=74269.5	C06_L06
Storm	750mm	X=167194.4, Y=74156.1	C06_L16
Foul	225mm	X=167475.8;Y=74005.6	C06_B07
Unprocessed	Unknown	X=167499.4, Y=73739.1	C06_L22
Interceptor	675mm	X=167455.7, Y=73650.73	C06_B04
Foul	375mm	X=167431.5, Y=73596.2	C06_B04
Interceptor	675mm	X=167425.9, Y=73557.1	C06_B04
Foul	530mm	X=167405.1, Y=73420.9	C06_B04
Interceptor	750mm	X=167417.3, Y=73408.6	C06_B04
Interceptor	825mm	X=167450, Y=73249	C06_B09
Storm	Unknown	X=167499.2, Y=73299.3	C06_B09
Storm	Unknown	X=167461.3, Y=73057.8	C01_B03
Storm	Unknown	X=167454.4, Y=73040.1	C01_B03

The proposed scheme has potential to have a significant impact on the crossings identified in Table 11.7. In the absence of mitigation measures, these pipes may be exposed or damaged during excavation works at the locations identified in Drawing MA001. This would lead to pollution of the Glenamought and Bride Rivers and disruption of the wastewater collection system.

Mitigation Measures

Prior to tendering the Contract, the Employer's Representative (Consultant Engineer) will assess the drainage network drawings and the detailed site investigation reports in order to determine the exact depth and location of the drainage network within the works area. The locations of the drainage network

pipework relative to the proposed works will be confirmed as part of the Design Phase. Should it be anticipated that the excavation for the proposed works will impact on this pipework, this will be taken into consideration at detailed design stage and any diversions necessary to avoid accidental clashes during construction phase will be designed, planned and agreed with Irish Water and Cork City Council in advance of the construction phase. Planned diversions will be included in the works requirements or carried out in advance as appropriate.

Prior to excavation, the Contractor will assess record drawings and the results of the Site Investigation Contract. The Contractor will carry out additional site investigation to confirm the location of the existing pipework. This will further reduce the risk of striking the drainage network and causing interruption to the system during the construction phase.

Residual Impact – Neutral Impact

Taking into account the abovementioned mitigation measures the residual impact of the proposed scheme on the wastewater collection network and treatment process will be imperceptible.

11.3.2 Potential Impact to the Water Distribution Network

Potential Temporary Moderate Impact

The proposed scheme will potentially impact the water distribution network in the locations identified in Table 11.8 below and as shown on Drawing MA002 in Appendix 11A.

Table 11.8 – Water Distribution Pipework Crossings

Crossing Type	Diameter	Location	Works Schedule Ref.
Watermain - Ductile Iron	300mm	X=166554.4, Y=74394.8	C07-R01
Watermain - Ductile Iron	150mm	X=166826.7, Y=74280.4	C06_L05
Watermain - Ductile Iron	150mm	X=166844.7, Y=74272.5	C06_L05
Watermain - Ductile Iron	150mm	X=166864.5, Y=74266.4	C06_L06
Watermain - Ductile Iron	150mm	X=167447.5;Y=74024.4	C06_B02
Watermain - Ductile Iron	250mm	X=167501.9 Y=73733.1	C06_L22
Watermain - Ductile Iron	800mm	X=167502.5, Y=73711.7	C06_L23
Watermain - Ductile Iron	600mm	X=167493.2, Y=73679.8	C06_L23
Watermain - Ductile Iron	150mm	X=167407.3, Y=73416.1	C06_P06
Watermain - Ductile Iron	250mm	X=167458.4, Y=73238.2	C06_B09
Watermain - Ductile Iron	250mm	X=167470.8, Y=73056.9	C01_B03
Watermain - Ductile Iron	250mm	X=167463.6, Y=73065.7	C01_B03

Watermains may be encountered during excavation works for the proposed flood defence walls and culverts at the locations identified in drawing MA002. It is possible that watermains could be damaged during the construction phase, resulting in distribution to the potable water supply in the area. The impacts are predicted to be moderate and temporary.

Mitigation Measures

The Employer's Representative (Consultant Engineer) will assess the water distribution drawing and detailed site investigation in order to determine the locations of watermains relative to the proposed works as part of the Design Phase. Any anticipated clashes between the water distribution network and the

proposed works will be identified during the design phase and any diversions necessary to avoid accidental clashes during the construction phase will be designed, planned and agreed with Irish Water in advance of the construction phase of the Scheme.

The Contractor will be supplied with record service drawing and the results of the Site Investigation prior to excavation in order to determine the location of existing watermains within the works area. The Contractor will carry out additional site investigation in order to confirm the location of the watermains. This will further reduce the risk of striking the watermains and causing unscheduled interruption to the potable water supply in the area.

Residual Impact - Neutral Impact

Taking into account the abovementioned mitigation measures, no residual impact to the watermains following the construction phase is predicted.

11.3.3 Potential Impact to the Gas Network

Potential Temporary Moderate Impact

There is an extensive gas distribution network throughout Blackpool which intersects or lies in close proximity to the proposed scheme at the locations identified in Table 11.9, as shown on Drawing MA003 in Appendix 11A.

Table 11.9 – Gas Pipework (Distribution) Crossings

Crossing Type	Location	Works Schedule Ref.
Gas Distribution	X=166070.0, Y=74693.1	C06_R02
Gas Distribution	X=166551.8, Y=74395.5	C07_R01
Gas Distribution	X=166923.6, Y=74239.9	C06_B01
Gas Distribution	X=167339.5, Y=74079.6	C06_L19
Gas Distribution	X=167370.2, Y=74056.2	C06_L18/L19
Gas Distribution	X=167428.3, Y=74018.8	C06_L18/L19
Gas Distribution	X=167481.9, Y=73858.6	C06_L22
Gas Distribution	X=167502.4, Y=73.821.6	C06_L22
Gas Distribution	X=167407.6, Y=73421.9	C06_P06
Gas Distribution	X=167421.7, Y=73343.2	C06_B04
Gas Distribution	X=167433.8, Y=73317.5	C06_B04
Gas Distribution	X=167447, Y=73294.2	C06_B08
Gas Distribution	X=167457.2, Y=73235.6	C06_B09
Gas Distribution	X=167469.6, Y=73055.1	C01_B03
Gas Distribution	X=167472.8, Y=73027.5	C01_B03

Excavation for the culverts and flood defence wall foundations could encounter a gas main at the locations identified in drawing MA003. It is possible that this gas main could be damaged during the construction phase, affecting the supply to properties in the area and potentially causing a fire or explosion.

The impacts described above are predicted to be temporary and significant.

Mitigation Measures

The locations of the gas pipelines relative to the proposed works will be confirmed as part of the Design Phase. The Employer's Representative (Consultant Engineer) will assess the gas network drawings and result of the detailed site investigation in order to determine the exact depth and location of the existing gas pipelines within the works area. Should it be anticipated that the excavation for the proposed works will impact on this pipework, this will be taken into consideration at detailed design stage and any diversions necessary to avoid accidental clashes during construction phase will be designed, planned and agreed with Bord Gáis in advance of the construction phase. Planned diversions will be include in the works requirements or carried out in advance as appropriate.

The Contractor will be supplied with the site investigation report and record drawings of the gas distribution network. Prior to excavation the Contractor will carry out additional site investigation, including slit trenches, in order to determine the exact location of the gas pipelines in close proximity to the works area. This will ensure that the gas distribution network will not be damaged during the construction phase.

Residual Impact - Neutral Impact

Taking into account the abovementioned mitigation measures, there will be no residual impact to the gas mains following the construction phase.

11.3.4 Potential Impact to Electricity Network

Potential Temporary Moderate Impact

The proposed scheme may impact on the underground and overground electricity network at the locations detailed in table 11.10 and on Drawing MA004 in Appendix 11A.

Table 11.10 – ESB Cable Crossings

Crossing Type	Location	Works Schedule Ref.
ESB Overground Cable	X=166856.4, Y=751126.7	C08_L03
ESB Underground Cable	X=166284.0, Y=74786.1	C08_B02
ESB Overground Cable	X=166063.7, Y=74714.3	C06_L01
ESB Overground Cable	X=166606.7, Y=74411.7	C06_L01/R01
ESB Overground Cable	X=166773, Y=74320.8	C06_L05
ESB Underground Cable	X=166781.3, Y=74329.8	C06_L05
ESB Underground Cable	X=166923.3, Y=74240.1	C06_B01
ESB Underground Cable	X=167159.8, Y=74152.2	C06_L18
ESB Underground Cable	X=167495.2, Y=73907.9	C06_R04
ESB Underground Cable	X=167496.3, Y=73828.9	C06_L22
ESB Underground Cable	X=167396.5, Y=73415.2	C06_P06
ESB Underground Cable	X=167424, Y=73343.1	C06_B04
ESB Underground Cable	X=167446.8, Y=73297.5	C06_B08
ESB Underground Cable	X=167456.6, Y=73266.8	C06_B09
ESB Underground Cable	X=167432, Y=73241	C06_B09
ESB Underground Cable	X=167473.1 Y=73046.8	C01_B03
ESB Underground Cable	X=167467.6, Y=73026.1	C01_B03

Electricity cable laid in close proximity to the location of the proposed culverts and flood defence walls and embankments has the potential to be damaged during excavation works. This would result in a loss of power in the area. The striking of an underground electricity cable during construction operations could potentially result in serious injury or death of site staff.

There are also a number of overground electricity cabling crosses in the vicinity of the works.

The potential impact to the electricity infrastructure as a result of the construction of the proposed works is predicted to be temporary and significant.

Mitigation Measures

The locations of the electricity network relative to the proposed works will be confirmed as part of the Design Phase. The Employer's Representative (Consultant Engineer) will assess the service drawings and results of the detailed site investigation in order to determine the exact depth and location of the existing electricity cables within the works area. Should it be anticipated that the excavation for the proposed works will impact on the electricity network, this will be taken into consideration at detailed design stage and any diversions necessary to avoid accidental clashes during construction phase will be designed, planned and agreed with the ESB in advance of the construction phase. Planned diversions will be include in the works requirements or carried out in advance as appropriate.

The Contractor will be supplied with the site investigation report and record drawings of the electricity network. Prior to excavation the Contractor will carry out additional site investigation, including slit trenches, in order to determine the exact location of the electricity network in close proximity to the works area. This will ensure that the underground electricity network will not be damaged during the construction phase.

The Contractor will be supplied with the information obtained in the slit trenches and the electrical cable locations will be marked prior to excavation in the area. The Contractor will carry out additional site investigation to determine the exact location of the electrical cables in the vicinity of the proposed works. This will further reduce the risk of striking the cables and causing damage during the construction phase.

It is considered that any likely impacts to or from the overhead cables will be mitigated by applying standard construction practices. The Contractor must adhere to the ESB Code of Practice for Avoiding Danger from Overhead Electricity Lines, 2008 and the HSA Code of Practice for Avoiding Danger from Underground Services, 2010.

Residual Impact - Neutral Impact

Taking into account the abovementioned mitigation measures there will be no residual impact to the electrical infrastructure following the construction phase.

11.3.5 Potential Impact to Broadband Network

Potential Temporary Slight Impact

The broadband network intersects the proposed scheme in five locations, as detailed in Table 11.11 and shown on Drawing MA005.

Table 11.11 – Broadband Network Crossings

Crossing Type	Location	Works Schedule Ref.
Broadband Duct	X=166925.2, Y=74234.7	C06_B01
Broadband Duct	X=167441, Y=74011.3	C06_B02
Broadband Duct	X=167409.5, Y=73419.2	C06_P06
Broadband Duct	X=167475.2, Y=73050	C01_B03
Broadband Duct	X=167473.4, Y=73034	C01_B03

Excavation works for the proposed culverts and flood defence walls has the potential to damage broadband cables at the locations identified in drawing MA005. This would result in the loss of service in the area. The potential impacts are considered to be slight and temporary.

Mitigation Measures

Prior to tendering Contract, the Employer's Representative (Consultant Engineer) will assess the broadband network drawings and the detailed site investigation reports in order to determine the exact depth and location of the broadband network within the works area. The locations of the drainage network pipework relative to the proposed works will be confirmed as part of the Design Phase. Should it be anticipated that the excavation for the proposed works will impact on this pipework, this will be taken into consideration at detailed design stage and any diversions necessary to avoid accidental clashes during construction phase will be designed, planned and agreed with the service provider in advance of the construction phase. Planned diversions will be included in the works requirements or carried out in advance as appropriate.

The Contractor will be supplied with the information obtained in the slit trenches and the electrical cable locations will be marked prior to excavation in the area. The Contractor will carry out additional site investigation to determine the exact location of the broadband cables in the vicinity of the proposed works. This will further reduce the risk of striking the cables and causing damage during the construction phase.

Residual Impact - Neutral Impact

Taking into account the abovementioned mitigation measures there will be no residual impact to the broadband infrastructure following the construction phase.

11.3.6 Potential Impact to Telecommunications Network

Potential Temporary Slight Impact

The telecommunications network intersects the proposed scheme at the locations shown on Drawing MA006 in Appendix 11A and listed in Table 11.12 below.

Table 11.12 – Telecommunications Network Crossings

Crossing Type	Location	Works Schedule Ref.
Overground Cable	X=166307, Y=74829	C08_B01
Underground Cable	X=166294, Y=74733	C08_B02
Overground Cable	X=166043.7, Y=74691	C06_L01
Overground Cable	X=166768.7, Y=74331.5	C06_L05
Underground Cable	X=166927.6, Y=74238	C06_B01
Overground Cable	X=167431.4, Y=74019.5	C06_B02
Underground Cable	X=167485.3, Y=73956.3	C06_E02

Crossing Type	Location	Works Schedule Ref.
Overground Cable	X=167488.1, Y=73897	C06_L22
Overground Cable	X=167488.1, Y=73850.9	C06_L22
Underground Cable	X=167500.8, Y=73723.5	C06_L22/L23
Overground Cable	X=167445.5, Y=73626.7	C06_B03
Overground Cable	X=167438.7, Y=73561.9	C06_B03
Underground Cable	X=167440.8, Y=73305.1	C06_B07
Underground Cable	X=167454.4, Y=73232.1	C06_B07
Underground Cable	X=167470.8, Y=73053.1	C01_B03
Underground Cable	X=167475.6, Y=73021	C01_B03

Works are proposed at the locations identified in MA006 where telecommunication cables are present both above and below ground. Should these cables clash with the works they could become damaged during construction phase.

The potential impacts are considered to be temporary and moderate.

Mitigation Measures

Prior to tendering Contract, the Employer's Representative (Consultant Engineer) will assess the telecommunications network drawings and the detailed site investigation reports in order to determine the exact depth and location of the existing network within the works area. The locations of the telecommunications cable locations relative to the proposed works will be confirmed as part of the Design Phase. Should it be anticipated that the excavation for the proposed works will impact on this cabling, this will be taken into consideration at detailed design stage and any diversions necessary to avoid accidental clashes during construction phase will be designed, planned and agreed with the service provider in advance of the construction phase. In the case of the proposed flood defence walls where the cables potentially run along the proposed wall route, these cables will have to be taken into consideration at detailed design stage. Planned diversions will be included in the works requirements or carried out in advance as appropriate.

The Contractor will be supplied with the information obtained in the slit trenches and the telecommunication cable locations. Prior to excavation the Contract will carry out additional site investigation in order to determine the exact location of any underground telecommunications cables. This will further reduce the risk of striking the cables and causing damage during the construction phase.

It is considered that any likely impacts to the overhead cables will be mitigated by applying standard construction practices.

Residual Impact - Neutral Impact

Taking into account the abovementioned mitigation measures there will be no residual impact to the telecommunications infrastructure following the construction phase.

11.4 WASTE MANAGEMENT DURING CONSTRUCTION

It is anticipated that the River Bride (Blackpool) Certified Drainage Scheme will produce a significant volume of waste material during the construction phase. Through an extensive document review combined with information received from the scheme designers this section will examine the potential impacts associated with this waste and any mitigation measures required.

11.4.1 Background Information

'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects (2006)' were published by the DoEHLG. These Guidelines outline the issues that need to be addressed at the pre-planning stage of a development all the way through to its completion.

Best Practice Guidelines sets thresholds to ascertain which projects require the preparation of C&D plans. The proposed development, exceeds the following threshold and therefore requires a C&D Waste Management Plan;

- Civil Engineering projects producing in excess of 500m^3 of waste, excluding waste materials used for development works on the site.

As outlined in Chapter 6, excavated material will be reused on site as much as practicable. Where this is not possible, the recycling rates for the C&D waste produced throughout the construction of the River Bride (Blackpool) Certified Drainage Scheme should be maintained at or above 85%, if possible, as outlined in the Waste Management (Planning) Regulations 1997.

11.4.2 Classification Of Waste

Excavation for flood defence foundations, pipe trenches and culverts will give rise to a volume of material during the construction phase of the proposed scheme. The excavated material will be reused where possible, however approximately 10,000 m^3 will have to be exported from the site.

The European Waste Codes (EWC) for typical waste materials that may possibly be generated during the construction phase are outlined in Table 11.13.

Table 11.13 – Applicable European Waste Codes

Waste Material	EWC
Soil, stones and dredged spoil	17 05
Bituminous mixtures, coal tar and tarred products	17 03
Concrete, Bricks, Tiles and Ceramics	17 01
Metals (including their alloys)	17 04
Waste Hydraulic Oils*	13 01
Wastes of Liquid Fuels*	13 07
* Denotes Hazardous Materials	

A breakdown of the estimated volumes of waste, origin of waste, and European Waste Codes are shown on Table 11.14.

Table 11.14 – Estimated C&D Waste resulting from the proposed scheme

Origin of Waste	EWC	Estimated Volume of Waste
Wall Foundations	17 05/17 03	2,200m³
Culverts	17 05/17 03	6,675m³
Embankment Foundations	17 05/17 03	910m³
Pipe Trenches	17 05/17 03	600m³
Miscellaneous	17 05/ 17 04/17 03/17 01/ 13 01/ 13 07	4,550m³
	Total	**14,935³**

11.4.3 Potential Impact during Construction Phase

Potential Temporary Moderate Impact

Poor management of excavated waste could lead to the disposal of waste deemed unsuitable for reuse or recycling in facilities that do not carry the appropriate licenses.

In addition, if waste is not managed and stored correctly on site, it has the potential to cause nuisance and environmental impact. Litter may be generated from packaging taken from materials, mixed waste produced by the construction workers (lunches, cigarette waste etc.), or from debris from leftover/damaged construction materials. Poor management of waste may also result in water and ground pollution on the site or adjacent to the site.

Fuels and hydraulic oils/lubricants that will be used during the construction phase are classed as hazardous. There will be fuels stored on site for machinery and construction vehicles along with oils and lubricants. Should any spillages, waste or surplus liquids be disposed of incorrectly it could cause serious harm to the surrounding environment.

The potential impacts of construction and demolition waste on the environment are predicted to be short term and moderate.

Mitigation Measures

All current and applicable waste management legislation will be applied and adhered to. Contractors that are engaged in the transport of waste off-site will comply with the provisions of the Waste Management Act (1996) (as amended), associated Regulations and the Waste Management Plan prepared in accordance with 'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects (2006)'. As such, the Contractor must handle, transport and dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities. A collection permit to transport waste must be held by the relevant contractor which has been issued by the Local Authority where the waste has been generated i.e Cork City Council and Cork County Council.

Waste receiving facilities must also be appropriately licensed or permitted for the waste being received. Operators of such facilities cannot receive any waste, unless in possession of a waste permit granted by the Local Authority under the 'Waste Management (Facility Permit & Registration) Regulations 2007' (as amended) or a waste license granted by the EPA. The permit/license held will specify the type and quantity of waste able to be received, stored, sorted, recycled and/or disposed of at the specific site. It

has been confirmed that there are appropriate facilities in the area available to receive and process waste material.

The construction compound for the proposed scheme should have a dedicated Waste Storage Area (WSA) for any construction waste generated. Receptacles/skips or bays will be provided for each recyclable material. Dedicated waste bins should also be provided on any water going vessel/platform to prevent litter from contaminating the River.

Bedrock, Block and Concrete

It is reasonable to assume that gravels and bedrock may be encountered during the excavation of foundations, culverts and pipe trenches. Any material which is not reused will be separated out and sent to the appropriate recycling facility or waste facility if deemed unsuitable for recycling.

During construction of flood defence walls and works to bridges and culverts it is reasonable to assume that there will be some waste concrete and blocks generated. This waste will be adequately contained and stored within the WSA of the construction compound. It will then be disposed of to a permitted or licensed facility.

Soil/Subsoil

Soils generated from excavations carried out throughout the scheme will be stored separately from the gravels and bedrock and will be transported to an appropriately licensed facility by permitted contractors. It not considered likely that these materials will be hazardous, but should a portion of it be deemed to be contaminated they will be stored separately to the inert material. Samples will be taken and tested in order to appropriately classify the material as non-hazardous or hazardous to establish the criteria for the acceptance of waste at landfills. They will then be transported to an appropriately licensed facility by permitted contractors.

Scrap Metal

Reinforced concrete is likely to be used as part of the construction of the flood defence walls and sediment trap. As such it is reasonable to assume that a small amount of scrap metal be generated.

Scrap metal is highly recyclable and as such it will be segregated from other waste and recycled accordingly.

Timber

A small amount of timber waste may also be generated as a result of hoarding around works areas, or from shuttering for in-situ concrete pours. It is likely that this timber can be reused for a number of different functions throughout the construction phase however a small amount of waste will be generated, and the timber as a whole could be disposed of as the construction phase comes to a close.

Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc, will all be recycled. Should any timber be deemed to be contaminated it will collected by an appropriately permitted specialist contractor and disposed of in an appropriately licensed facility.

Hazardous Materials

If hazardous materials are used/encountered on site, i.e. timber with paint, asbestos concrete pipes, a specialist contractor will be employed to carry out an environmental clean-up to remove all traces of contaminated material from the site. The specialist contractor will be licensed under the 'Waste

Management (Collection Permit) Regulations, 2007' (as amended). This will be disposed of at an appropriately licensed facility.

In order to avoid any hazardous materials infiltrating the ground water during construction and operation phase there will be a bunded area constructed within the site compound with sufficient volume to contain any spills. All plant refuelling, maintenance or washing will be carried out within the bunded area. Spill kits will also be available at this area to facilitate the quick and effective cleaning of any substances.

Documentation

Waste will be weighed, either by weighing mechanism on the truck or at the receiving facility, and these records will be kept by the contractor (both hard and soft copies).

A copy of all waste collection permits, for all waste contractors will be kept by the Waste Manager, working on behalf of the Contractor, on site.

If the waste is being transported to another site, a copy of the waste permit or EPA Waste License for that site must be provided and kept by the Waste Manager. If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) document must be obtained from Dublin City Council (as the relevant authority on behalf of all local authorities in Ireland) and kept on site along with details of the final destination (permits, licenses etc). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

All information will be entered into the waste management system to be maintained on site.

Residual Impacts – Neutral Impact

Taking into account the abovementioned mitigation measures the residual impact of the construction phase will be imperceptible.

11.4.4 Potential impact during the Operational Phase

Potential Temporary Slight Impact

The operational phase of the proposed scheme is unlikely to produce any waste of significant volume. Periodic maintenance of flood defences, pumping stations and trash screen will be carried out which could generate very small volumes of litter, packaging, concrete, scrap metal, bitumen products or soils that if not disposed of correctly could adversely affect the local environment.

Mitigation Measures

For maintenance and repair work, all maintenance teams involved will take all waste generated on site back to their compounds to be placed in appropriate waste streams designated for recycling, reuse or disposal. No waste will be left at the site of the repair or maintenance.

Residual Impacts – Neutral Impact

Taking into account the abovementioned mitigation measures the residual impact of the operational phase will be imperceptible.

11.5 ASSESSMENT OF CUMULATIVE IMPACTS

A search in relation to plans and projects that may have the potential to result in cumulative impact on the environment was carried out as part of the EIAR. Data sources included the following:

- Cork County Development Plan 2014

- Cork City Development Plan 2015
- Relevant Local Area Plans
- South Western River Basin Management Plan
- Lower Lee CFRAMS including the Lower Lee Flood Relief Scheme
- An Bord Pleanála Website (Planning Searches)
- Myplan.ie
- Web search for major infrastructure projects in Cork City and County

The proposed flood relief scheme in combination with the proposed Cork City Development Plan and related Local Area Plans. The Drainage Scheme will provide increased protection to residential and commercial premises in Blackpool. This allows for the regeneration and economic development of the area as identified within the LAPs. Property values will be maintained or increased and the ability to obtain housing insurance will be greatly improved. Overall, a long-term significant positive cumulative impact is anticipated.

The impact on transport infrastructure, utilities and waste management is unlikely to occur cumulatively as a result of the proposed works. Impact on infrastructure and water is temporary and will not result in residual impact in combination with other plans or projects.

12 INTERACTION OF THE FOREGOING

The preceding Chapters 4 to 11 of this EIAR identify the potential environmental impacts that may occur in terms of Human Beings, Population and Human Health, Biodiversity, Flora and Fauna, Land, Soils and Geology, Hydrology and Hydrogeology, Air and Climate / Noise and Vibration, Landscape, Cultural Heritage and Material Assets, as a result of the proposed development. All of the potential impacts of the proposed development and the measures proposed to mitigate them have been outlined in the preceding sections of this report. 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.

The following paragraphs detail the instances where there is or was an interaction between the impacts in the various sections and how any resultant adverse impacts have been averted.

Human Beings & Flora & Fauna

The scheme was initially designed to retain as much open channel as possible in order to minimise the impact on fisheries. When modelled, this design option (Option 3) required high flood retaining walls in Orchard Court which were found by much of the public to be unacceptable. Therefore, an alternative option (Option 4) 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. Such compensatory measures includes the de-culverting of a significant length of culvert through sunbeam as well as a commitment from OPW to provide funding to IFI for other compensation measures in the catchment to enhance the fisheries resource. Security of the properties will be aided by alternative deterrents.

Human Beings & Landscape

Among the original designs for the flood relief works was the construction of flood defence walls in the area near Orchard Court. Following consultation, this design was rejected due to the impact that it would have had on the views within the area. The enclosed culvert design that was chosen will instead provide additional amenity areas and will not result in any visual barrier. Security of the properties will be ensured by alternative deterrents.

Human Beings and Material Assets

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.