River Fealge (Clonakilty) Drainage Scheme

Environmental Impact Statement Vol. 1 - Non Technical Summary

Final Report

December 2014

JBA consulting

OPW
The Office of Public Works
Oifig na nOibreacha Poibli

Cork County Council
Comhairle Contae Chorcaí

JBA Project Manager

Declan Egan
24 Grove Island
Corbally
Limerick

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Contract

This report describes work commissioned by Liam Basquille, on behalf of the Office of Public Works, by a letter dated 27th February 2014. The Office of Public Works representative for the contract was Patrick McAlinney. Tom Sampson, Laura Thomas, Matthew Hemsworth, David Mould, Keiran Sheehan, Seb Bentley, Nicholas Allin, Alex Craven and Declan Egan of JBA Consulting, Teresa Bolger of Rubicon Heritage, Craig Bullock of Optimise Consulting and Howard Williams of INIS Environmental carried out this work.

Prepared by ..... Declan Egan BSc. (Env) MSc. CSci. CEnv. CWEM

Project Manager

Reviewed by ..... Jonathan Cooper BEng MSc DipCD CEng MICE MCIWEM C.WEM MIoD

Director

Anne Murray BSc CIEEM

Senior Ecologist

Purpose

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1.1 Description of the Clonakilty Drainage Scheme

The proposed River Fealge (Clonakilty) Drainage Scheme is illustrate in Figure 1-1. It comprises tidal defence walls and a fluvial storage area. The scheme is described in greater detail below.

1.1.1 Tidal Defences

The tidal defences comprise:

- 1.1m high flood walls on both banks between Michael Collins Bridge and the Library
- Replace railings with solid parapets on Credit Union pedestrian bridge
- 1.1m high flood walls on both banks between Library and Rossa Street Bridge
- 1.1 to 1.3m high flood walls on both banks between Rossa Street Bridge and Seymour Street Pedestrian Bridge
- Replace railings with solid parapets on Seymour Street Pedestrian Bridge
- 1.3m high flood walls on both banks between Seymour Street Pedestrian Bridge and Clarke Street Bridge
- Strengthen and raise parapets of Clarke's Street Bridge
- 1.1m to 1.3m high flood walls along Croppy Road between Clarke Street and Fracksbridge
- 1.2m high flood walls from Clarke Street along the south bank, through the Waterfront Development to boundary of Waste Water Treatment Plant
- 0.75m high flood defence embankment at boundary of Waterfront Development and Waste Water Treatment Plant. Embankment to run north-south tying into existing ground levels
- 1.6m high flood wall and 1.7m raised road level along 220m of the Ring Road from Fracksbridge
- 1.4m high flood embankment behind houses on the Old Timoleague Road
- 1.3m high flood walls behind a number of properties on Convent Road

A number of storm water pipelines will be installed in the town along Kent Street, Kent Street Car Park, Rossa Street, Asthna Street, Long Quay and Croppy Road. A number of underground pumping stations will be installed at Kent Street, Kent Street Car Park, Rossa Street, Croppy Road and Waterfront. These will discharge into the river and to the estuary.

In addition to the above mentioned tidal defences a number of sections of the existing flood defence walls along the banks of the River Fealge will be replaced or repaired.

1.1.2 Fluvial Storage

The primary element of the drainage scheme is the provision of a storage reservoir that will hold the flood water and allow it to be released at rates that will not over top the river banks in the town. The storage reservoir comprises agricultural land to the west of Dunne's Stores. The outflow of water from the storage reservoir will be controlled by a sluice. The sluice will be manually operated and will be informed by river level gauges along the River Fealge.

Some minor fluvial defence measures (embankments and flood walls) would be required at Killgarrif Bridge, the Garage Stream and on the Ballyhalwick Stream.

Figure 1-1: Schematic of the River Fealge (Clonakilty) Drainage Scheme

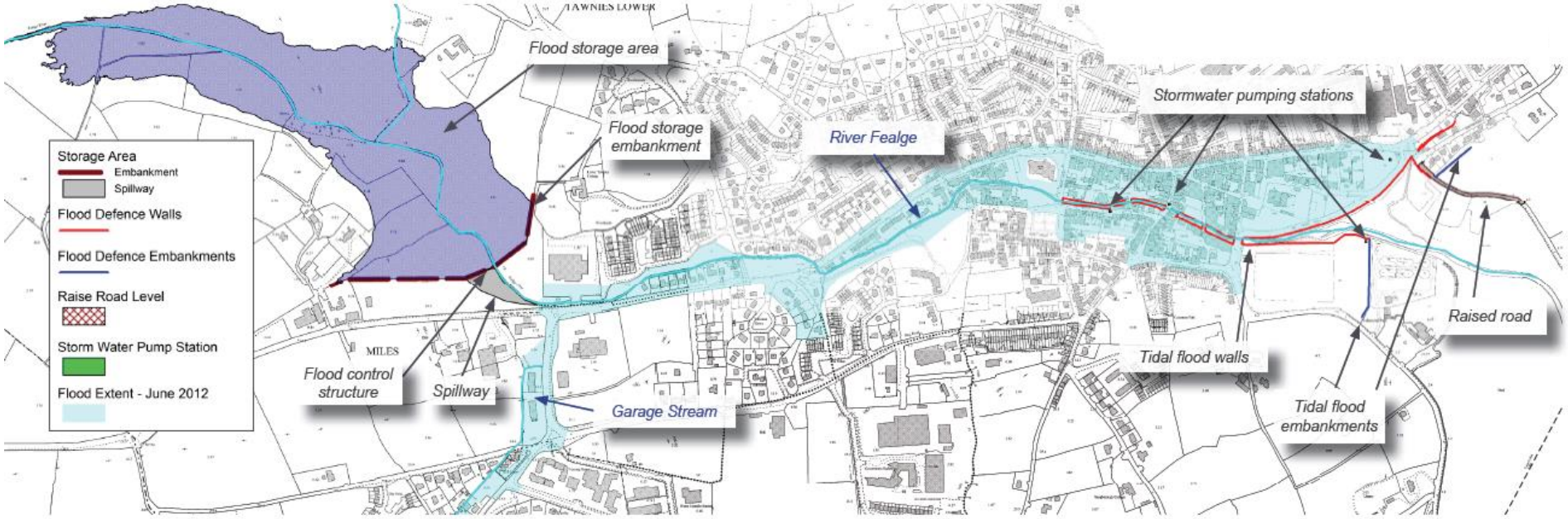

Figure 1-2: Photomontage of the defence wall at Croppy Road

Figure 1-3: Photomontage of the embankment from the N71

2 Need for the Scheme

There is a long history of flooding in Clonakilty Town. Flooding in the town was recorded in 1961, 1963, December 1996, 2004, 2006, 2008, three times during 2009, 2010, and five times in 2012. In the vast majority of these cases flooding was attributed to rivers and streams.

A number of studies conducted in the past, for example the MC O'Sullivan's Study in 1992, identified the requirement for a flood alleviation scheme for the town.

The OPW, in partnership with Cork County Council and other local authorities in the South West, have commissioned the South Western Catchment Flood Risk Assessment (SW CFRAM). This is in response to the EU Directive on the Assessment and Management of Flood Risks (227/60/EC) which aims to, reduce the adverse consequences of flooding on human health, the environment, cultural heritage and economic activity. This Directive coupled with the 2004 OPW Report on the Flood Risk Policy Review Group shifted the emphasis in addressing flood risk towards:

- A catchment-based context for managing risk
- Pro-active risk assessment and management of future spatial development
- Increased use of non-structural and flood impact mitigation measures.

In summary the objectives of the SW CFRAM Study are to:

- Identify and map existing and potential flood hazards within the South West
- Assess and map the existing and potential flood hazards within the South West
- Identify systems and measures for the effective and sustainable management of flood risk in the Areas for Further Assessment (AFAs) and within the South West
- Prepare Flood Risk management Plans (FRMPs) for the Study Area, prepare Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) for the plans.

Clonakilty forms one of the 26 AFAs in the SW CFRAM study. Clonakilty town experienced extreme flooding in June 2012 and this prompted the CFRAM work for the town to be accelerated in order to assess the risk and to identify a viable flood relief scheme.

3 Construction Methodology

3.1 Duration of Construction

It is anticipated that all of the required statutory permits and Contractors will be in place by October 2015. The timeline for the completion of the scheme will be determined by the Contractor but it is anticipated that the scheme will be completed by early 2017 (approximately 18 month duration). The typical working hours will be 8.00 am to 6.00 pm Monday to Friday and 8.00 am to 4.00 pm on Saturday. Working will be restricted around Christmas and where possible during the summer tourist season. Environmental factors associated with the in-river works upstream of the Special Area of Conservation (SAC) will be restricted to May to September inclusive, which is outside the salmon breeding season. In addition, for works within the SAC the over-wintering bird season of November to February must also be avoided.

3.2 Construction Activities

All of the construction activities will meet all Health & Safety requirements. Similarly all works, particularly in-river works will be carried out under strict Standard Operating Procedures to ensure that the pollution risks may affect watercourses do not arise. All of the Work Method Statements will be agreed in advance through a Construction Environmental Management Plan undertaken by a qualified ecologist and agreed with OPW and Inland Fisheries Ireland.

3.2.1 Site Access Routes

Access roads to the site of the proposed storage embankment will be required to facilitate the haulage of construction and other materials to and from the site. Due to the physical constraint of the River Fealge, a temporary access road off the N71 and off the Fernhill Road will probably be required. The Contractor will agree access points to the embankment from both sides of the river with Cork County Council and the landowners prior to commencement of the work.

3.2.2 Contractors Compound

It is anticipated that one site compound will be located close to the proposed storage embankment. Possibility a second site compound will be located close to Croppy Road. The location of the Contractors Compounds will be agreed with the landowners and Cork County Council in advance of the scheme commencing.

3.2.3 Equipment and Machinery

The construction of the storage embankment will require the use of heavy goods vehicles (HGV's) to transport the material to the site and earth moving machinery will be used to place and form the embankment. Ready mix concrete trucks and a concrete pump will be required for the construction of the wing walls for the sluice. Supplementary equipment that will be used for the construction of the sluice will include formwork, scaffolding, excavator, dumper trucks, diesel for re-fuelling plant, and welfare facilities. Skips for storing waste will also be contained within the compound.

A similar range of equipment will be used to construct the defence walls in the town. It is anticipated that ready mix concrete trucks, a concrete pump, cranes, pile driving rigs and excavators, portable cement mixers, scaffolding and dewatering pumps will be the main pieces of equipment used for the construction of the tidal defence walls.

3.3 Construction Methodology

3.3.1 Fluvial Storage Embankment

Approximately 22,500 tonnes of impermeable soil will be required to construct the embankments. This material will be brought to the site in 20 Tonne heavy good vehicles. The trucks will enter the site from the N71 at Miles close to the Maxol Filling Station. The material for the northern section of the embankment will enter the site off the Fernhill Road.

The construction of the wing walls to support the sluice will require the excavation of foundations or installation of a sheet piled wall.

3.3.2 Tidal Defence Walls and river walls

Depending on its location the construction of the tidal defence walls will take place on the landward side of the river bank where works are proposed adjacent to the estuary. The walls that will be constructed on dry land, for example along Croppy Road, it is expected that the contractor will use typical construction techniques i.e. excavate for foundations, erection of formwork, placement of reinforced steel, and pumping of concrete or pilled steel walls. The finishes to the walls will be completed when the entire wall is constructed.

A number of the walls, for example, the construction of the section of wall downstream from Seymour Pedestrian Bridge, and walls by Brookville will be completed using in-river works. This will involve the construction of a cofferdam, pumping out of the water to ensure a dry working area, excavation of foundations, placing the formwork and reinforced steel, pumping concrete and finally removal of the formwork when the concrete has set.

3.3.3 Storm water pipes and pumping stations

The work will involve excavation and placement of the pipe and fill material. A storm water pipeline will be constructed along Croppy Road and the outfall will discharge to the estuary and will be integrated into the works associated with the defence wall. All the pumping stations will be constructed underground with a small control cabinet above ground.

3.4 Estimated Cost of the Scheme

The estimated cost to construct the scheme is € 12.5 M (excl. VAT).

3.5 Operation and Maintenance of the Scheme

The scheme will require maintenance when it comes into operation. The maintenance schedule will become part of the Office of Public Works Maintenance Programme for all schemes nationwide. The condition of the defence wall will be assess on a regular basis and maintenance works programmed. Similarly the removal of branches, excessive weed growth or any object that might restrict river flows will be removed as part of the maintenance regime.

The workings of the sluice gate in the embankment will be under a similar maintenance programme. The sluice will be operated manually and the operator will be informed of river levels in the River Fealge by a number of water level sensors that will be strategically placed along the river. This information will allow the operator to determine the quantity of water that can be released without overtopping the banks and walls of the river downstream.

4 Impact Assessment

4.1 Introduction

The following sections of this Non-Technical Summary describe the impacts of the scheme on the environment. The assessment conducted by JBA Consulting found that the main impacts of the scheme will arise during the construction stages.

4.1.1 Human Beings

This section of the report looks at the impacts of the proposed scheme on the people living in Clonakilty. In this review the impacts of traffic, noise, and dust on humans is commented upon. The positive impacts on humans both from an economic and quality of life perspective are also addressed.

Clonakilty is an attractive market town with a population of 4,721 recorded in the 2011 Census. Clonakilty is an important destination for tourism. Visitors are attracted by the combination of a vibrant and attractive town centre, the built and cultural heritage, the nearby coastal scenery and beaches, along with the wider attributes of West Cork. The town contains a good number of lively cafes, pubs and craft shops along with more convention main street premises. The Model Railway Village is a specific attraction sited beside the bay. There is also a series of cultural and music festivals throughout the year. Visitor accommodation in the town is supplied by hotels and guest houses providing for over 4,400 beds.

In recent years significant flooding has occurred in the town on a number of occasions. In June 2012 much of the commercial heart of the town, along with areas along the River Fealge, found itself suddenly under water following a period of intense rainfall. The regularity of flooding has the potential to seriously set back aspirations to maintain a residential population and commercial activity in the town centre as set out in the Development Plan. According to Clonakilty Chamber of Commerce, 105 private residences were impacted by the 2012 event along with 170 commercial premises, more than ten of which sustained direct losses of over €40,000. The total damage was estimated at between €6 and €7 million including material damage and loss of business. The flooding has also had a damaging social impact through the prevention of access to community facilities, damage to property and temporary relocation. Some of the properties worst affected by the 2012 floods were occupied by elderly people and other more vulnerable subsets of the population. This causes anxiety when intense periods of rainfall are forecast or occur for those who have suffered flood inundation previously. Access to flood insurance is a major concern and is having a large impact on business confidence in the heart of the town.

During the construction of the scheme the residents of Clonakilty and the surrounding area will experience some traffic disruption, a temporary localised increase in noise and dust levels. Work will be restricted to 8.00 am to 6.00 pm Monday to Friday and 8.00 am to 4.00 pm on Saturday. A Traffic Management Plan will be put in place to minimise traffic disruption. The contractor will be required to avoid excessive dust emissions during the works or to put in place measures, such as water bowsing, to minimise dust emissions. The work that will be undertaken in the town will be sensitive to people using the town and disruption to pedestrians will be kept to a minimum. Bridge closures will take place during construction such as at the Credit Union pedestrian bridge and the Seymour Pedestrian Bridge. Closures will be kept to a minimum particularly during the tourist season.

On completion, the flood defences will have a profound positive impact by removing or greatly reducing the risk of flooding and the impacts this has in terms of severance, disruption to daily life, health and direct threats to life, business and property.

Positive impacts will be most significant for the 500 people residing in the town centre and most especially those living in rental or owner-occupied accommodation in the central area which is at highest risk. There is a particular positive impact for more vulnerable population subsets such as elderly people or people with disabilities, for example people living on Casement Street or in basement flats. On previous occasions, these individuals will have had to have moved out during period of flooding or will have had to cope with a period of living in an unsatisfactory environment following a flood event. There has involved problems of material damage and damp with consequent financial and health implications.

The benefits to business will be greatest for those shops, hotels and other businesses located on Western Road, Kent Street, Connolly Street, Rossa Street, Clarke Street, Astna Street, College

Road and Ashe Street/Wolf Tone Street. The protection should permit businesses without insurance to re-avail of cover.

4.1.2 Water

The section of the report covers the topic of water. This section describes the existing aquatic environment within the Study Area and it describes the impacts of the proposed Clonakilty Drainage Scheme on the aquatic environment. There are 3 types of aquatic habitats within the Study Area namely:

- Freshwater
- Estuarine/marine
- Groundwater

The River Fealge is a major freshwater resource within the Study Area. The catchment consists of moderately sloping hills and valleys rising to a height of approximately 150 m in the western side of the catchment. The Garage Stream and the Cappeen Stream are smaller streams that flow into the Fealge. The water quality in the River Fealge is good.

Clonakilty Harbour comprises the estuarine water within the Study Area. It is a Special Area of Conservation under the Habitats Regulations and a Special Protection Area under the Birds Directive. The quality of the water in the Harbour is described as moderate.

The study area has poorly productive bedrock except for local zones and groundwater is not generally used as a potable water supply. The groundwater in the area is however vulnerable to pollution.

The stripping of the topsoil for the construction of the embankments and the contractor's compound has the potential for silt laden runoff to enter the river during heavy rainfall events. Any silt laden runoff discharges to the river will have a negative impact on both water quality and the species (e.g. macro-invertebrates and fish) that inhabit the river. The spillage of diesel, hydraulic oil or lubricants from the contractor's compound to the water course will have a negative impact on the river and may result on the loss of some of the species in the river.

In-river works also has the potential to cause pollution in the river and in the estuary. Work will not take place in the river between the wetter months of October and May to allow the safe passage of migrating salmon, trout and eels.

The contractor will be required to have an Environmental Management Plan in place before any work commences. This plan will set out strict procedures for carrying out work in or close to water both in the river and the estuary. The plan will also contain procedures for dealing with emergencies such as a spillage of diesel or concrete into the river.

When construction is completed it is anticipated that the impact of the tidal defence walls and the storage embankment on water quality will be minimum. There may be some localised changes in the flow patterns around or close by to them but it is anticipated that this will be a localised minimal negative impact.

4.1.3 Hydromorphology

This section provides an overview of the existing hydromorphological condition of the associated project watercourses along with the impacts associated with the construction of the proposed drainage scheme.

Hydromorphology can be described as the hydraulic interaction between channel form and channel flows to define physical habitat. This also demonstrates the important link between hydromorphological forms and processes, and ecological condition and habitat.

The existing morphology throughout the Fealge River system is diverse. The bed of the channel is predominantly gravel based, operating naturally to move coarse sediment. This is supplied largely from glacial deposits being reworked from bank erosion and the bedrock dominated upper reaches which act to supply sediment entering the river in the upper reaches, downstream via a series of temporary in-channel bar stores. The majority of bars within the channel are dynamically stable and are replenished with sediment from upstream whilst also providing a source for transport to downstream reaches during geomorphologically effective flows. The river throughout

contains a good gravel substrate which can provide, in some locations, good places for fish spawning.

Historic narrowing of the estuarine zone through land reclamation has created a dynamic mudflat zone that is likely to be sensitive to artificial modification.

The study has shown that the construction of the drainage scheme will have low to medium impacts on the hydromorphology of the river and estuary. However the reinstatement of damaged sediment bed features once construction is complete will sufficiently mitigate these impacts. Monitoring will be required when the scheme is operational and possible intervention.

4.1.4 Ecology - Flora & Fauna

To assess the ecological impacts of the proposed Clonakilty Drainage Scheme a range of assessments and surveys have been undertaken to identify the ecological receptors within the study area, determine their ecological value, assess the potential impacts of the scheme upon them and propose mitigation to offset any identified impacts.

The ecological impact assessment was conducted in line with relevant standard guidance and included:

- A desk-based assessment to collate information on protected/notable species and statutorily designated nature conservation sites in, or within close proximity to, the study area.
- An ecological walkover survey including mapping of habitats present, recording of bird species observed, recording of any evidence of protected species (i.e. Otter, Badger), identification of any features with suitability for roosting bats and mapping of any non-native invasive species.
- A bat survey involving a data search, roost surveying and timed searches.
- A crayfish survey
- A fish survey involving a desktop review, habitat suitability assessment and electro-fishing
- A hydromorphological audit and gravel condition survey to identify potential fish spawning areas.

During development of the Clonakilty Drainage Scheme and production of this Environmental Impact Statement consultation meetings were held with the National Parks and Wildlife Service (NPWS) and Inland Fisheries Ireland (IFI).

The assessments and field surveys undertaken as part of this project identified the presence of Clonakilty Bay Special Area of Conservation (SAC), Special Protection Area (SPA) and proposed Natural Heritage Area (pNHA) within the study area. Whilst most habitats within the study area were only of local value at most, the River Fealge, with vegetation communities equivalent to the Annex I habitat of watercourses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation was identified to be of greater value. Similarly, the estuarine and intertidal habitats, as they form part of the designated site, were identified as being of considerable importance. The field surveys also identified the presence of notable wetland bird populations in the estuary, Otter (including a resting place along the River Fealge), bat populations within the town, salmonid populations in the River Fealge and Japanese Knotweed near Facksbridge.

During the installation of tidal walls around Clonakilty Bay SAC, SPA and pNHA, the working footprint may encroach into the designation, resulting in temporary habitat damage. However, no permanent structure will be constructed within the designated site and temporary impacts can be mitigated against by minimising the working footprint and reinstating mudflat and sandflat substrate upon completion. Scour of mudflats within the Bay around the new defences may also occur once built, however the impact of this, in comparison to existing conditions, is considered to be negligible.

Construction activities around Clonakilty Bay could also result in disturbance to overwintering bird populations which could cause displacement, stress and potentially mortality, particularly during cold weather. Timing of the works in the tidal reaches should be undertaken in the summer months (March-October) in order to avoid this impact.

The construction phase also has the potential to adversely impact upon riverine, estuarine and intertidal habitats and species, in particular fish, through sediment mobilisation and pollution incidents. However, following appropriate pollution prevention guidelines and best construction

practice, in particular when using a cofferdam, will help avoid and mitigate these potential impacts. Upon completion, the new flood defences may also effect sediment movements within the River Fealge and cause scour immediately downstream of the sluice at the flood storage area, potentially impacting upon riverine habitats and fish. However, this can be mitigated against by introducing spawning gravels at appropriate locations upstream and armouring the channel bed at the sluice to prevent scour.

Bird populations upstream of the town may also be adversely impacted upon by disturbance and potential nest damage/destruction during construction activities and from the loss of approximately 80m of hedgerow around the storage embankment. Timing hedgerow removal works outside of the bird nesting season, minimising the length of hedgerow removal and ensuring lost hedgerow is replaced through replanting will minimise this impact.

During the construction works the Otter population in the area will be disturbed, however, the resting place, being a considerable distance from the works site, will be unaffected. Pre-works surveys will, however, be undertaken at all works areas, site compounds and access routes to ensure that new Otter resting places are not present. This pre-works survey will also ensure impacts on other protected species, such as Badger, do not arise and that non-native invasive species have not colonised the area since the initial survey.

The town of Clonakilty was found to provide good habitat for a number of bat species, with a number of species also recorded at the embankment location upstream of the town. Removal of approximately 80m of hedgerow during the construction phase will impact upon foraging habitat for bats. Repair of existing, or construction of new defences, through the town could also impact upon bats as several lengths of wall within the town were identified as having the potential to support roosting bats. Pre-works bat activity surveys are therefore required on all walls where work is to be undertaken and where bats may potentially be present.

The construction phase also has the potential to have minor negative impacts on fish populations through disturbance and damage of fish spawning habitats from in-channel working. However, timing works to avoid the salmonid spawning season (November-March) and minimising in-channel working will mitigate this impact. During the operational phase fish passage may be impacted upon temporarily as a result of high velocity flows through the sluice during flood events, or more permanently for some species due to the creation of a smooth concrete structure within the channel bed at the sluice. However, this can be mitigated against through the inclusion of a bristle substrate elver/lamprey pass on the sluice and through the embedding of cobbles/gravel within the concrete to replicate natural bed conditions. The replacement of culverts and installation of trash screens on some of the tributaries could also impact on fish movement, but by following appropriate guidance these can be designed in such a way as to mitigate potential negative impacts.

Overall, the most significant ecological impacts will arise during the construction phase as a result of disturbance to Otter, fish, birds and bats, damage to and loss of small areas of notable habitats, including hedgerows, and water pollution incidents and sediment mobilisation. Operational impacts are generally minimal, with only small-scale localised habitat loss anticipated. However, potential operational impacts of minor negative significance may arise in relation to fisheries due to adverse effects on spawning habitat and fish passage. A range of mitigation measures have been proposed to offset potentially significant negative impacts, including appropriate timing of the works, replacement planting, pollution prevention measures and habitat reinstatement. Consequently the residual impact for the majority of identified impacts was reassessed as being neutral or of minor negative significance only. It can therefore be concluded that the ecological impact of the construction and operation of Clonakilty Drainage Scheme will be neutral or minor negative only, provided that the identified mitigation measures are fully implemented and monitored.

All construction works and mitigation measures relating to ecology will be monitored by a suitably qualified ecologist who will provide regular weekly reports to the competent authority. The format and content of the reports to be agreed with the competent authority.

4.1.5 Air & Climate

The construction activities will emit dust into the surrounding environment. The dust will be generated by truck movements carrying materials to the site, particularly the impermeable material for the construction of the embankments. A number of mitigation measures such as wetting of the stockpiles during periods of extended dry weather and the use of rumble strips at the site exit will ensure that the impact on air quality will be minimal.

4.1.6 Noise and Vibration

It is anticipated that construction works will take approximately 18 months to complete. However, works will not be on-going in any one area for the duration of the construction phase. Therefore the noise generated by the construction works associated with the proposed flood defence scheme will be temporary and transient in nature. There are noise sensitive receptors located adjacent to the proposed works both in the town and outside in the Miles area where the storage embankment will be located. A baseline noise assessment conducted in the town found that traffic noise is the dominant source of noise. It has been estimated that the construction noise will have a moderate impact on people living close to the construction site. Mitigation measures such as hoarding around the work areas and switching machinery/plant off when not in use, will help to reduce the impacts of noise. Noise generated by the underground pumping stations will generated when the pumps are in operation.

4.1.7 Landscape and Visual Impact

A number of Regional and local planning policies serve to protect the landscape and visual qualities that inform the character of Clonakilty and its surroundings. The presence of historic stone walls, the character and ambience of the old town, the bay, the river and views and prospects and amenity spaces all add to the character of Clonakilty. Protection is afforded through the designation of scenic routes, scenic landscapes, Protected Buildings and an Architectural Conservation Area.

The landscape assessment found that a number of properties will experience a significant effect during construction and operation of the scheme. A significant effect is expected during construction of the storage embankment to Glen House at Tawnies Lower where earthworks and machinery will be evident within largely rural views. Similarly properties on the Old Timoleague Road will experience a significant effect during construction of the embankment at the rear of these houses. Significant effects will arise during construction to the riverside pedestrian walkway to the rear of Harte's Courtyard and including William A. Houlihan Bridge which forms an amenity route in the town.

A localised significant effect is expected during the construction for a short section of the Ring Road. Visual impacts during construction will also arise for a number of commercial and non-residential properties close to Bridge Street, including the library, Town Hall, Post Office and the Credit Union building.

Any visual impacts that arise during construction are expected to be temporary and short lived.

The majority of the visual impacts that may arise during the operation of the scheme can be mitigated through a number of measures such as the avoidance of unnecessary tree loss, replacement of vegetation with appropriate species, and the specification of locally-sourced stone as facing and capping to new walls.

Receptors for which there will be no significant visual impacts include the Fernhill House Hotel, the Clonakilty Model Railway Village, the Waterfront Development, Emmet Square and residential properties around Kilgarriff Cottages.

4.1.8 Archaeology & Cultural Heritage

The purpose of this section is to assess the importance and sensitivity of the known as well as the potential archaeological, architectural and cultural heritage environment of the proposed development site on the Clonakilty Drainage Scheme, to identify the impact of the proposed development on this environment and to propose mitigation measures to reduce any impacts.

Results from this assessment have illustrated that a total of 113 individual cultural heritage sites are located within the study area for this assessment. No National Monuments or sites with Preservation Orders are located within the study area but there are 12 Recorded Monument (RMPs), 65 Protected Structures and 56 NIAH sites. The River Fealge itself and its estuary are considered to be an area of archaeological potential (CH#113) for the purposes of this assessment. In addition, the urban core of Clonakilty has been designated an Architectural Conservation Area (ACA) and a Zone of Archaeological Potential (ZAP).

The proposed flood relief works will have a direct impact on nine cultural heritage sites or receptors. The proposed fluvial storage area will be formed by a substantial embankment bank. Three fulacht fiadh sites (CH#10-12) that are designated as RMPs are close to the footprint of this embankment and may be impacted by groundworks associated with its construction. In addition,

the former course of a mill-race (CH#109) passes through the footprint of the embankment and may be impacted. Construction of the spillway and sluice on the south side of the Fluvial Storage Area could impact on sub-surface remains of a former footbridge (CH#111), if such survive. A tidal flood bank proposed, on the north side of the estuary, at Old Timoleague Road, will be located close to the site of an enclosure with no surviving surface remains (CH#9). Again groundworks associated with its construction may impact on this site. Construction of the new tidal defences through the town may require the removal (rather than just enhancement) of sections of the existing river wall or revetment (CH#110). Groundworks associated with the scheme may impact on the ZAP for Clonakilty (CH#102) and the area of archaeological potential that constitutes the river Fealge and estuary (CH#113).

Nine indirect impacts have been identified at operation stage. Most of these impacts are impacts on setting or character (i.e. visual impacts) and will arise as a result of the construction of new tidal defence walls within the Architectural Conservation Area (ACA). In addition impacts on setting will arise as a result of the proposed fluvial storage area. Five RMP sites (CH3-4 and CH10-12) are located within the footprint of the storage area. Regular flooding of this area may result in impacts on the setting of these cultural heritage sites and affect their long-term preservation.

The following proposed mitigation measures are subject to approval by Cork County Council and the National Monuments Service, Department of Arts, Heritage and the Gaeltacht:

1. In order to identify buried or unknown archaeological remains, a programme of test trenching will be carried out, in advance of construction, at the proposed floodbanks at the southeast end of the Fluvial Storage Area and at Old Timoleague Road, where the proposed embankments are close to or within the constraint areas of RMP sites. This should be carried out by a suitably qualified archaeologist under license and in accordance with the provisions of the National Monuments Acts 1930-2004. It will provide advance information to inform the delivery of other mitigation measures outlined below, notably those relating to preservation in situ either by avoidance or design and the positioning of buffer-zones as well as any necessary archaeological excavation or other mitigation measures that might be required by the County Archaeologist or the National Monuments Service. A report on the results of any test trenching will be submitted to the Local Authority, the Heritage and Planning Division, Department of Arts, Heritage and the Gaeltacht and the National Museum of Ireland prior to the commencement of the main construction programme.
2. An underwater archaeological survey will be undertaken along the section of the River Fealge west of Clonakilty that may be affected by the temporary diversion of the river channel and along any sections of the river where full replacement of river walls or revetments will be required. This survey will be undertaken by a suitably qualified archaeologist and should be completed prior to the commencement of the main construction programme so as to inform the delivery of any other specific mitigation measures outlined below.
3. In order to identify buried or unknown archaeological remains, archaeological monitoring of all groundworks associated with the proposed scheme will be carried out during the construction phase. This should be carried out by a suitably qualified archaeologist under license and in accordance with the provisions of the National Monuments Acts 1930-2004.
4. Where possible, every reasonable effort will be made to preserve in situ, or reduce the impact on any identified archaeological material through design. The current policy of the Minister for Arts, Heritage and the Gaeltacht is that preservation in situ of archaeological sites is the preferred option. Where known archaeological sites are adjacent to proposed works and are to be preserved in situ, these areas will be fenced off for the duration of construction works and will not be utilised in any temporary capacity such as spoil stockpiles, site access or haul routes or site compounds/storage area.
5. Where preservation in situ cannot be achieved, either in whole or in part, then a programme of full archaeological excavation will be implemented to ensure the preservation by record of the portion of the site that will be directly impacted upon. This work should be carried out by a suitably qualified archaeologist under license and in accordance with the provisions of the National Monuments Acts 1930-2004.
6. A condition survey should be undertaken of the RMP sites within the Fluvial Storage Area. This survey should be repeated at regular intervals once the storage area is operational to monitor its long-term effects on these monuments and their setting.

7. If existing river walls or revetments are to be removed (in whole or in part) then a detailed written and photographic record of the affected section of walling or revetment should be compiled along with a historic buildings survey (to NIAH standards) prior to its removal.
8. In order to preserve the architectural character and minimise impacts on the setting of architectural heritage sites it is recommended that new tidal defence walls be matched to the existing fabric of existing revetments and river walls. This can be achieved either through construction using similar fabric or that facing be applied to new concrete infrastructure to match the historic fabric.
9. Any alterations to or reinforcement of bridges which are protected structures should be undertaken in consultation with the Cork County Conservation Officer and following the guidance in Architectural Heritage Guidelines for the Planning Authorities.

4.1.9 Traffic

Clonakilty has an attractive and compact town centre, which is defined by a system of narrow, mostly one-way, streets, with on-street parking available. The N71 National Secondary Road runs through the town, in a broadly north-west direction. The N71 is a National Secondary Road, the primary link between Cork City and Bandon with Clonakilty, and onwards to Skibbereen and West Cork.

The town is also linked to the surrounding hinterland via the Regional Road R588 (Fernhill Road) which runs northbound from the town, the Regional Road R599 which runs North-West and the Regional Road R600 linking to the east to Timoleague. Each of these Regional Roads links with the N71 National Road on the approach to, or within, the Town Centre. The N71 an Annual Average Daily Traffic Flow (AADT) of 8,566 Passenger Car Units (PCUs, or "car-equivalents") with 3.1% Heavy Goods Vehicles (HGV) content in 2013 (HGVs being considered as trucks with more than 2 axles for the purposes of this assessment).

A traffic survey undertaken as part of this Environmental Assessment on the N71 found an AADT of 6,930 PCUs with 1.7% HGV content. It is anticipated that the work on the defence walls in the town will require 3-4 deliveries or removals of materials per day. Based on the robust assumption of 1 car per operative, this element of the work will result in additional 15-20 PCU movements per day (2-Way) within the town. This will not result in significant additional traffic to the town. Notwithstanding the low level of impact, there may be a requirement for much localised traffic management measures during the progression of these works, and any such measures can and will be done through agreement with the Local Authority and the Garda.

The raising of the Ring Road will require localised temporary signed diversions and a traffic management plan to be agreed in advance with the Local Authority and the local Garda. Local Access will be maintained to local properties.

The construction of the storage embankment just west of Dunne's Stores will require the importation of low-permeability clay in order to create the impermeable embankments to the south of the storage area. This involves the importation of 11,250m^3 of material (or approximately 22,500T). Based on a construction programme of say 13 weeks for the embankments, an additional 11 trucks per day will enter the site off the N71. This will have a negligible impact on traffic on this road. Similarly on the northern section of the embankment an additional 7 trucks per day will enter the site off the Fernhill Road. This will have a slight to moderate impact on this road.

Site access routes will be agreed with the landowners and the contractors prior to the commencement of the work. The road signage associated with the temporary access will fully meet the requirements of the Department of Transport's Traffic Signs Manual.

The temporary access will include the internal provision of wheel wash & brush facilities to ensure that there is no inadvertent depositing of mud or clay on the public roads associated with the passage of construction vehicles with additional road sweeping as necessary.

4.1.10 Material Assets

The Fealge River (Clonakilty) Drainage Scheme comprises work in Clonakilty Town in and beside the River Fealge, the estuary and at a site west of Dunne's Stores. The scheme will have the potential to impact on the following material assets:

- Electricity Networks
- Bord Gais Networks

- Telecommunication Networks
- Surface water Collection
- Waste water Collection
- Pedestrian Bridges
- Roads

The proposed scheme may impact on underground electricity services. Excavations along Croppy Road, or work on the defence walls in the town may impact on these underground services. This would have an impact on both the workers and nearby residents and commercial outlets. As part of the Health & Safety Plan for the scheme the contractor will be required to contact the various service providers and Cork County Council regarding the underground services. These will be marked on site prior to the work commencing.

Telecommunication lines may also intersect sections of the scheme and again the contractor will contact the service providers in advance of the works. Cable routes will be marked on the ground and sub-contractors made aware of the services.

The contractor will contact Cork County Council regarding waste water collection pipes around the town. A number of the combined sewers are being separated at the moment and any disruption to waste water treatment lines should be identified before any excavation work commences. The construction of the underground storm water pipelines and pumping stations could encounter waste water collection pipes. Again the contractor will identify these services and pipes with a member of Cork County Council before any work commences in an area.

Work along the southern bank of the estuary will come close to the outfall from the waste water treatment plant. All works undertaken in this area will require some alternative discharge location for the duration of the works. This may be a case of linking a flexible hose pipe and re-diverting the flow for a short while.

The work on the bridges in the town, Clarkes Street Bridge, Seymour Pedestrian Bridge and the Credit Union pedestrian bridge will cause disruption to pedestrians. However pedestrians will be directed around the bridge when the work is underway and access to the bridges will be resumed as quickly as possible.

The impacts of the scheme on the roads are discussed in Section 4.1.9 above.

4.2 Interaction of the Above

Sections 4.1.1 to 4.1.10 deals with the impacts from the proposed scheme on environmental aspects such as, surface water, ecology and human beings. Interactions between impacts can also occur when the impact caused by the scheme causes interaction or dependency with other environmental aspects. This section discusses the interactions between the impacts and assesses them as positive, negative or neutral (as having no interaction or interdependency).

Cumulative impact interactions can occur as either interactions between impacts associated with just one project or interactions between the impacts of a number of projects in an area. As a result, two types of cumulative impact interaction have been considered within this Environmental Statement (ES) as follows:

1. The combined effect of individual impacts arising as a result of the Proposed Development, for example effects in relation to noise, airborne dust or traffic impacting on a single receptor; and
2. The combined impact of the Proposed Development with several other development schemes which may, on an individual basis be insignificant but, together (i.e. cumulatively), have a significant impact.

Other plans and programmes as per the Clonakilty Town Development Plan (2009-2015) will be advanced during the construction of this scheme, for example the upgrade of the waste water treatment plant and the provision of a route for the North Ring Road around the town. The interactions of these developments have been assessed with the proposed scheme and it was found that:

- The provision of additional storage in the fluvial storage area will compensate for the area for the proposed bypass that will pass over the storage area
- The provision of the proposed storm water pipelines as part of this scheme will have the benefit of reducing the hydraulic loading to the waste water treatment plant
- The provision of the scheme will allow the land for zoned for residential development on Map 3 of the Town Development Plan be realised.

The design of the proposed scheme considered the design and the environmental constraints identified at the early stages of this project. This process is discussed in Section 5 – Alternatives Considered, in this EIS.

Indirect and cumulative impacts were considered during the development of this scheme as a result of the sensitivity of the Special Area of Conservation in Clonakilty Bay, the presence of salmonids in the River Fealge, the architectural heritage of Clonakilty town, its archaeology and the inhabitants and commerce within the town. The requirements of the Clonakilty Town Plan were also considered. The options selected reduced the scale of intervention in the town, by reducing flow into the town as a result of engineering storage in the upper catchment. The tidal defences avoided large scale works in Clonakilty Bay by using modest tidal defences within the boundary of the town. The balance between environmental, social, cultural heritage and economics constraints has been described in this assessment.

The remaining interactions after the optimisation of the layout of the scheme between the various aspects of the environment are discussed in each section of the environmental impact statement and reproduced in summary in the following section.

4.2.1 Potential Interactive Impacts

4.2.1.1 Human Beings

Human beings are specifically addressed in Section 12 of the Environmental Impact Statement (Volume 2). They are also indirectly considered where their livelihood and quality of life are considered. The scheme is positive for the inhabitants of Clonakilty. However the scheme will generate negative impacts such as visual impacts and agricultural land severance. Negative impacts will also occur during construction due to increased traffic in the town and road closures, noise and dust.

4.2.1.2 Ecology and Fisheries

The construction of the sluice and the storage of flood waters may have a negative impact on the fish in the River Fealge because of increased suspended solid loading to the river. This impact will be short term and controlled by following good site management practices. Silt release will also depend on the number of occasions that the reservoir fills and empties in the early phase of its operation. The deposition of silt and suspended solids on the river bed has the potential to cover potential spawning grounds for salmonids.

4.2.1.3 Hydrogeology and Hydrology

Interactions between geology and water quality will occur during the construction phase due to soil excavation. This also has the potential knock-on negative impacts on fisheries and ecology.

4.2.1.4 Hydromorphology

There will be negative interactions between the operation of the storage area control device and the hydromorphology of the River Fealge. The proposed scheme has been assessed against the WFD objectives set out in chapter 8 of the Environmental Impact Statement (Volume 2). The Fealge river system through Clonakilty is considered to be in a 'moderate' condition (ecological and chemical) in the River Basin Management Plan, with an objective to be restored by 2021 to satisfy stated WFD targets. The proposed scheme should not cause deterioration in the existing waterbody status and should not compromise its ability to achieve a future objective. Wider remediation may be required as reach scale impacts are possible as a result of the scheme, such as increased fine sediment deposition in the vicinity of the storage area due to dampened flows. These interactions may require channel remediation works, following a period of monitoring.

4.3 Interaction with other Plans and Programmes

The construction of this scheme also interacts with other programmes and policies. For example the scheme interacts with:

- The current Clonakilty Town Development Plan (2009-2015)
- The Cork County Biodiversity Plan (2009-2014)
- Cork County Draft Landscape Strategy (2007)
- The South West River Basin Management Plan (2009-2015)

4.3.1 Clonakilty Town Development Plan (2009-2015)

The Clonakilty Town Development Plan sets out the development objectives for the town over the life time of the plan. Two proposed project – the construction of the proposed bypass around the town (the North Ring Road) and the upgrade of the waste water treatment plant.

The footprint for the proposed bypass will pass through the storage area. The design of the storage area has made provision for the additional area that will be occupied by the bypass.

The works to be carried out at the waste water treatment plant include increasing and improving the capacity at the WWTP (by increasing the design load from 5,333 P.E. to 20,500 P.E.), including the incorporation of nitrogen and phosphorous reduction. The improvement works will also include the general refurbishment at the WWTP, an upgrade of the Long Quay pumping station and the construction of a new pumping station at Ring Village. An element of the drainage scheme is the provision of a number of storm water pipe lines in the town and a number of pumping stations that will discharge into the river or the estuary. The storm water drains will have the positive effect of reducing the hydraulic loading to the waste water treatment plant. The provision of nutrient management of the effluent discharges from the WWTP will assist in reducing the eutrophic status of the estuary and bay. This will have a knock-on effect of increasing the likelihood of the water quality in the estuary and bay achieving good water quality status by 2021 as per the requirements of the Water Framework Directive.

A Tidal Barrage is proposed in the development plan (draft) and if it goes ahead, it will be assessed under the Habitats Directive. However, it is envisaged that the proposed scheme will reduce the potential requirement for a Tidal Barrage as a flood management structure. The potential cumulative impacts of the proposed flood alleviation scheme in combination with a Tidal Barrage would not be significant, as a result of the flood alleviation measures chosen as these aim to avoid permanent works within the estuary and Clonakilty Bay SAC and SPA. However, the Tidal Barrage as a project in its own right may have significant impacts on Clonakilty Bay SAC and SPA and therefore is not viewed as the most appropriate option in the Options Appraisal Report due to the potential significant permanent impacts on Clonakilty Bay SAC and SPA, for this reason the development of the Tidal Barrage is unlikely to proceed due to adverse impacts on Clonakilty Bay SAC and SPA. However should it proceed the current flood scheme will not contribute to the adverse impacts of the Tidal Barrage.

4.3.2 The Cork County Biodiversity Plan (2009-2014)

In summary this Plan sets out Cork County Council's objectives to protect biodiversity in the County. The preferred drainage scheme for Clonakilty went through a number of processes; a constraints study, an environmental options appraisal and an Environmental Impact Statement before a decision was made on the final scheme. Stage 1 Screening Assessment were conducted on all the options considered. The tidal barrage option was removed because of the legal status (it is a Special Protection Area) and sensitivity of the Clonakilty Bay.

The final design of the scheme will have cognisance of fish (salmon, trout and eels) that inhabit the River Fealge and all in-river work upstream of the SAC will be carried out between May and September.

4.3.3 Cork County Draft County Landscape Strategy (2007)

The visual impact assessment of the scheme had cognisance of the Landscape Strategy and the Scenic Views listed in the Cork County Development Plan. The final design and frontage on the defence walls will be agreed with the Clonakilty Town Architect.

Registered Office

24 Grove Island
Corbally
Limerick
Ireland

t: +353 (0) 61 345463
e:info@jbaconsulting.ie

JBA Consulting Engineers and Scientists Limited

Registration number 444752

Visit our website
www,jbaconsulting.ie