

EIA Consultee Letter

20th January 2012

Ref: 2185-100735

Re: Bandon Flood Relief Scheme – Environmental Impact Assessment Consultation

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Ryan Hanley, in association with McCarthy Keville O'Sullivan, have been appointed by the Office of Public Works to carry out an Environmental Impact Assessment (EIA) of the proposed Bandon Flood Relief Scheme.

Further to our previous correspondence to you, a Constraints Study and Options Report have been prepared and preliminary public consultation (in the form of two public information events in Bandon) has been undertaken. A preferred option is now being considered at EIA stage. Previous engineering and environmental reports have been completed and are available to access online at <http://www.bandonfloodwarning.ie/bandonfloodrelief.htm>

As part of the EIA process, we would appreciate any comments that you or your organisation might have in relation to the proposed preferred scheme. In order to facilitate this, a scoping pack is enclosed with this letter. The scoping pack provides a brief description of the options considered, preferred option and the scope of the EIA and Environmental Impact Statement.

We would appreciate that you would forward this documentation to the most appropriate person within your organisation, if it has been issued to you in error. I would appreciate if you could return any comments or suggestions for my attention, before the 24th of February 2012. If you require any further information, please do not hesitate to contact me.

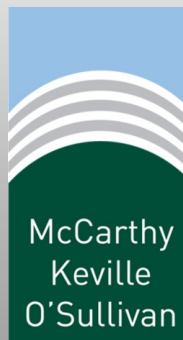
Yours sincerely,



Corina Collieran,
McCarthy Keville O'Sullivan Ltd.

BANDON FLOOD RELIEF SCHEME

EIA SCOPING PACK



RYAN HANLEY

JANUARY 2012



1 INTRODUCTION AND BACKGROUND INFORMATION

1.1 INTRODUCTION

The Office of Public Works have appointed Ryan Hanley Consulting Engineers in association with McCarthy Keville O'Sullivan as Environmental Consultants to complete an Environmental Impact Assessment (EIA) for the proposed Bandon Flood Relief Scheme. The assessment is currently being prepared in accordance with requirements set out by the Environmental Protection Agency (EPA) in the 'Guidelines on the Information to be contained in Environmental Impact Statements'. This scoping document provides details regarding the proposed flood relief works and the subject area, and is being circulated to all relevant consultees. Consultees are invited to contribute to the EIA by suggesting baseline data, survey techniques and potential impacts that should be considered as part of the EIA process and in the preparation of the EIS. The list of consultees to whom the Scoping Document has been circulated is provided in Appendix 1 of this report.

1.2 HISTORY OF FLOODING

Bandon Town has a long history of serious flooding. Flooding is primarily due to heavy rainfall in the catchment of the Bandon River and of its tributary, the Bridewell River, which joins the Bandon River immediately downstream of the Bandon Bridge. Flooding can be exasperated by high tides in the Bandon River estuary, approximately 6km to the east of the town. Since the previous highest recorded flood in 1975, serious flooding has occurred in the town in 1978, 1982, 1986, 1988 and November 2009. Minor flooding in the past decade has occurred in 2004, 2005, 2006 and January 2011.

1.3 CURRENT SITUATION

The management of flood risk at present consists of a Flood Early Warning System (FEWS) which was installed in early 2011 and an associated Flood Emergency Response Plan (FERP). The FEWS operates by monitoring river levels at three gauging stations located at Longbridge, Bealaboy and Bandon and issuing text alerts to designated people depending on the level of the river and the associated colour of the alert – yellow (low), yellow (high), orange and red. The level of the alert determines the resulting actions by the people contacted ultimately resulting in the implementation of the FERP.

1.4 DESIGN STANDARD

The design standard to be adopted for the scheme is the 1% Annual Exceedance Probability (AEP) (1% AEP = 1 in 100 chance of occurring in any given year) flood level with provision for adaptability in the future to accommodate the potential effects of climate change.

1.5 CURRENT STATUS OF SCHEME

The following surveys and reports have been completed to date:

- Constraints Study
- Appropriate Assessment Screening Report
- Hydrology Report
- Development of Hydraulic Model and Hydraulics Report
- Baseline Ecological Surveys
- Baseline Underwater Archaeological Survey
- Defence Asset Condition Survey
- Property Threshold Survey
- Preliminary Site Investigation
- Flood Risk Assessments

The Constraints Study, Hydrology Report and Hydraulics Report are published at <http://www.bandonfloodwarning.ie/bandonfloodrelief.htm>

The final Flood Risk Management Plan is currently being completed by the Engineering Team. The Environmental Impact Assessment process (this process) has commenced and is due for completion in the coming months. Following completion of the final Flood Risk Management Plan and an Environmental Impact Statement, the preferred flood relief scheme will be presented to the public at a Public Exhibition in accordance with the Arterial Drainage Act (1945) and Amendment Act (1995).

2 INITIAL SCREENING OF FLOOD RISK MANAGEMENT OPTIONS

The range of engineering measures typically considered for flood alleviation schemes include, but are not limited to the following:

- a) Do Nothing (i.e., implement no new flood alleviation measures)
- b) Non-Structural Measures (e.g. flood warning system or individual property protection)
- c) Relocation of Properties and/or infrastructure
- d) Reconstruction of Properties and/or infrastructure to a higher level
- e) Flow Diversion (e.g. river diversion or flood flow bypass channel)
- f) Flow Reduction (e.g. upstream catchment management or flood storage)
- g) Flood Containment through Construction of Flood Defences
- h) Increase Conveyance of Channel (upstream and/or through and/or downstream of the town)
- i) Sediment Deposition and Possible Sediment Traps
- j) Pump storm waters from behind flood defences
- k) Measures Specific to the Study Location

The above measures were the subject of an initial screening process in order to shortlist a number of potentially viable flood relief options for Bandon Town.

The criteria used in the initial screening were:

- Applicability to area;
- Social;
- Environmental;
- Cultural;
- Economic.

Each of the options considered as part of the initial screening are described briefly overleaf.

2.1 DO NOTHING

In this situation, the existing FEWS and associated FERP would not be utilised, which would increase the existing flood risk. Overall this option was not considered acceptable due to its excessively high level of risk and was therefore not considered further.

2.2 EXISTING REGIME

In this situation the FEWS and associated FERP would be utilised. The existing risk remains. Overall this option is not considered acceptable due to the excessively high level of risk and it was not considered further.

2.3 MINIMAL MEASURES

Minimal measures could include annual local dredging of the Bandon River around Bandon Bridge and local trimming of vegetation along the river bank. The reduction in risk would be negligible relative to the current situation. This option was not considered acceptable on its own due to the excessively high level of residual risk and it was not considered further.

2.4 NON-STRUCTURAL MEASURES

The FEWS and FERP are examples of non-structural measures currently in place. Other non-structural measures that could be considered include planning and control measures, building regulations regarding flood-proofing buildings, public awareness and preparedness campaigns, individual flood protection of buildings and land use management plans.

The use of non-structural measures on their own would provide only a limited reduction in risk relative to the current risk. The measures would take time to implement, possibly in excess of 10 to 20 years. Overall this option is not considered acceptable on its own due to its excessively high level of residual risk and the time required to implement the measures. It was therefore not considered any further on its own. This measure will be recommended in conjunction with other measures as associated costs are relatively low and in order to increase general public awareness.

2.5 STRUCTURAL MEASURES FOR EXISTING RISK

2.5.1 Flood Water Storage

This option considers the storage of flood water in the Bandon River catchment upstream of Bandon Town. The option was modelled to assess potential storage requirements. In order to avoid damage to property in Bandon, it would be necessary to restrict the flood flow through Bandon to less than the 10% AEP flood flow. In this situation, up to 13,000,000m³ of flood water storage would be required which would cover an area of approximately 650 hectares.

This method could potentially reduce the flood risk to an acceptable level, however, an examination of the catchment upstream of Bandon did not locate any suitable storage areas to provide the required volume of storage. The level of protection would also depend on the duration of the flood event. For longer flood events, the storage could be fully utilised before the flood has passed, thereby increasing the flood risk.

2.5.2 Flow Diversion

Flow diversion was not considered in any detail as the topography of the area does not lend itself to providing an alternative route for floodwater without the requirement for very significant volumes of pumping. The difference between the estimated 1% AEP and 10% AEP flow is 145m³/sec. This option would require a minimum of a 50m² conveyance channel through which to convey the pumped flows. A secure power supply would be

required for the pumps. There would also be a residual risk of pump failure. Overall this option is not considered acceptable due to the very significant technical difficulties, the significant costs, the environmental and cultural risk involved with constructing a bypass channel and the residual risk.

2.5.3 Increased Conveyance

Options for increased conveyance include deepening the existing channel, widening the existing channel and removal of local constraints to flood flows. All have the potential ability to reduce the 1% AEP flood level to sufficiently low levels. The use of increased conveyance has considerable potential to achieve the Flood Risk Management objectives for Bandon. Overall this method could be considered to be potentially viable, either on its own or in conjunction with other methods. This option was therefore carried forward for consideration as a potential option.

2.5.4 Flood Defences

Flood defences can include walls, embankments and demountable defences. The construction of flood defences has the potential ability to protect the Area of Potential Significant Risk (APSR) from the 1% AEP flood event and to achieve the Flood Risk Management objectives for Bandon. Overall this method is considered to be potentially viable, either on its own or in conjunction with other methods.

2.5.5 Rehabilitate/Improve Existing Defences

There are existing structures in Bandon which have been constructed as flood defences or can act as flood defences. These include an embankment by the Bandon River at the Riverview Shopping Centre and Lidl Supermarket, the walls by the Bandon River along McSweeney Quay, and the walls by the Bridewell River along St. Finbarr's Place, Market Quay and New Road. These structures could be improved to give some level of protection. The degree of flood protection would depend on the design flood height which would be determined by the other flood protection measures adopted.

Rehabilitation/improvement of existing flood defences on its own would not provide sufficient protection to Bandon Town but has potential to achieve the Flood Risk Management objectives when used in conjunction with other methods.

2.5.6 Relocation of Properties

This would require 257 properties to be reconstructed or accommodated at a suitable location outside of the flood envelope of the 0.1% AEP mid range future scenario (which takes account of potential climate change). New infrastructure including transport, electricity, gas, telecommunications, water supply and sewage collection would be required. It is possible that the abandoned properties could be utilised in an appropriate manner

suited to their location in a flood plain. However, it would effectively mean that the commercial centre of Bandon Town would be lost. Ideally, the centre would be re-built at one location rather than be spread around the suburbs of Bandon.

This option would ensure sufficient protection for Bandon, however the cost of relocation would be excessive and there would be a significant impact on society and on commercial activity in Bandon. Very minor relocation could be considered where the cost of protecting an individual property is considered to be excessive. Overall though, this option was not considered to be potentially viable and was not considered further.

2.6 SUMMARY OF INITIAL SCREENING PROCESS

The measures examined that were considered potentially viable and which therefore warrant further consideration, based on the initial screening were:

- Increased conveyance
- New flood defences
- Rehabilitation/improvement of existing defences in combination with other methods

3 DEVELOPMENT OF POTENTIAL OPTIONS

3.1 INCREASE IN CONVEYANCE

An increase in river flow conveyance can be achieved by;

- Increasing the width of the channel over the full depth;
- Increasing the width of the channel over part of the channel depth i.e. a compound channel
- Increasing the depth of the channel
- Removal of local channel constrictions e.g. bridge piers, weirs, local narrow points
- A combination of the above

The above types of works could be carried out locally or over long lengths of the river.

3.1.1 Increase in Channel Width

An increase in channel width was initially considered. However, there is little opportunity to widen the river channel in the initial 2km below Bandon Weir due to existing infrastructure and development close to the river bank. Where infrastructure and development is absent, steep topography makes channel widening difficult. There are only a small number of locations available for channel widening.

The option of removing the walkway along the right bank downstream of Bandon Bridge was also assessed using the hydraulic model. The modelling results showed only a minor reduction in flood levels as a result – in the order of 40mm.

3.1.2 Increase in Channel Depth

Four dredging options to increase the river channel depth were examined. These are summarised below with details of the dredged bed e.g. the proposed bed level downstream of Bandon Weir, the extent of dredging, the proposed bed slope and the resulting change in flood levels. The existing and resulting 1% AEP flood levels at various locations through Bandon are also shown in Table 3.1 below.

	Existing Situation	Dredging Works			
Bed Level DS of Weir (mOD)	11.10	10.00	9.50	9.00	8.00
Gradient	NA	1:1,000	1:1,000	1:1,000	1:1,000
Extent of Dredging (m)	0	3,000	3,500	4,000	5,200
Dredged Volume (m ³)	0	111,000	153,000	195,000	432,000
Location	Existing Flood Level (mOD)	Flood Levels Resulting from Dredging (mOD)			
Lidl Carpark	17.31	17.42	17.42	17.42	17.42
US of Weir	17.04	17.12	17.12	17.12	17.12
DS of Weir	16.65	15.37	15.00	14.63	13.73
US of Bandon Bridge	16.18	15.02	14.68	14.33	13.42
DS of Bandon Bridge	15.43	14.85	14.48	14.15	13.24
Gauge Station	14.98	14.57	14.19	13.83	12.94
Bypass Roundabout	14.22	13.97	13.62	13.31	12.47
WWTP	13.49	13.40	12.82	12.48	11.81

Table 3.1 1% AEP Flood Levels for Dredging Options

There would be a significant reduction in flood levels between the weir and Bandon Bridge for all of the dredge options considered in Table 3.1 above. Flood levels would be below bank levels on the right bank for all options. However, it would be necessary to dredge to at least 9.0mOD to bring flood levels below the vast majority of property thresholds in South Main Street, Bridge Street, Pearse Street and North Main Street. There would also be a significant but smaller reduction in flood levels between Bandon Bridge and the bypass roundabout.

It would be necessary to dredge to at least 9.0mOD to bring flood levels below bank levels and property thresholds in this area. The volume of dredged material in this case would be approximately 195,000m³ and the extent of the dredge would be 4km in length.

Dredging to higher levels than 9.0m from the weir would require the use of flood defences to provide full protection for the 1% AEP flood event. The volume of material to be dredged would reduce to 153,000m³ and the extent of the dredge would be 3.5km in length.

3.1.3 Removal of Local Restrictions

Local restrictions to flood flows are apparent at a number of locations in Bandon including the Bandon Weir, the Pedestrian Footbridge, Bandon Bridge and the confluence of the Bandon River with the Bridewell River. The effect of removing of each of these restrictions was simulated using the hydraulic model.

3.1.3.1 Bandon Weir

The removal of the Bandon Weir would result in a significant reduction in flood levels upstream of its location but it would make little difference to flood levels downstream of its location. The right bank upstream of the weir is already substantially protected

by an existing embankment which is to be improved shortly to provide full protection for the 1% AEP flood event. There is one property at risk on the left bank and removal of the weir would eliminate this risk. However, this property could also be protected locally.

The weir is currently utilised for the generation of hydroelectric power. It was also identified in the Constraints Study as a cultural heritage site. Therefore, the benefit of removing it may be out-weighted by the benefit of retaining it.

3.1.3.2 Pedestrian Footbridge

The pedestrian footbridge causes a significant afflux at the current 1% AEP flood flow, largely due to the presence of the bridge deck and handrailing. This afflux would be largely eliminated if the level of the riverbed was to be reduced by dredging. In the absence of dredging as part of the proposed solution, replacement of the bridge with either a clear span or a reduced number of spans at a higher level could be considered.

3.1.3.2 Bandon Bridge

Bandon Bridge causes a very significant afflux for the current 1% AEP flood flow due to the effects of the abutments and parapet. This afflux would be significantly reduced if the riverbed level was reduced by dredging. Replacement of the bridge will not provide sufficient relief as an individual measure and is also unlikely to prove a viable option due to its status as a Protected Structure and the prohibitive costs and disturbance that would be associated with its replacement.

3.1.3.2 Confluence of Bandon River and Bridewell River

The confluence of the Bridewell River with the Bandon River was examined to determine whether it was contributing to flooding at Bandon Town. The findings of this examination are that the Bridewell River on its own does not result in flooding during the 1% AEP event and it is the Bandon River that controls water level along the downstream reach of the Bridewell River. The additional inflow from the Bridewell River to the Bandon River is less than 5% of the total river flow and does not significantly influence flood levels. The precautionary approach was used in this examination whereby the timing of the flood peak on the Bridewell River was coincided with the flood peak on the Bandon River. In reality this is unlikely to occur due to the difference in the critical duration for the two rivers. It was concluded that improving the confluence of the Bridewell River with the Bandon River would not influence flood levels significantly.

3.2 NEW FLOOD DEFENCES

The option of using flood defences was examined by modelling defences along both banks of the Bandon and Bridewell Rivers. This option would protect all properties from flooding during the 1% AEP. It would result in an increase in the 1% AEP flood event level by up to 510mm upstream of Bandon Bridge but only marginally downstream of the bridge. This method would require defences of up to 2.0m along McSweeney Quay and up to 2.7m on the left bank of the river upstream of Bandon Bridge. While providing protection, this would result in increased flood levels behind defence walls and a significant associated risk to public health and safety in the event of overtopping or defence failure. The presence of defences also hinders escape of flood waters in the event of overtopping. The works would require significant construction and associated disruption in the Town centre. The residual risk associated with this option was therefore considered unacceptable as an individual option at this scale, and the associated public unease was considered likely to be unacceptable to the general public.

3.3 REHABILITATION/IMPROVEMENT OF EXISTING DEFENCES

The option of improving existing flood defences was examined in a similar way to the new flood defences but only in locations where there were existing defences along the Bandon and Bridewell Rivers. This option would only be effective only along the right hand bank from Lidl supermarket to Bandon Bridge and along the Bridewell River. It would leave large areas of Bandon undefended, if used on its own. Therefore, this option could only be considered in combination with other options and was considered in more detail in option 3.4 below.

3.4 COMBINATION OF DREDGING AND DEFENCES

Four options comprising a combination of dredging and defences were also examined. The options varied from very minor dredging to substantial dredging involving the deepening of the existing riverbed level by 1.6m. The assessment of the four options showed that it would be necessary to dredge to 9.5mOD (a reduction in bed level of 1.6m downstream of Bandon Weir) in order to avoid new or improved defences being required on the right bank upstream of Bandon Bridge with local defences only required on the left bank. In addition, defences would be required downstream of Bandon Bridge on both banks of the river and along the Bridewell River. Options with a lesser amount of dredging would require flood defences in all areas, which would negate one of the significant benefits of dredging ie. avoiding the construction of defences.

While an element of residual risk would still result from the use of defences within the combined options, this would be considered slight by comparison to the level of risk associated with defence only options outlined above.

4 EMERGING PREFERRED OPTION SUBJECT TO ENVIRONMENTAL IMPACT ASSESSMENT

It is considered that the option of dredging on its own would potentially result in too great an environmental impact both in terms of the depth of dredging and the length of the dredge.

The option of flood defences on their own would require significant heights of defences resulting in an increase in the 1% AEP flood level of up to 540mm, a very significant increase in the residual health and safety risk and a potentially unacceptable visual impact.

The benefits of local improvements and the improvement of existing flood defences would not provide the required level of protection.

The emerging preferred option therefore is to use a combination of flood defences with dredging. The dredged depth would be to 9.5mOD downstream of the weir and it would extend over a distance of 3.5km. New flood defences would be required downstream of Bandon Bridge and locally on the left bank upstream of the weir and along the Bridewell River.

The emerging preferred flood relief option involves the following:

- Deepening of the existing riverbed by 1.6m just downstream of Bandon Weir to 9.5mOD and dredge for 3.5km (to O'Driscoll's Bridge) at a gradient of 1/1000;
- An average depth of dredge of 1m over the length of the dredge;
- Approximately 150,000m³ of material to be dredged
- Provision of a new fish pass at Bandon weir;
- Underpinning of Bandon Bridge and Pedestrian Bridge
- New 2.0m high local flood defence wall on left bank upstream of Bandon Bridge
- New flood defence walls up to 1.1m high on left bank downstream of Bandon Bridge for 450m
- New flood defence walls up to 1.1m high and flood defence embankments up to 1.8m high on right bank from Bandon Bridge to the wastewater treatment plant
- The improvement of existing flood defence walls along the Bridewell River
- The improvement of the Existing flood embankment at the Riverview Shopping Centre
- The provision of a new culvert to Mill Stream

The extent of the dredging and the location of the new and improved defences are shown on the following drawings included in Appendix 2:

- Study Area Map
- 104/A Flood Defence Locations
- 105/A Proposed Dredging Works General Arrangement Layout

- 106/A Bandon River Longitudinal Sections Sheet 1
- 107/A Bandon River Longitudinal Sections Sheet 2
- 108/A Bandon River Cross Sections Sheet 1
- 109/A Bandon River Cross Sections Sheet 2

A Flood Extent Map for the emerging preferred option and the associated Benefitting Area is shown on Drawing 110/A.

The emerging preferred flood relief option comprising a combination of defences and dredging will now be subjected to Environmental Impact Assessment and an Environmental Impact Statement will be prepared which will be included in the Public Exhibition of the preferred scheme.

5 PROPOSED CONTENT OF ENVIRONMENTAL IMPACT STATEMENT

5.1 PURPOSE AND SCOPE OF THE EIS

The purpose of the Environmental Impact Statement (EIS) will be to document the current state of the environment in the vicinity of the proposed works area in an effort to quantify the possible effects, if any, of the proposed works on the environment. The assessment process will serve to highlight any areas where mitigation measures may be necessary in order to protect the surrounding environment from any negative impacts of the proposed works.

5.2 GENERAL STRUCTURE OF THE EIS

The EIS will use the grouped structure method to describe the existing environment, the potential impacts of the proposed works thereon and the mitigation measures proposed. Background information relating to the proposed works, scoping and consultation undertaken and a description of the proposed works will be presented in separate sections. The grouped format sections will describe the impacts of the proposed development in terms of Human Beings, Flora and Fauna, Soils and Geology, Water, Air, Noise and Climate, Landscape, Cultural Heritage and Material Assets such as Traffic and Transportation, along with the interaction of the foregoing. The EIS will also include a non-technical summary, which is a condensed and easily comprehensible version of the EIS document.

5.3 DESCRIPTION OF IMPACTS

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

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

- *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* (EPA, 2003)
- *Guidelines on the Information to be contained in Environmental Impact Statements* (EPA, 2002)

Standard definitions are provided in these documents, which permit the evaluation and classification of the quality, significance, duration and type of impacts associated with a proposed development on the receiving environment. The use of pre-existing standardised terms for the classification of impacts will ensure that the EIA employs a systematic approach, which can be replicated across all disciplines covered in the EIS, as advised in *'Guidelines on the Information to be contained in Environmental Impact Statements'* (EPA, 2002). The consistent application of terminology throughout the EIS will facilitate the assessment of the proposed works on the receiving environment. Table 5.1 lists the glossary of impacts as published in the EPA guidance documents referred to above.

Table 5.1 Impact Classification Terminology (EPA, 2002/3)

Impact Characteristic		Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	A change which does not affect the quality of the environment
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An impact capable of measurement but without noticeable consequences
	Slight	An impact which causes noticeable changes in the character of the environment without affecting its sensitivities
	Moderate	An impact that alters the character of the environment in a manner consistent with existing and emerging trends
	Significant	An impact, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Profound	An impact which obliterates sensitive characteristics
Duration	Short-term	Impact lasting one to seven years
	Medium-term	Impact lasting seven to fifteen years
	Long-term	Impact lasting fifteen to sixty years
	Permanent	Impact lasting over sixty years
	Temporary	Impact lasting for one year or less
Type	Cumulative	The addition of many small impacts to create one larger, more significant impact
	'Do Nothing'	The environment as it would be in the future should no development of any kind be carried out
	Indeterminable	When the full consequences of a change in the environment cannot be described
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant impact is of greater significance than the sum of its constituents
	'Worst Case'	The impacts arising from a development in the case where mitigation measures substantially fail.

Impacts will be described in terms of quality, significance, duration and type, where possible. A *'Do Nothing'* impact will also be predicted in respect of each environmental theme in the EIS. Residual impacts will be presented following any impact for which mitigation measures are prescribed. The remaining impact types will be presented as required or applicable

throughout the EIS. The proposed Table of Contents of the EIS is outlined below. Specific reference is made in the right hand column, to reports or detailed surveys which are proposed, or have already been completed as part of the process.

Non Technical Summary	Relevant Surveys/Reports
Introduction	
1.1 The Applicant 1.2 Need for the Proposed Development 1.3 Purpose and Scope of the EIS 1.4 Structure and Content of the EIS 1.5 Project Team 1.6 Brief Description of the Proposed Development	
Background to the Proposed Development	
2.1 Background to the Proposed Development 2.2 Site Location 2.2.1 Flood History 2.3 Physical Characteristics of Surrounding Lands 2.4 Site Access 2.5 Policy Context 2.6 Scoping and Consultation 2.7 Alternatives Considered	Constraints Study Report Flood Risk Management Options Report
Description of the Proposed Development	
3.1 Location of the Proposed Works 3.2 Existing Features of the Study Area 3.3 Characteristics of the Proposed Works 3.4 Construction Works Methodology 3.5 Operation and Maintenance Proposed	
Human Beings	
4.1 Human Beings in the Existing Environment 4.1.1 Study Area 4.1.2 Current Economic Activity 4.1.3 Social Consideration 4.1.4 Land Use 4.1.5 Health and Safety 4.2 Likely and Significant Impacts 4.3 Proposed Mitigation Measures/Conclusions	Flood Damages Assessment Benefit Analysis Impacts on Tourism and Local Economy Flood Risk Assessment
Flora and Fauna	
5.1 Flora and Fauna in the Existing Environment 5.1.1 Methodology and Limitations 5.1.2 Sources of Information – Published Material 5.1.2.1 Designated Areas 5.1.2.2 New Flora Atlas 5.1.2.3 Breeding Bird Atlas 5.1.2.4 Other Information Sources 5.1.3 Sources of Information – Consultation/Discussion 5.1.4 Flora in the Existing Environment 5.1.4.1 Habitats Present 5.1.4.2 Species Present 5.1.4.3 Character of Habitats 5.1.4.4 Significance of Habitats	Fish Stock Survey Protected Species Surveys (Pearl Mussel, Kingfisher, Otter, White Clawed Crayfish, etc).

	5.1.5	Fauna in the Existing Environment		Habitat Assessment Appropriate Assessment Screening Natura Impact Statement	
	5.1.5.1	Fish			
	5.1.5.2	Mammals			
	5.1.5.3	Birds			
	5.1.5.4	Other Species			
	5.1.5.5	Species not observed, likely to be present			
	5.1.5.6	Species of conservation importance that potentially use the site			
5.2	Likely and Significant Impacts on Flora and Fauna				
	5.2.1	'Do Nothing' Impact			
	5.2.2	Likely and Significant Impacts on Flora			
	5.2.2.1	Impacts During Construction Phase			
	5.2.2.2	Impacts while Operational			
	5.2.3	Likely and Significant Impacts on Fauna			
	5.2.3.1	Impacts resulting from Habitat loss			
	5.2.3.2	Impacts resulting from Disturbance			
	5.2.3.3	Impacts resulting from changes in Water Quality			
5.3	Proposed Mitigation Measures				
Geology and Soils					
6.1	Geology and Soils in the Existing Environment			Preliminary Site Investigations Report Hydrogeomorphology Report	
	6.1.1	Methodology and Limitations			
	6.1.2	Published Material			
	6.1.3	Geology			
	6.1.3.1	Quaternary Geology			
	6.1.4	Soils			
	6.1.4.1	Soil Formation			
	6.1.4.2	Soil Associations			
6.2	Likely and Significant Impacts on Soils and Geology				
	6.2.1	Impacts on Geology			
	6.2.2	Impacts on Soils			
6.3	Proposed Mitigation Measures				
Water - Hydrology & Hydrogeology					
7.1	Hydrology			Hydrological Modelling Hydraulic Modelling Flood Risk Assessment Groundwater and Surface Water Quality Assessment	
	7.1.1	Hydrogeology in the Existing Environment			
	7.1.2	Likely and Significant Impacts on Hydrology			
	7.1.3	Proposed Mitigation Measures			
7.2	Hydrogeology				
	7.2.1	Hydrogeology in the Existing Environment			
	7.2.2	Likely and Significant Impacts on Hydrogeology			
	7.2.3	Proposed Mitigation Measures			
Air, Climate and Noise					
8.1	Air				Noise and Vibration Assessment
	8.1.1	Existing Air Quality			
8.2	Noise				
	8.2.1	Existing Noise Levels			
	8.2.2	Noise Sensitive Receptors			
	8.2.3	Vibration			
8.3	Climate and Weather				
	8.3.1	Long Term Weather Patterns			
8.4	Likely and Significant Impacts on Air, Noise and Climate				
	8.4.1	Impacts on Air Quality			
	8.4.2	Impacts on Noise Levels			
	8.4.3	Impacts on Climate			
8.5	Proposed Mitigation Measures				

Landscape

9.1	Landscape of the Existing Environment	Visual Impact Assessment Landscape Character Assessment Photomontage Production
9.1.1	Landscape Policy	
9.1.2	Site Characteristics	
9.1.3	Land Use	
9.1.4	Sensitive Receptors	
9.1.5	Visibility	
	9.1.5.1 Existing Views from the Site	
	9.1.5.2 Existing Views of the Site	
9.2	Potential and Significant Impacts on Landscape	
9.2.1	Impacts on Landscape Character	
9.2.2	Impacts on Visual Character	
9.2.3	Impacts on Views	
9.3	Proposed Mitigation Measures	

Cultural Heritage

10.1	Cultural Heritage in the Existing Environment	Terrestrial Archaeological Survey Underwater Archaeological Survey Buildings and Cultural Heritage Assessment Visual Impact on Archaeological Assessment
10.1.1	Published Material	
10.1.2	Archaeological Features in the vicinity of the site of the proposed works	
10.1.3	Archaeological Features within the site of the proposed development – Underwater Archaeology	
10.2	Likely and Significant Impacts	Structural Integrity Assessment of Archaeological Features
10.2.1	Impacts on Designated Sites	
10.2.2	Impacts on Features of Archaeological or Cultural Interest	
10.3	Proposed Mitigation Measures	

Material Assets

11.1	Traffic and Roads	Waste Management Plan Traffic Management Plan
11.1.1	Description of Project and Road Network	
11.1.2	Existing Traffic	
11.1.3	Generated Traffic	
11.1.4	Construction Traffic	
11.1.5	Traffic Impacts and Proposed Mitigation Measures	
11.2	Impacts on Services and Proposed Mitigation Measures	
11.3	Waste Management during Construction	

Interaction of the Foregoing**References****Appendices****Natura Impact Statement**

Appendix 1

List of Consultees

EIA Consultees

An Bord Pleanála
An Comhairle Ealaíon (The Arts Council)
An Óige
An Taisce - The National Trust for Ireland
Ballineen/Enniskene Anglers
Bandon AFC
Bandon Angling Association
Bandon and Gaggin Game Protection Association
Bandon G.A.A
Bandon Historical Society
Bandon Rugby Football Club
Bandon Town Council
Bat Conservation Ireland
Birdwatch Ireland
Fáilte Ireland
Bord Gais
Bord na Móna
Castle Bernard Golf Club
Coillte Teoranta
Commission for Electricity Regulation
Cork Airport
Cork Federation of Gun Clubs
Tourist Office of Cork and Kerry Counties
Department of Agriculture, Food and the Marine
Department of Arts, Heritage and the Gaeltacht
Department of Communications, Energy and Natural Resources
Department of Environment, Community and Local Government
Department of Justice and Equality
Department of Jobs, Enterprise & Innovation
Department of Transport, Tourism and Sport
Development Applications Unit
National Transportation Office
Dunmanway Salmon and Trout Anglers
Friends of the Earth Ireland
Eircom
Environment Section
Environmental Protection Agency
ESB Head Office
Geographical Society of Ireland
Geological Survey of Ireland
Health and Safety Authority
HSE Southern Regional Health Forum
ICMSA Head Office
Inland Fisheries Ireland
Institute of Geologists of Ireland
Irish Aviation Authority
Irish Farmers Association (Cork Region)
Irish Georgian Society
Irish Heritage Trust

Irish Peatland Conservation Council
Irish Planning Institute

Irish Wildlife Trust
Kilmacsimon Rowing Club
Cork Chamber of Commerce
Manx House Fishery

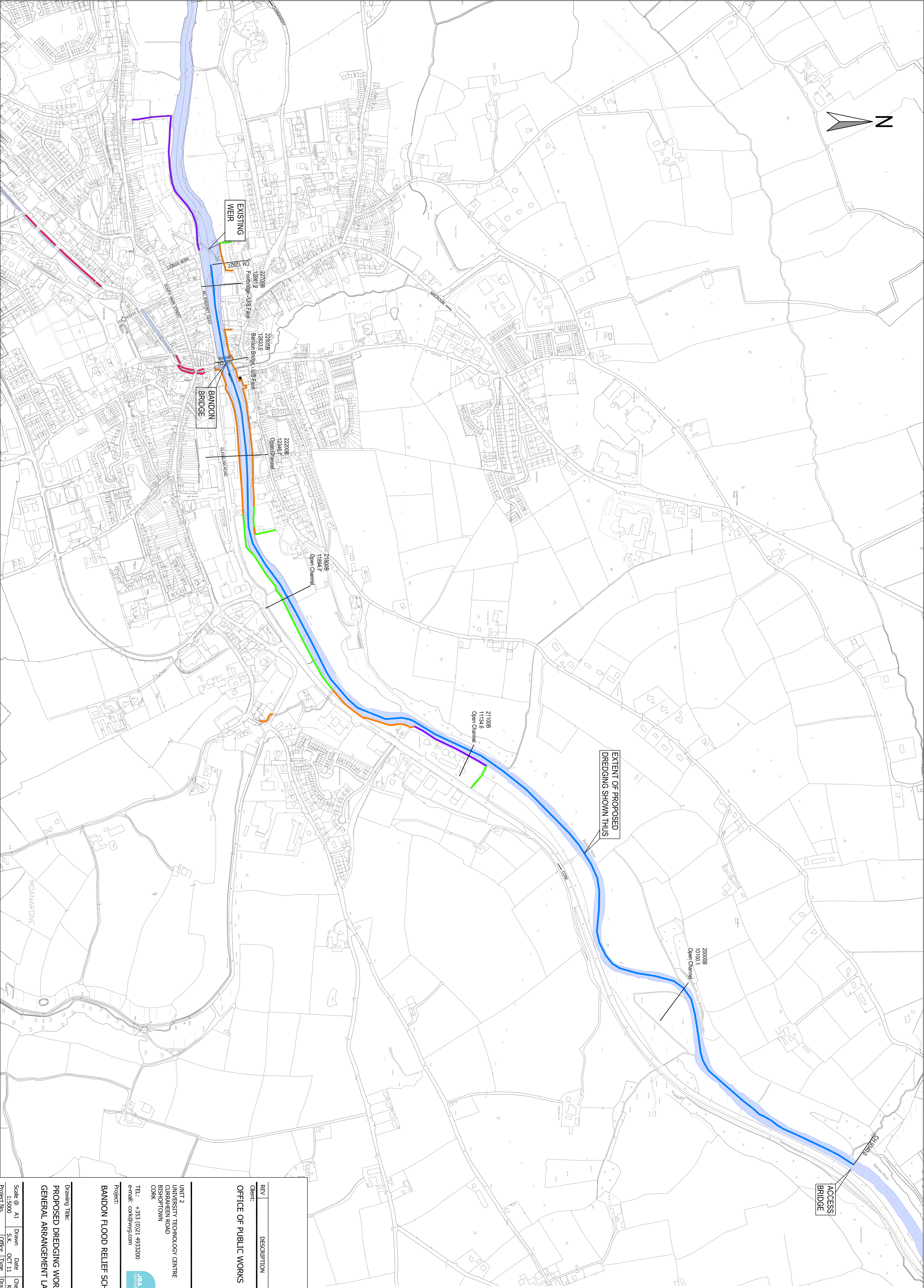
National Association of Regional Game Councils
National Building Agency
National Federation of Group Water Schemes
National Monuments Service
National Museum of Ireland
National Roads Authority
Planning Section
Railway Procurement Agency
Roads Section
Robert Wilmot (Chair)
Royal Town Planning Institute (Ireland)
Salmon Growers Association
Salmon Research Agency of Ireland
South West Regional Authority
Teagasc
The Heritage Council
The Meteorological Service
Plunkett Taaffe (Secretary)
Voice of Irish Concern for the Environment
Water Services Section
Waterways Ireland
West Cork Tourism

Alan Coleman
Kevin Murphy
Veronica Neville
Margaret Murphy O'Mahony
Sean O'Donovan
Andrew Coleman
Gillian Coughlan
Rose Holland
Deirdre Lane
Cindy McCarthy
Rachel McCarthy
Gearoid Buckley
Tim Lombard
Pat Moore
Kevin O'Neill
Tom O'Sullivan

Appendix 2

Drawings of Preferred Option





REV

DESCRIPTION

BY

CHK

APP

DATE

Client:

Office of Public Works

UNIT 2

UNIVERSITY TECHNOLOGY CENTRE

CURRAHEEN ROAD

BISHOPTOWN

CORK

TEL: +353 (0)21 4933200

e-mail: orp@wvg.com

Project:

BANDON FLOOD RELIEF SCHEME

Drawing Title:

PROPOSED DREDGING WORKS
GENERAL ARRANGEMENT LAYOUT

Scale @ A1

Drawn S.K.

Date OCT 11

Checked K.T.

Date OCT 11

Approved K.T.

Date OCT 11

Project No.

C008065

Office Type

10

Drawing No.

105

Revision

A

OPW

Office of Public Works

WVG

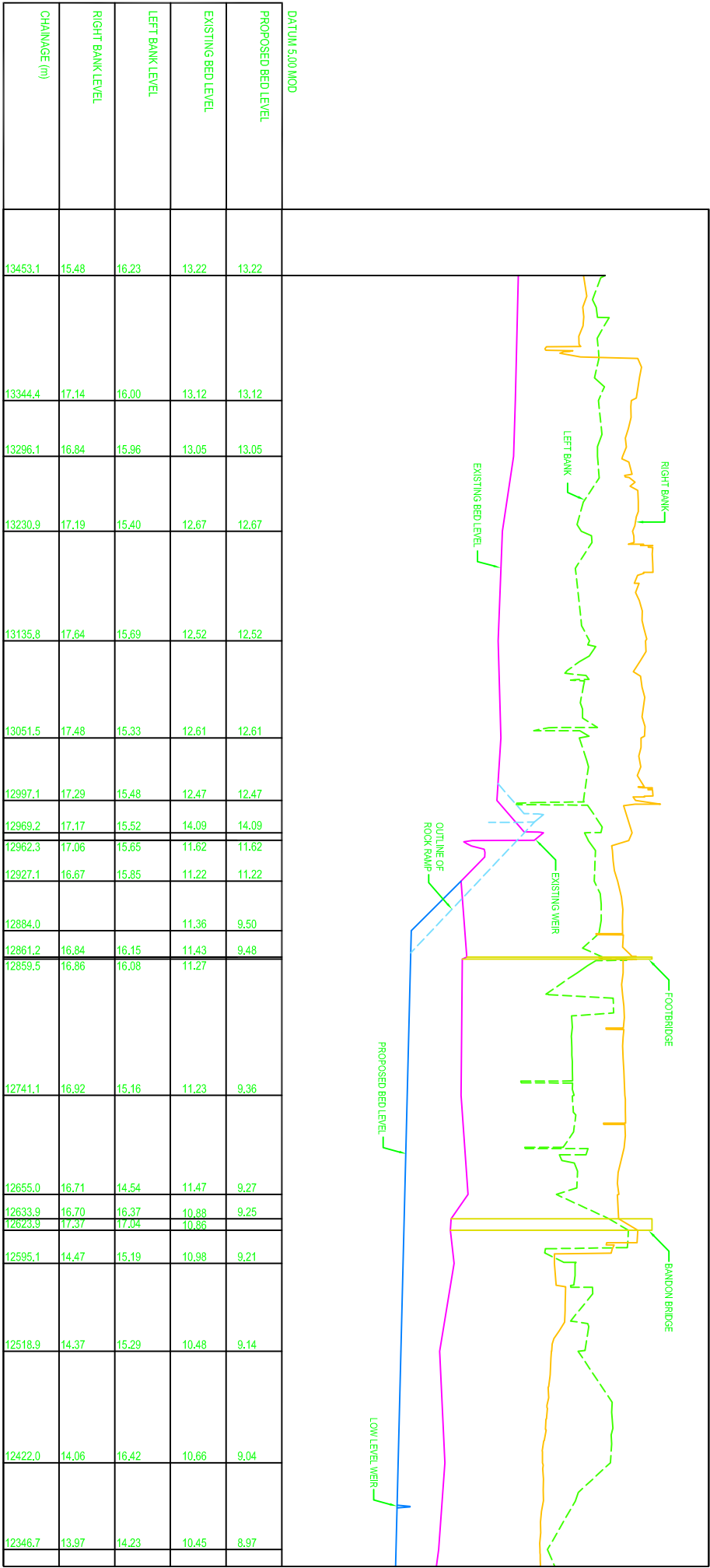
consulting

WVG

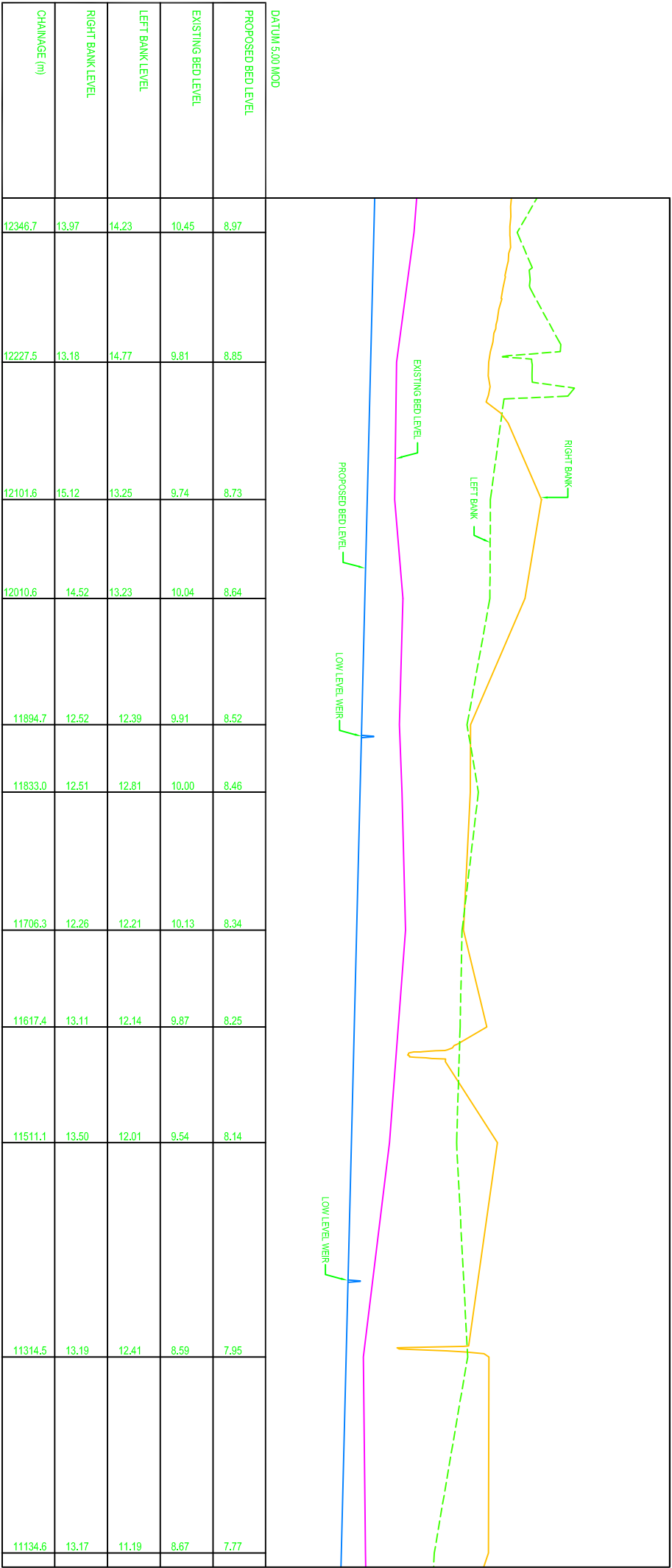
Group Ltd



LOW LEVEL WEIR AT
PROPOSED RIVER BED LEVEL
SCALE 1:50




RIVER LONGITUDINAL SECTION
CH 13453.1 TO CH 12346.7
SCALE H:1:2500, V:1:100



RIVER LONGITUDINAL SECTION
CH 12346.7 TO CH 11134.6
SCALE H:1:2500, V:1:100

REV	DESCRIPTION	BY	CHK	APP	DATE

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JBA
Consulting



Project: **BANDON FLOOD RELIEF SCHEME**

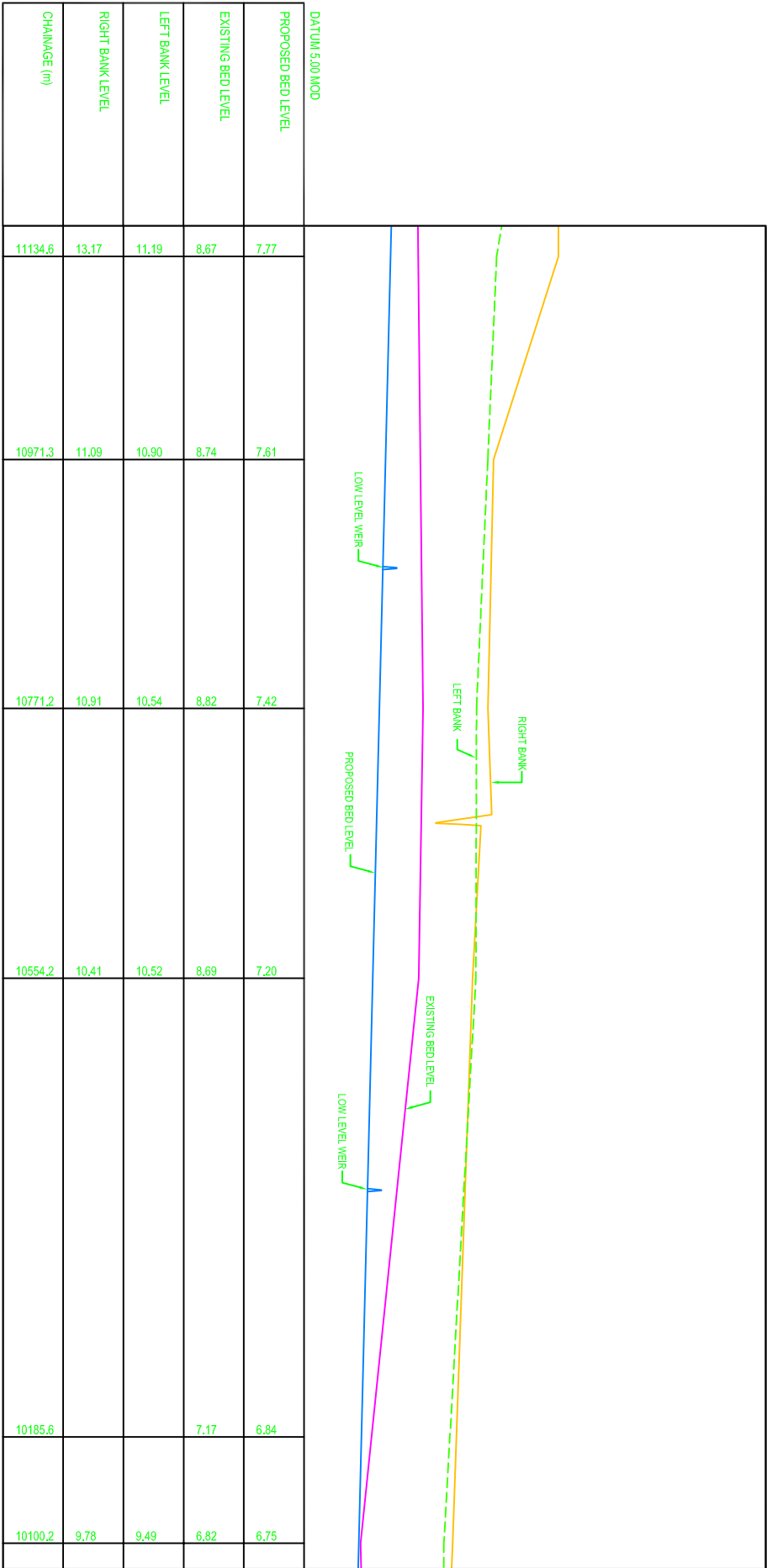
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Drawing No.	106
Revision	A

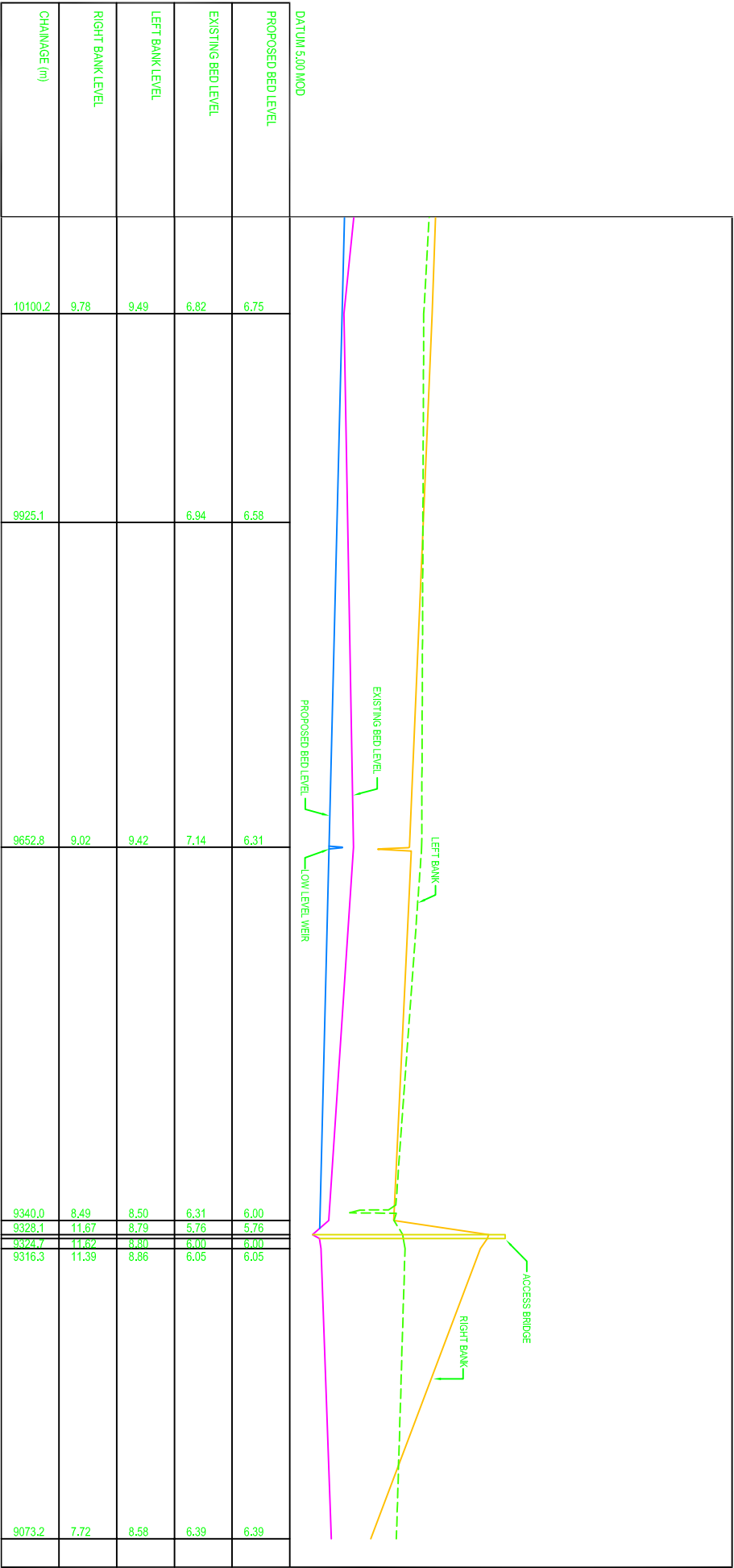




LOW LEVEL WEIR AT
PROPOSED RIVER BED LEVEL
SCALE 1:50




RIVER LONGITUDINAL SECTION
CH 11134.6 TO CH 10100.2
SCALE H 1:2500, V 1:100



RIVER LONGITUDINAL SECTION
CH 10100.2 TO CH 9073.2
SCALE H 1:2500, V 1:100

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Drawing Title:					
BANDON RIVER LONGITUDINAL SECTIONS					
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Project No.	Drawing No.	Type	Revision		
C008065	10	C	107	A	

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Office na mBliantach Poblait

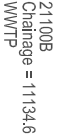


Drawing Title:

**BANDON RIVER
CROSS SECTIONS**

SHEET 1

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BANDON RIVER CROSS SECTIONS

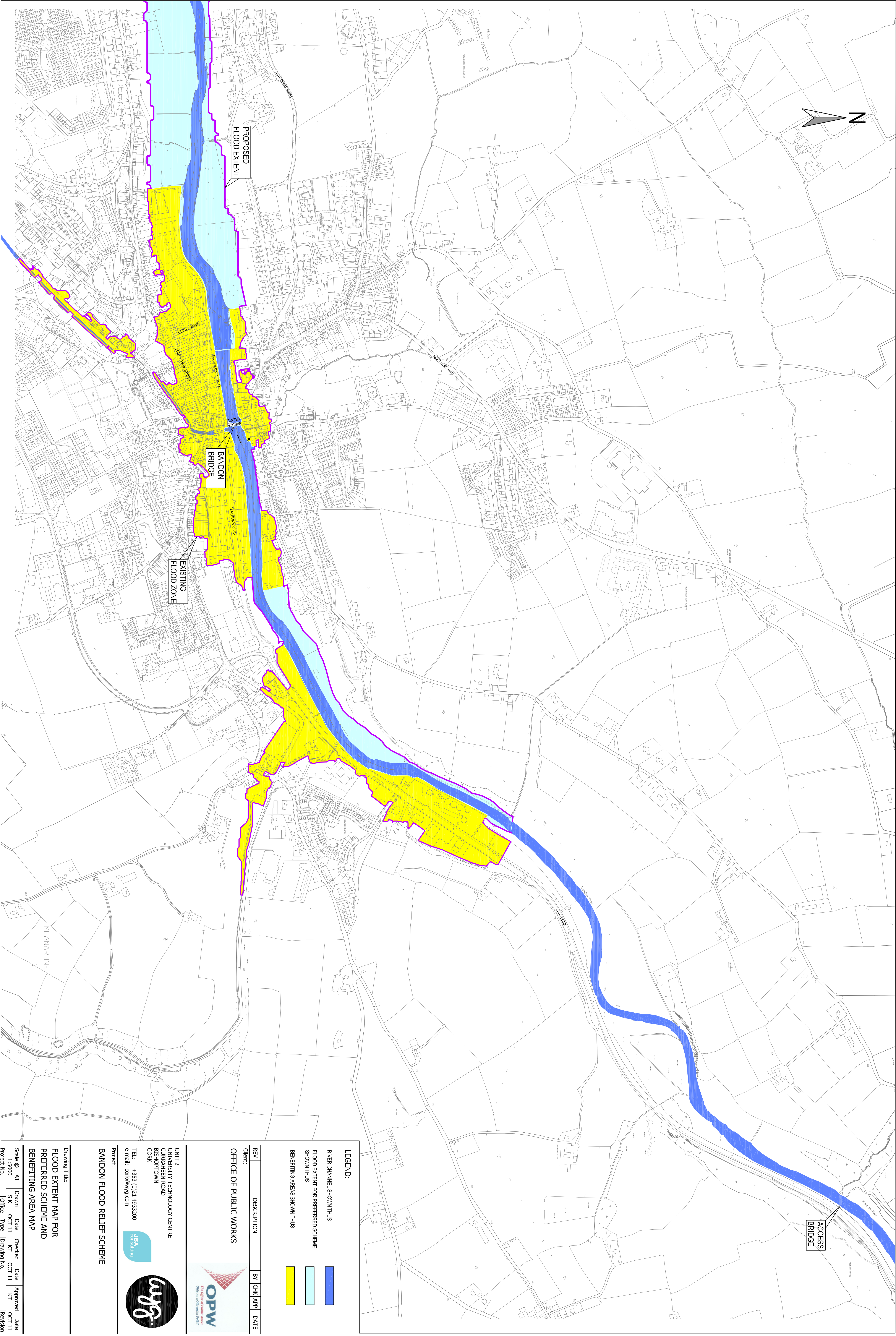
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Project No. C008065	Office 10	Type C	Drawing No. 109		Revision A	



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BANDON FLOOD RELIEF SCHEME

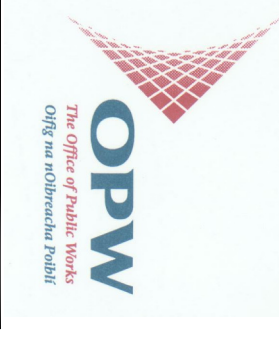


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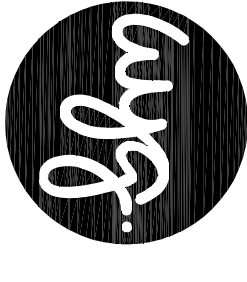
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- RIVER CHANNEL SHOWN THIS
 - FLOOD EXTENT FOR PREFERRED SCHEME SHOWN THIS
 - BENEFITING AREAS SHOWN THIS

REV	DESCRIPTION	BY	CHK	APP	DATE
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Project: BANDON FLOOD RELIEF SCHEME

Drawing Title:
FLOOD EXTENT MAP FOR
PREFERRED SCHEME AND
BENEFITING AREA MAP

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Project No.	CO08065	Office Type	10	Drawing No.	110	Revision	A