

Dublin City Council

Dodder Flood Alleviation Works

Planning Amendment to the
previously approved Planning
Application 2504/13 at Donnybrook
RFC

253355-00

Issue 04 | 10 April 2017

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 253355-00

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ARUP

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1 Background

The River Dodder is one of Dublin's best known and most important rivers. It flows from Kippure Mountain through bogland, light forest and agricultural land before entering urban Dublin. The Dodder collects rainwater from a 12,081 hectare (120.8km²) catchment and discharges to the Liffey Estuary. The lower section of the river is tidal up to the weir upstream of Ballsbridge.

As outlined in the original part 8 planning application, the Dodder Flood Alleviation Scheme is a scheme proposed to deal with the Flood Risk in the Lower Dodder Catchment, which is influenced by both coastal (or marine) and fluvial flooding.

The construction works are on-going and are being carried out by the OPW on a phased basis. The first section of the works commenced in September 2007 at Ringsend Bridge, moving upstream to the Lansdowne Railway Bridge.

The second section of works commenced in 2013 from the Lansdowne Railway Bridge upstream towards Clonskeagh. Phase 2C extends from the Lansdowne Railway Bridge to Ballsbridge, 2D extends from Ballsbridge to Anglesea Bridge (Donnybrook), and 2E extends from Anglesea Bridge to upstream of Smurfit Weir beside Ashtons Pub. Phases 2C and 2D are currently under construction.

1.1 Ancillary documents

In conjunction with this document, other documents submitted as part of this amendment to the Part 8 planning of the Dodder Flood Alleviation Scheme include the following:

1. Drawings – provided in Appendix A.
2. Environmental report – provided in Appendix B.

Reference should be made to the original Dodder Flood Alleviations Works Phases 2C-2E Part 8 Planning Application.

2 Outline of the proposed amendment to the current Part 8

2.1 Context

Dublin City Council is currently engaged in River Dodder Flood Alleviation Works, Phases 2C-2D-2E under a Part 8 planning permission issued in 2013. Part of this project includes works to the western bank of the river Dodder between Herbert Park and Anglesea Bridge (Donnybrook).

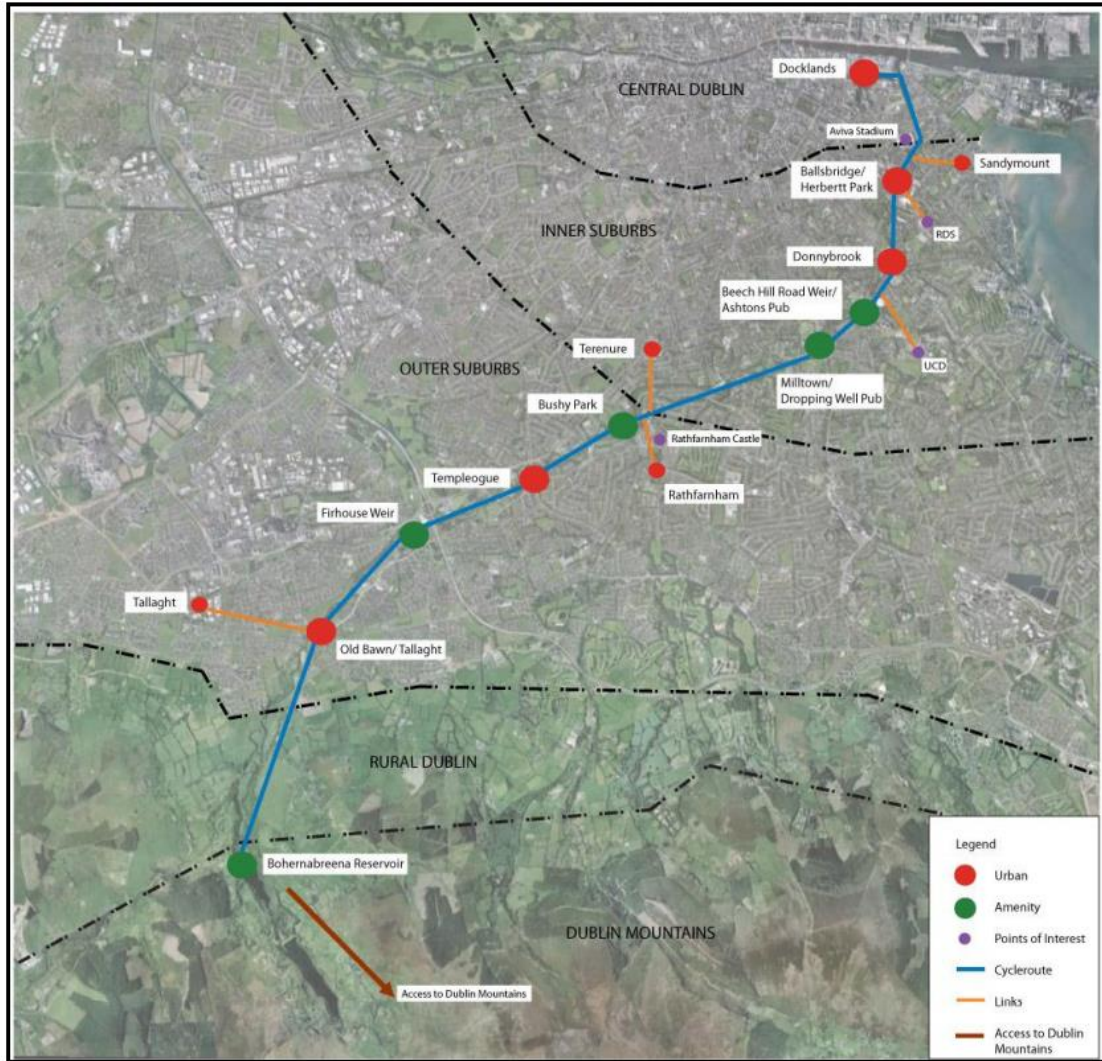
Separately, Dublin City Council with the support of the National Transport Authority (NTA) has been developing proposals for a high quality walking and cycling route along the river Dodder. The Dodder Greenway project is a proposed 29km walking and cycling route from Sir John Rogerson's Quay through Grand Canal Dock, Ringsend, Lansdowne, Ballsbridge, Donnybrook, Clonskeagh, Milltown, Rathfarnham, Tallaght and into the Dublin Mountains. (see drawing below) The proposed greenway passes through 3 administrative areas namely South Dublin County Council, Dunlaoghaire Rathdown County Council and Dublin City Council.

In June 2015 Dublin City Council engaged RPS Consulting engineers to provide design services on the Dodder Greenway project. Having assessed the possible options for the greenway in the Donnybrook area the preferred option has been identified as a route along the western bank of the River Dodder between Anglesea Bridge (Donnybrook) and Herbert Park.

The current proposals for the flood alleviation works in this area would require major alteration in the future to allow for the Dodder Greenway to be provided along the preferred route on the western bank of the Dodder between Herbert Park and Anglesea Bridge. Dublin City Council therefore proposes to amend the current proposals for the flood alleviation works between Herbert Park and Anglesea Bridge so that the greenway can be constructed as part of the current on-going flood defences in this area.

There are three main advantages to modifying the flood defence works and constructing the greenway at this time. Firstly the works when complete will provide a segregated pedestrian and cycling link between Donnybrook Road and Herbert Park. Secondly it avoids any necessity in the future of having to modify the flood defence works which would not only be costly but would also be disruptive to the adjacent properties and would involve further disturbance to the ecology of the area. Thirdly it ensures that a vital link in the overall Dodder Greenway is secured at any early stage.

Figure 1: Proposed Greenway



2.2 Description of the works

The proposed amendment to the Dodder Flood Alleviation Scheme, Phase 2D involves the following changes at 5 distinct sections. (Refer to drawing D-DL-A-0002):

- **Section 1** - The original flood alleviation works entailed the construction of an embankment approximately 120m in length extending from Eglinton Terrace along the western bank of the Dodder. It is proposed to widen this embankment to allow for the construction of a 4m wide walking and cycling route (greenway) along its length.
- **Section 2** - Travelling upstream, the original flood alleviation works entailed the construction of a concrete parapet wall as flood defence in this section. It is proposed to construct this parapet wall as originally planned but to alter the line of the wall in order that the greenway pavement and the drainage system can be constructed without impacting on the neighbouring pitches and tennis courts.

- Section 3 - For the next 120m the flood (parapet) wall that was previously proposed will be replaced by a 4m wide concrete platform and cantilevered parapet wall section. The cantilever has been designed as a flood defence structure having an elevated stone-clad concrete parapet, thus providing the function of flood alleviation. It is proposed that a number of piles will be installed to support the cantilever along this section.
- Section 4- Along the next section (approximately 40m) it is proposed to construct a parapet wall as originally planned but to alter the line of the wall in order that the greenway pavement can be constructed.
- Section 5 – The ground levels in this area are above the flood defence level and no works were previously proposed in this area. The proposed amendment would involve extending the greenway pavement through this area as far as Donnybrook Road.
- The works involve routing the greenway along the western bank of the Dodder. With the exception of a small plot of land in the south western section of the site which is in the ownership of Dublin City Council, the route passes through lands owned by the Leinster Branch of the IRFU. The proposals are being advanced with the agreement of Leinster Branch. As part of the works a new boundary fence will be installed along the length of the route separating the lands owned by the Leinster Branch from the greenway and the river beyond.
- The boundary fence will be a Paladin style fence or similar, except immediately adjacent to the tennis courts where a chain-link fence will be installed.
- Beech hedging or similar will be planted on the Leinster Branch side of the boundary fence to provide screening. Native planting will also be provided on the greenway side of the boundary fence to provide additional screening.
- Along the entire route the greenway pavement and the drainage system will be constructed between the flood relief wall and the new boundary fencing.
- A lighting system will be installed along the greenway route.
- As part of the works some existing low value trees will be removed and a new tree planting scheme will be provided.

Please refer to the scheme design drawings in Appendix A for more details on the Greenway route layout and the sections in the Donnybrook area.

3 Environmental considerations

In 2013, an Environmental Report was prepared relating to the Dodder Flood Alleviation Works Phases 2C-2E. The Scheme was progressed through the Part 8 planning process. Construction of the scheme commenced in 2013 and is currently ongoing. Please refer to the Dodder Flood Alleviation Works Phases 2C-2E Part 8 Environmental Report for the overall predicted environmental impacts and recommended mitigation measures relating to this scheme.

An Environmental Report was also prepared in relation to this Proposed Amendment to the Dodder Flood Alleviation Works Phases 2C-2E. The report which assesses the environmental impact of and recommends mitigation in relation to this Proposed Amendment is attached as Appendix B.

There is expected to be no change in the environmental impact resulting from the Proposed Amendment on the following environmental aspects and on that basis, these were screened out of the Environmental Report:

- Traffic and transportation.
- Air quality and climate.
- Archaeological, architectural and cultural heritage and
- Material assets.

Following implementation of mitigation measures no significant impacts are identified in relation to the following environmental topics during construction or operation of the Proposed Amendment:

- Biodiversity.
- Hydrology and
- Soils, Geology and Hydrogeology.

In relation to noise and vibration there is the potential for residual impact associated with the installation of sheet piles, however this will be a short term, temporary day time exceedence.

In relation to landscape and visual impacts the impacts are limited and primarily restricted to construction stage works. Following construction and implementation of mitigation the proposed reinstatement and planting will result in a moderate impact. This will reduce to a slight localised neutral impact in the medium and long term as planting becomes established.

An Appropriate Assessment screening on this proposed amendment has been carried out by Moore Group and has been included as Appendix 7.1. The conclusion of the screening report is that given the employment of best practice construction methods, there would be no significant impacts on the Qualifying interests or Conservation Objectives of the European sites considered in the assessment. The report concludes that it is not necessary to undertake any further stage of the Appropriate Assessment process.

Flood modelling analysis of the proposed amendment to the flood defence wall has been conducted by RPS Consulting Engineers on behalf of the Flood Defence Unit. It has been concluded that any increased flood risks due to the proposed amendment fall within acceptable limits.

Appendix A

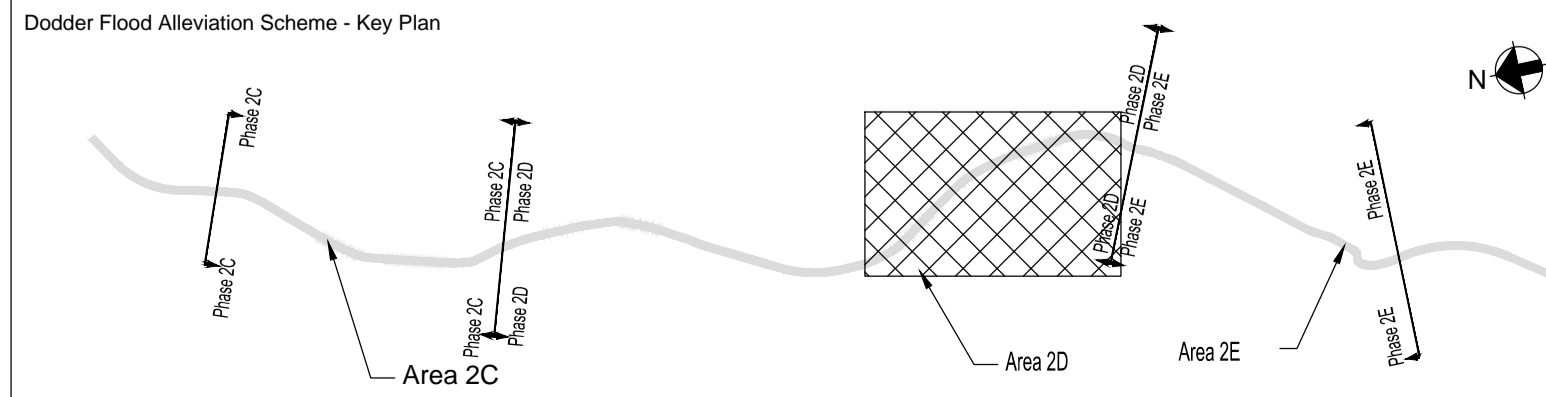
Drawings and photomontage

A1 Drawings


A1
1
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10



LEGEND:
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Issue	Date	By	Chkd	Appd
P1	06/04/17	VB	BT	IA

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Contractor
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Donnybrook Greenway
 Scale at A1 1:1000 @ A1
 Date: April 2017

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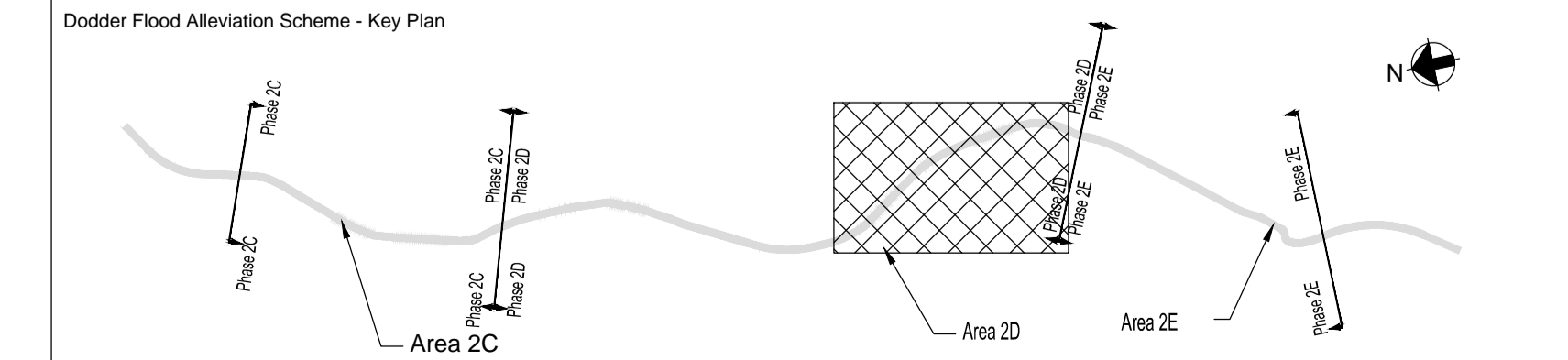
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Drawing Title
Area 2D - Donnybrook RFC Location Map
 Drawing Status
For Planning
 Project No **253355** Drawing No **D-DL-A-0001** Issue **P1**


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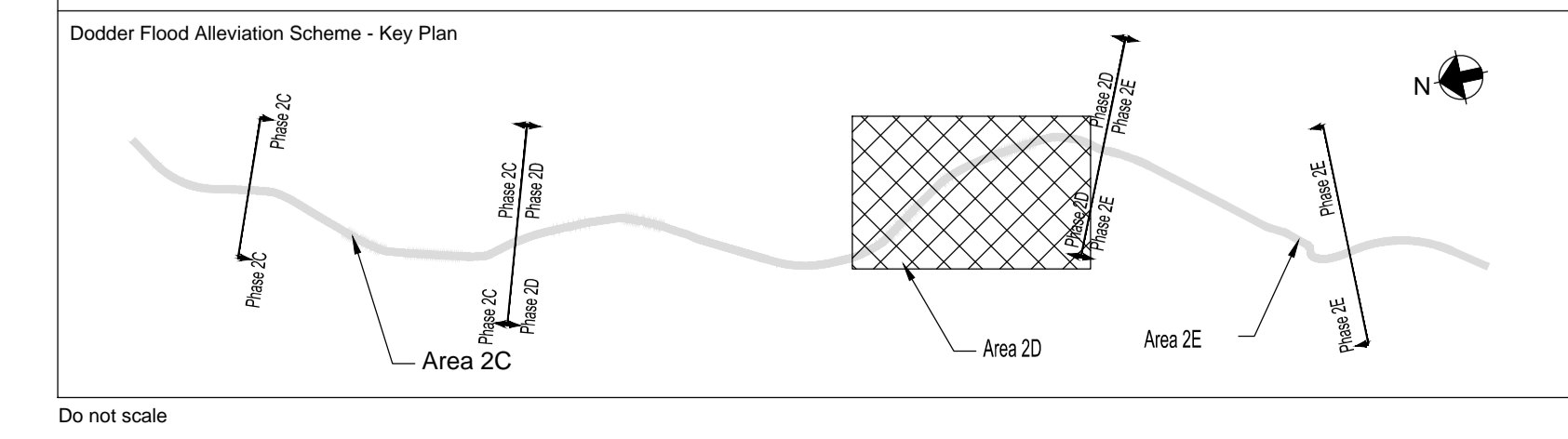
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Drawing Title
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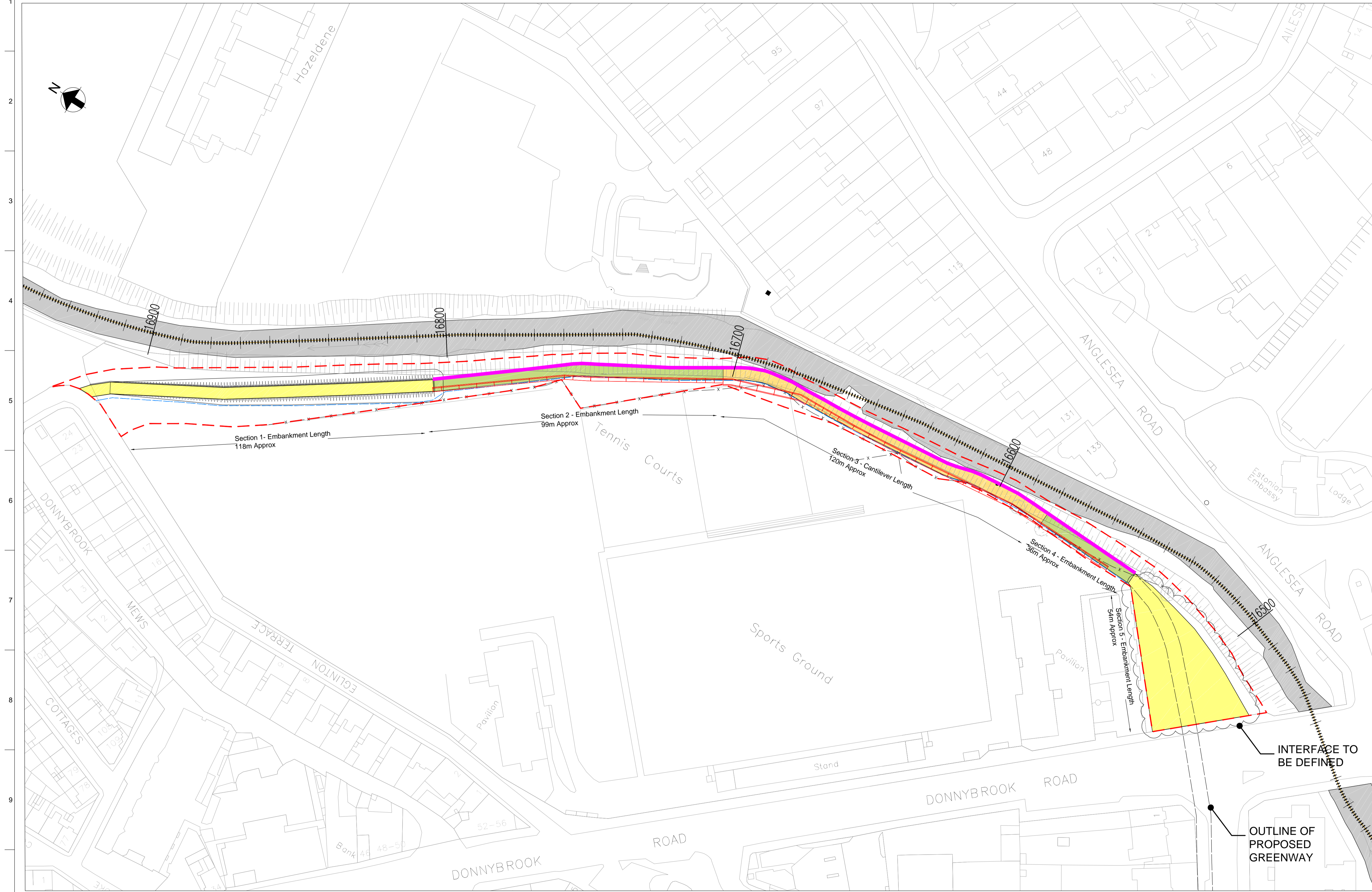
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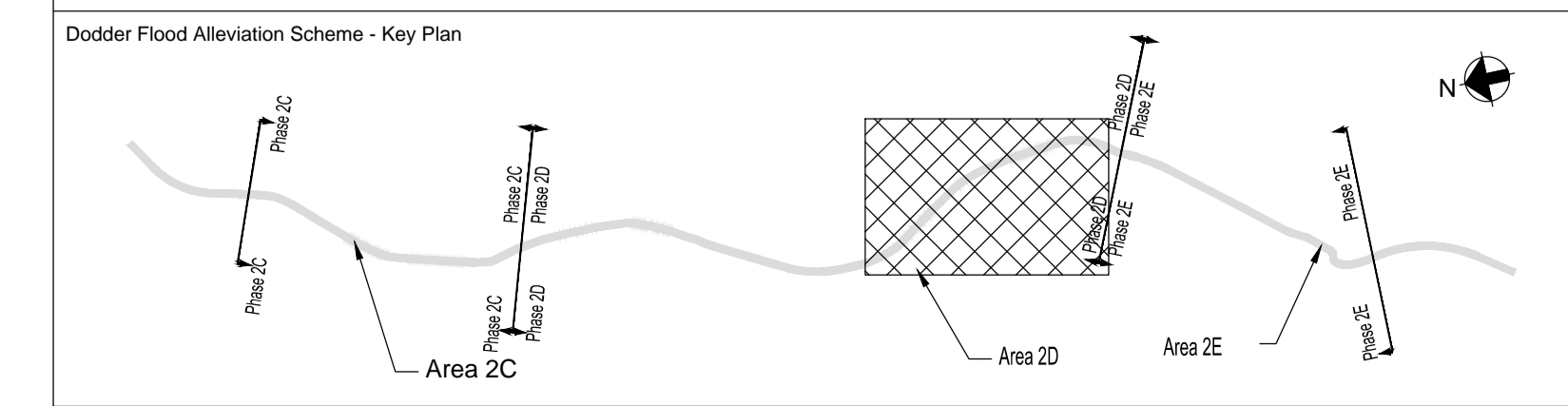
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- NEW FLOOD WALL
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- EMBANKMENT WITHOUT WALL
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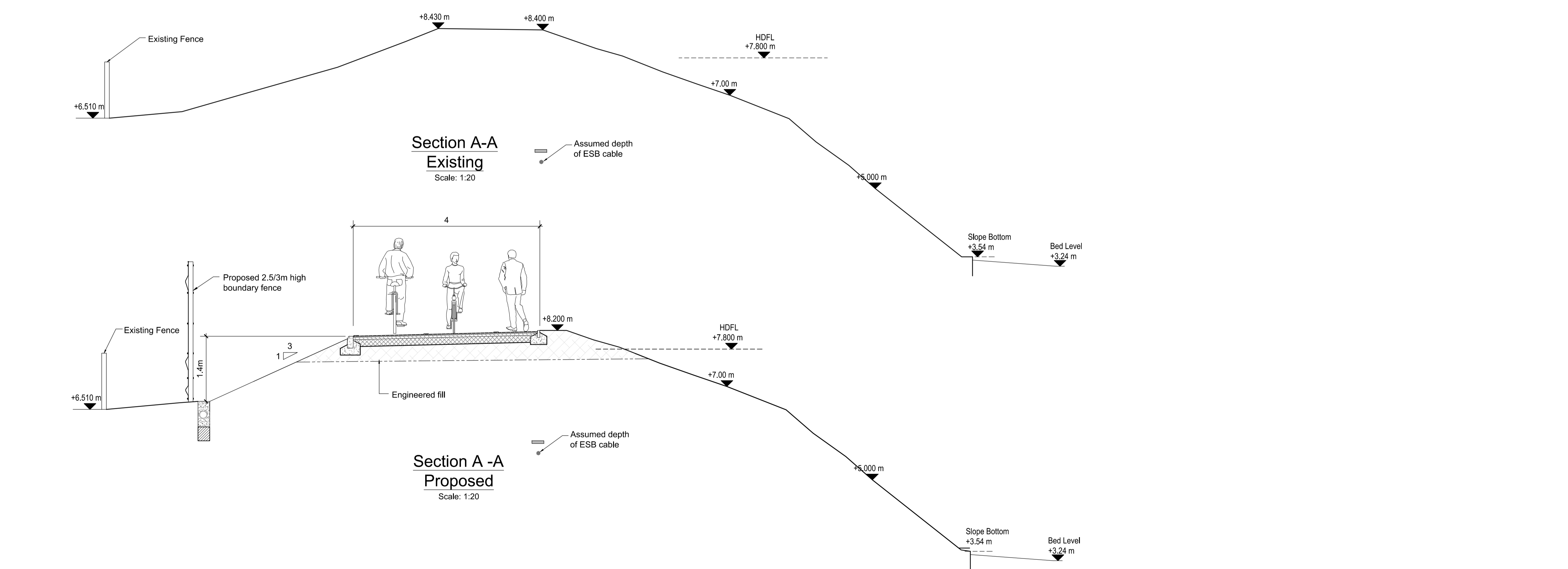
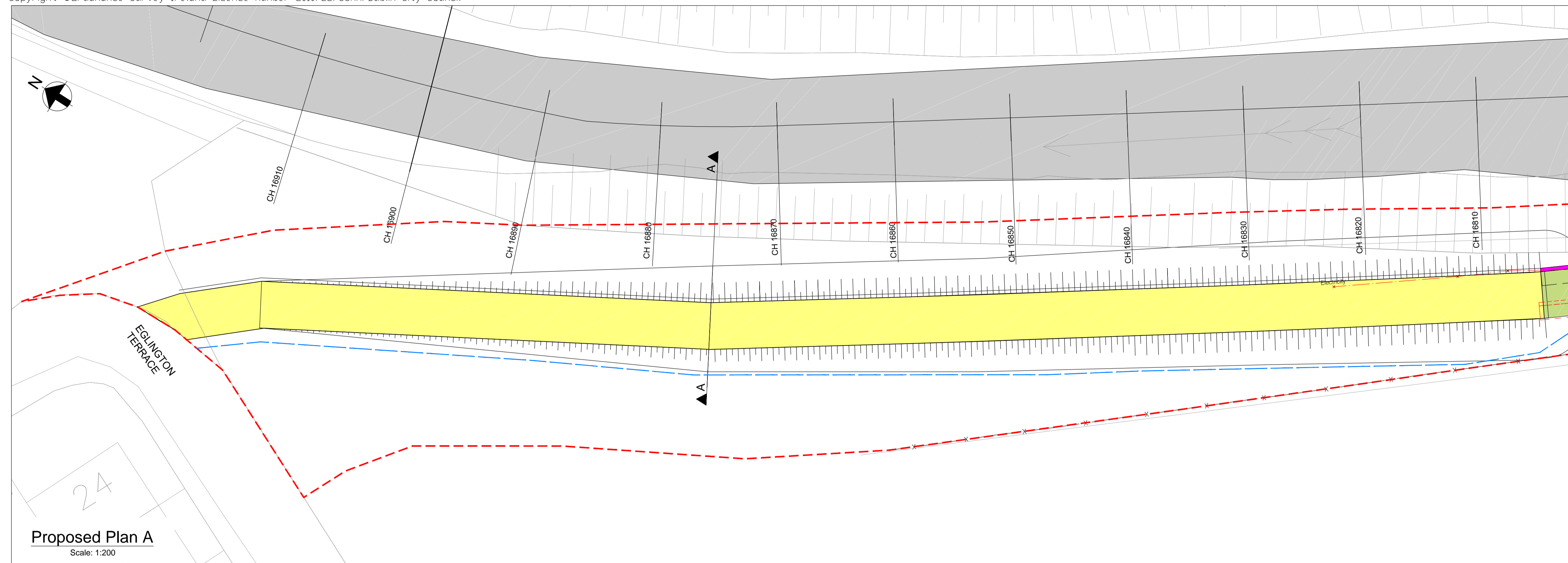
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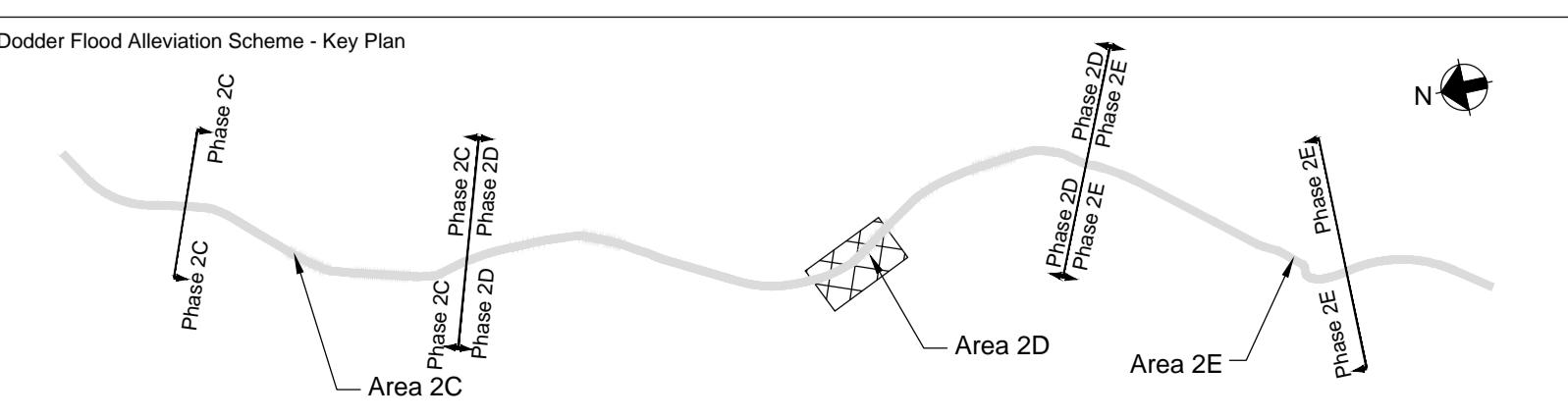
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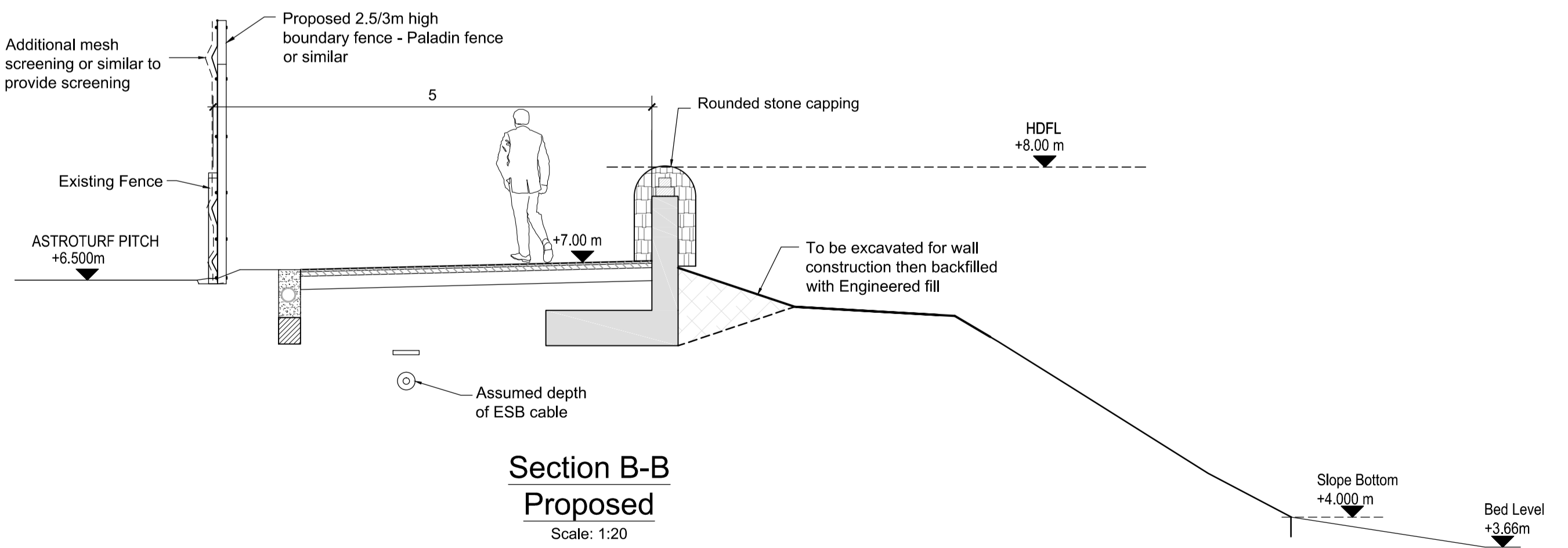
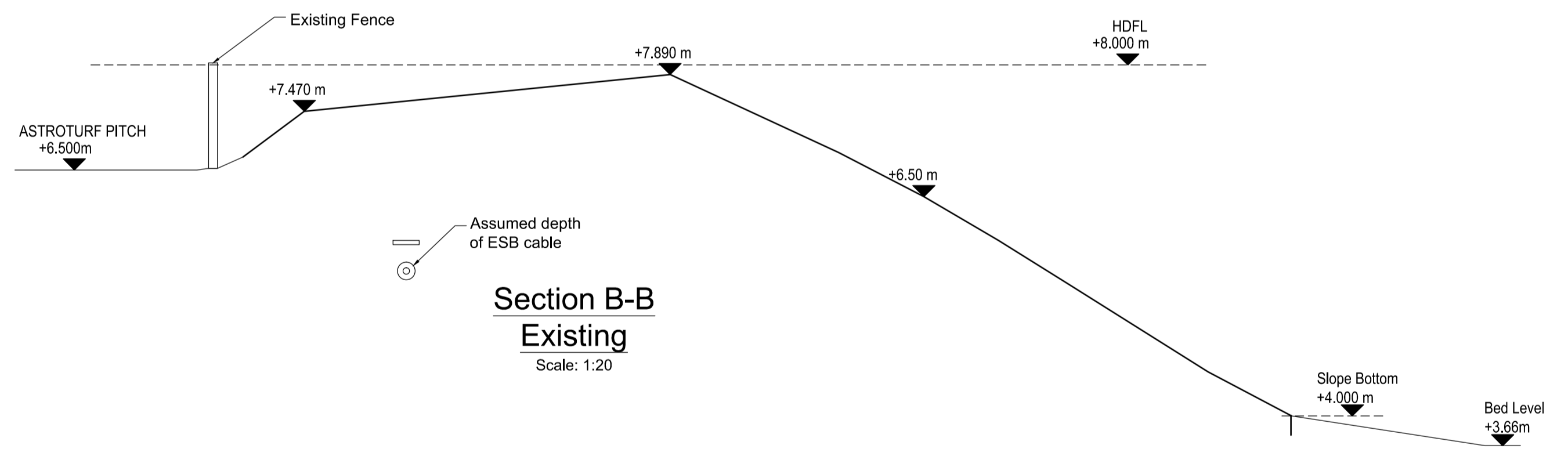
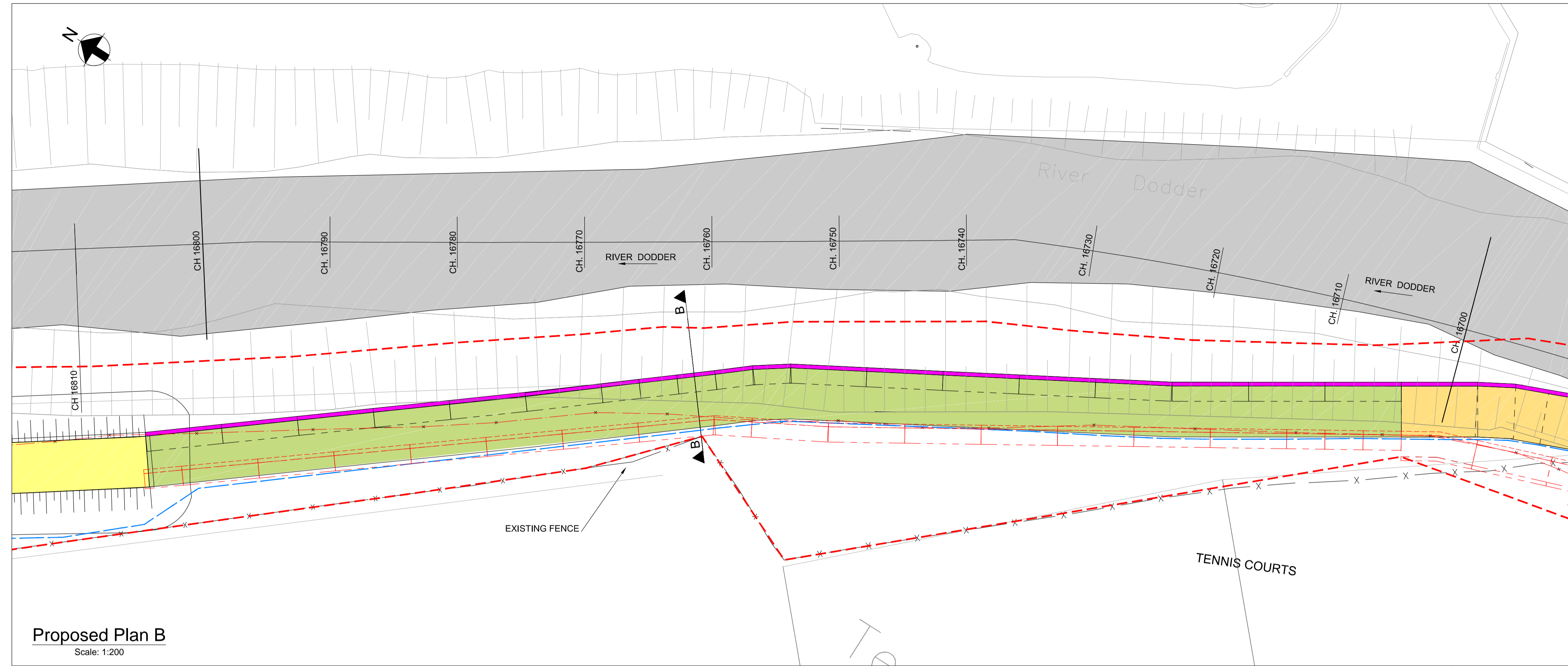
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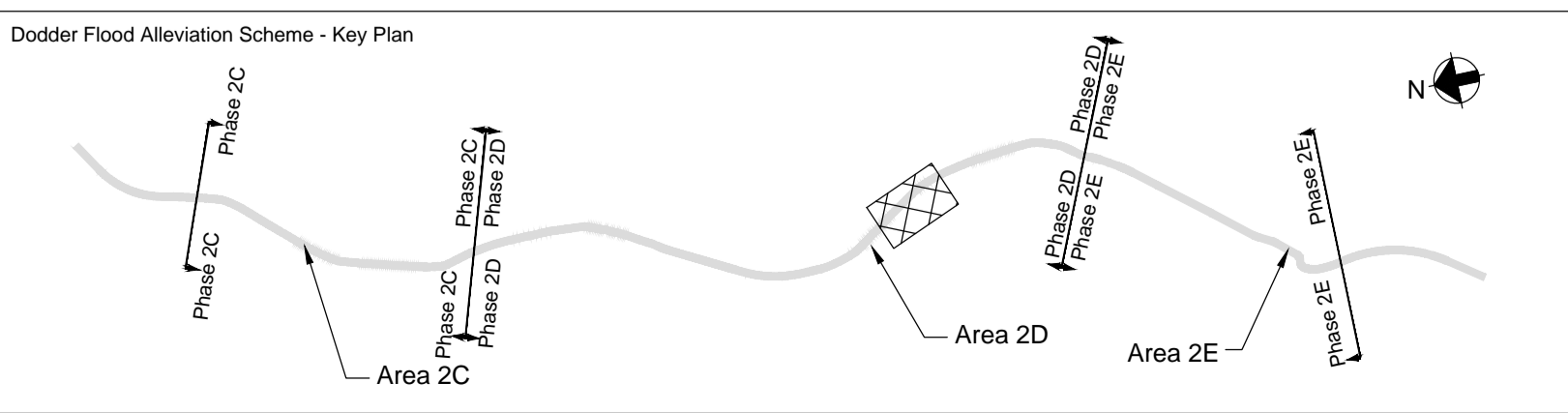
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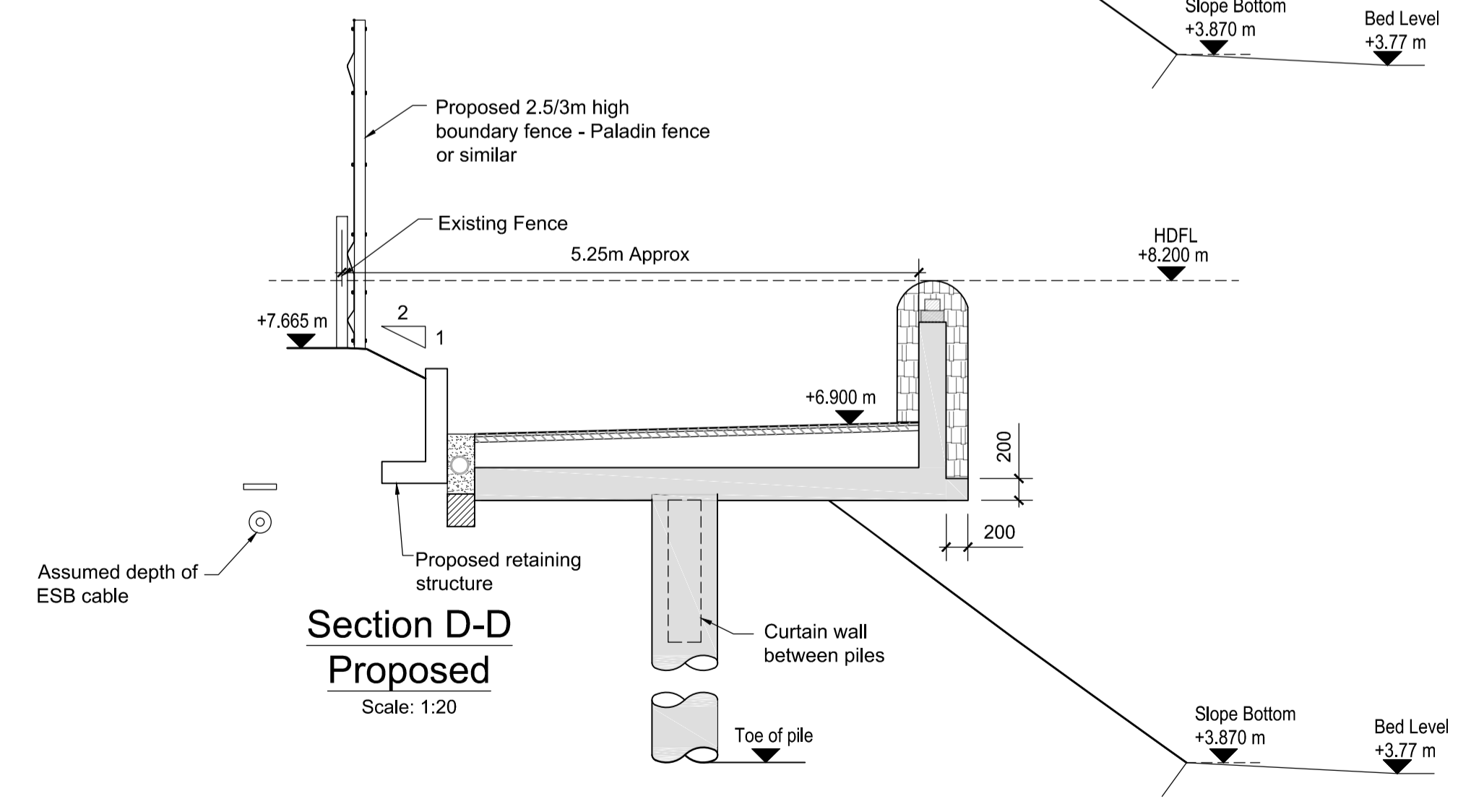
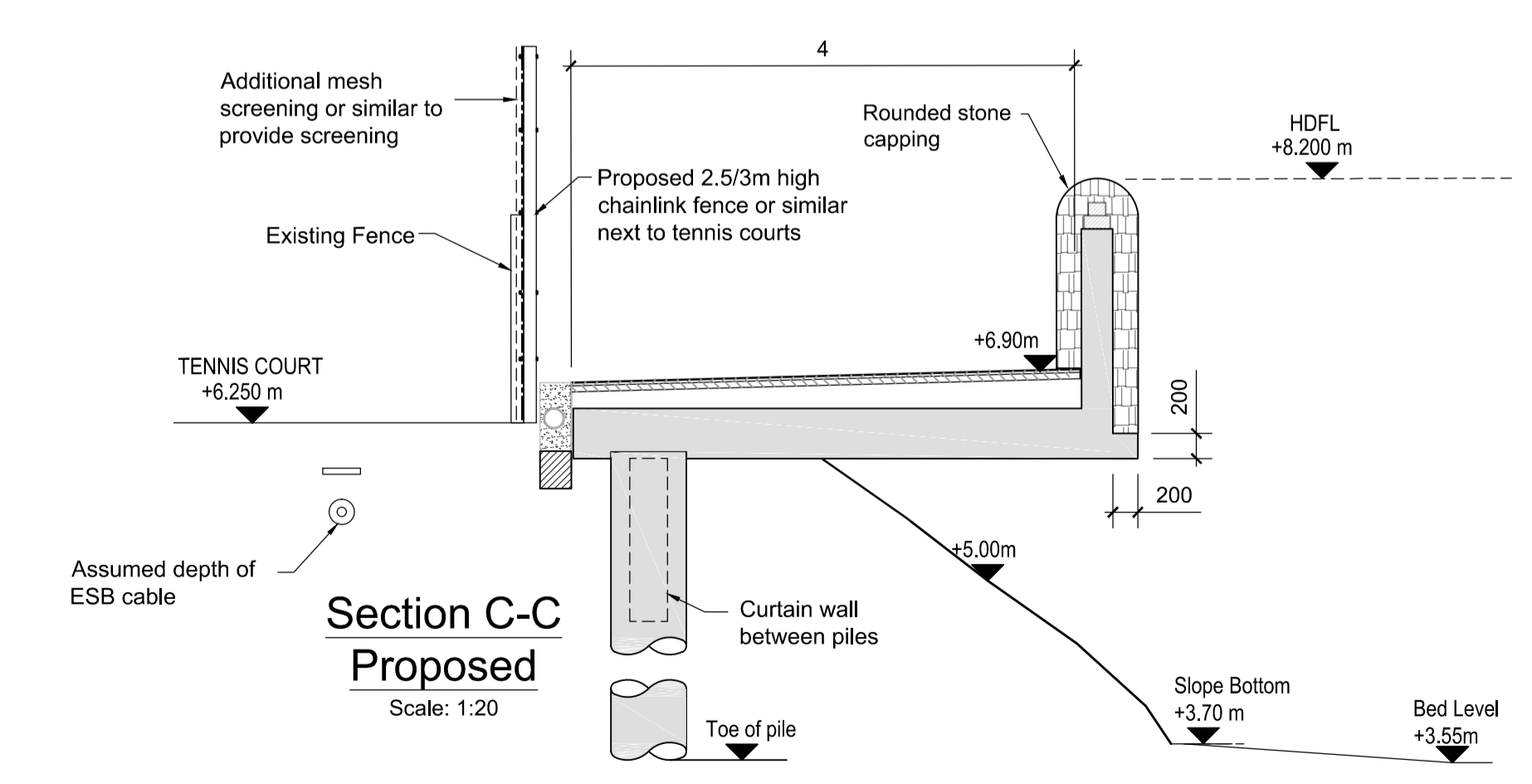
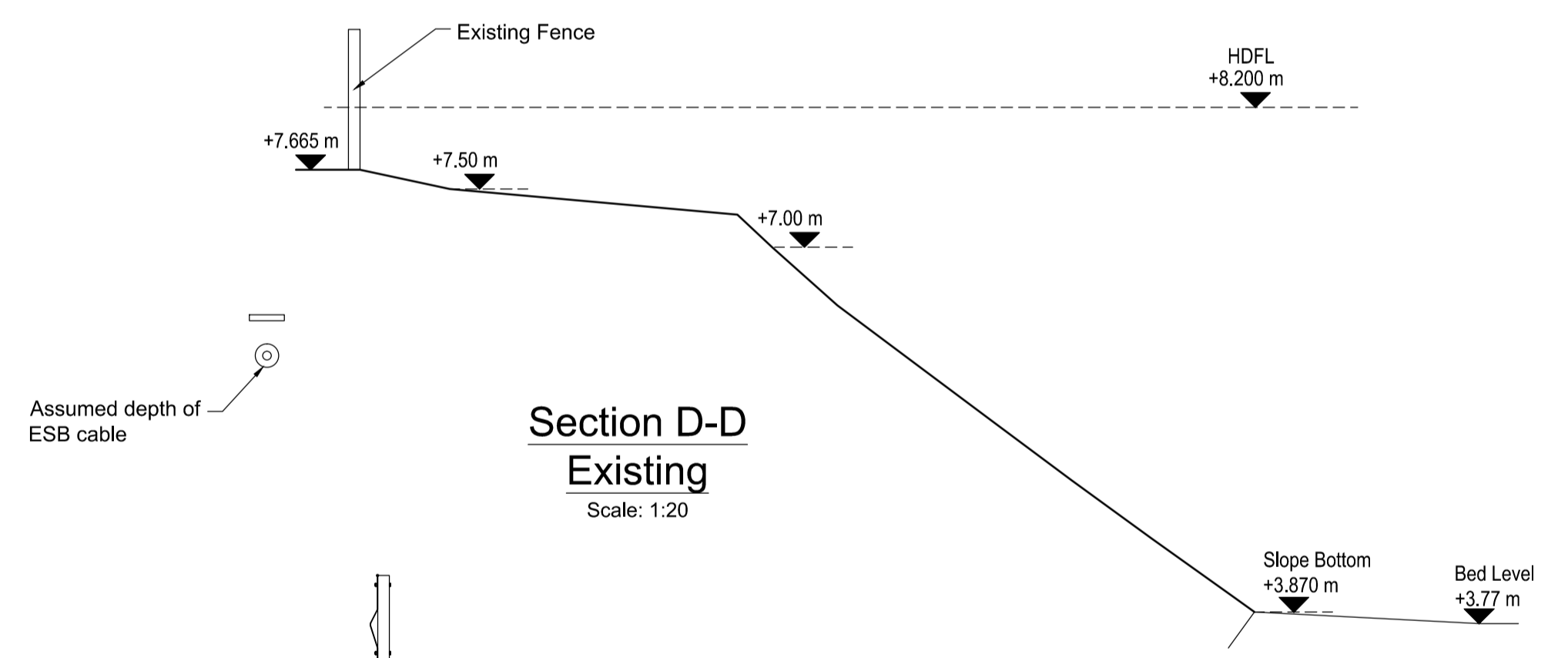
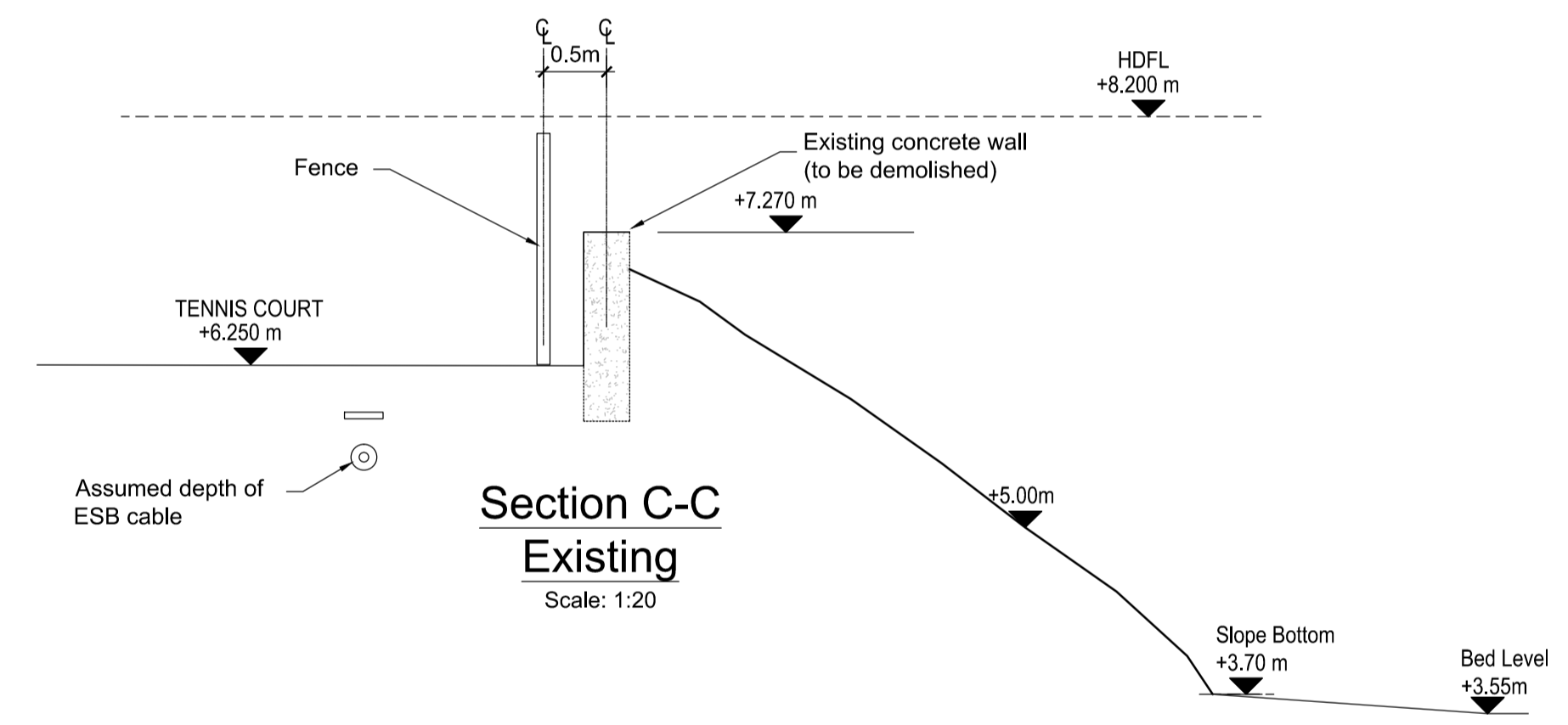
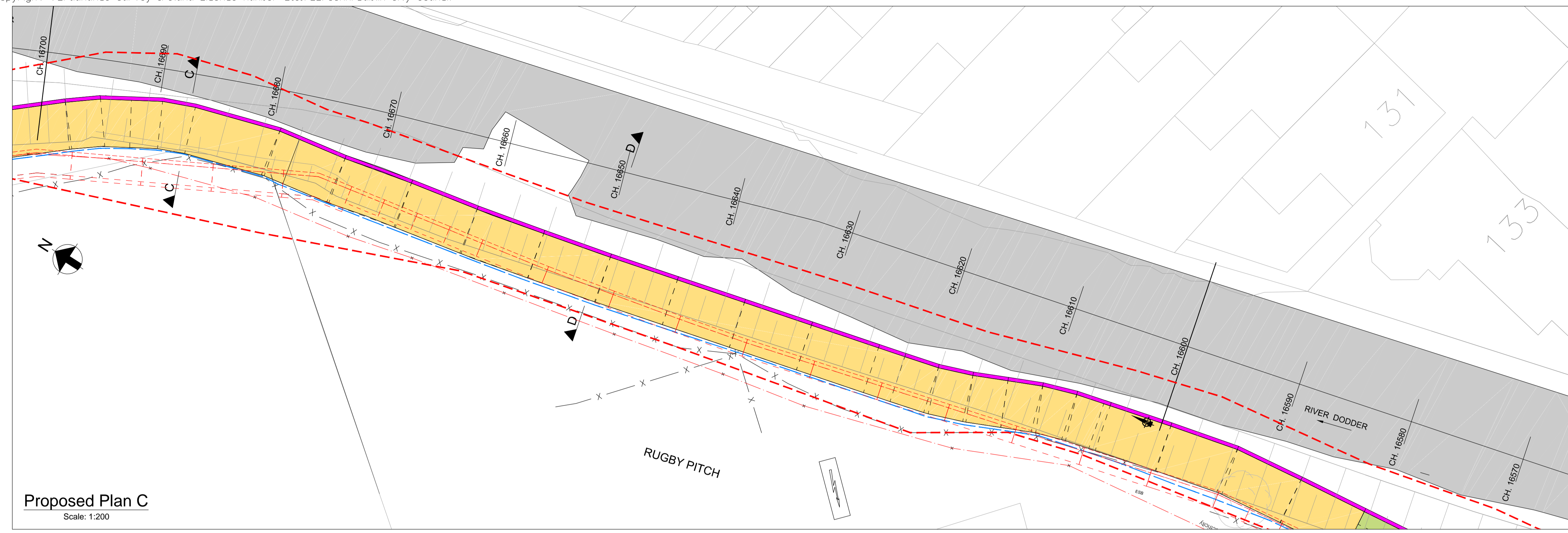
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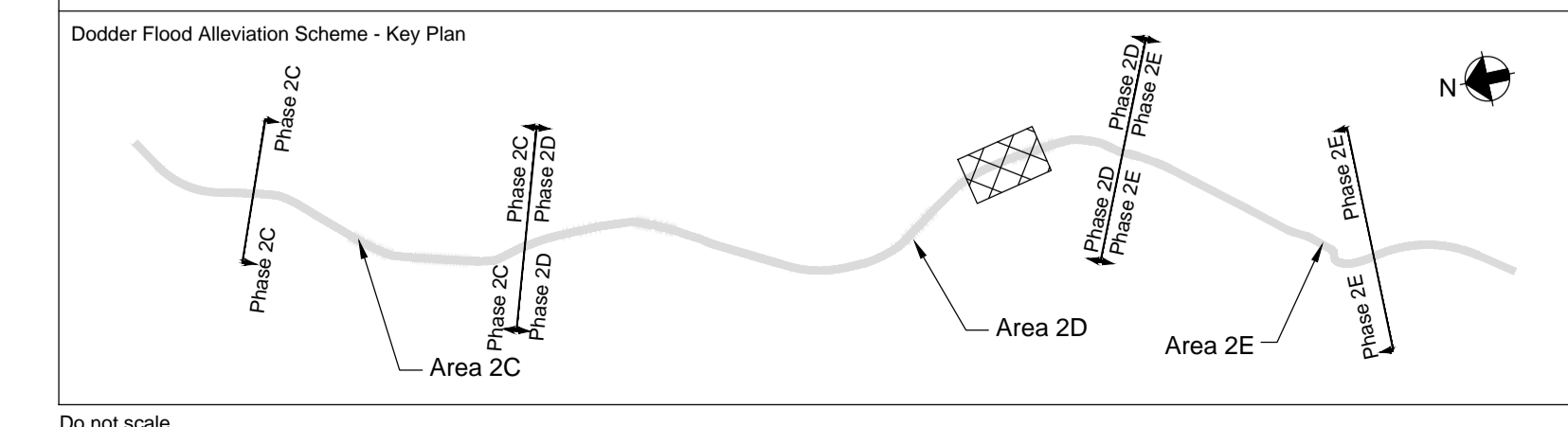
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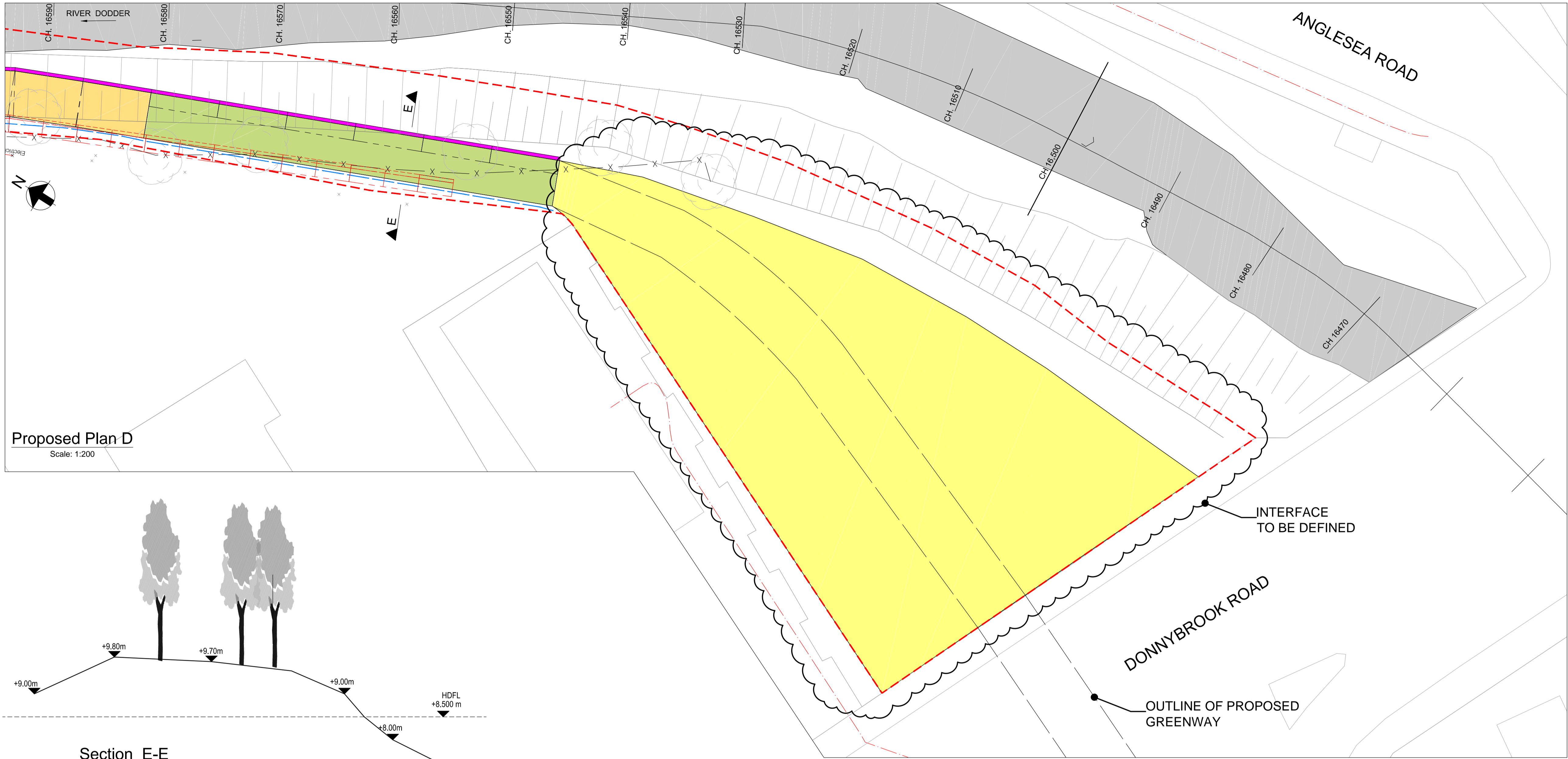
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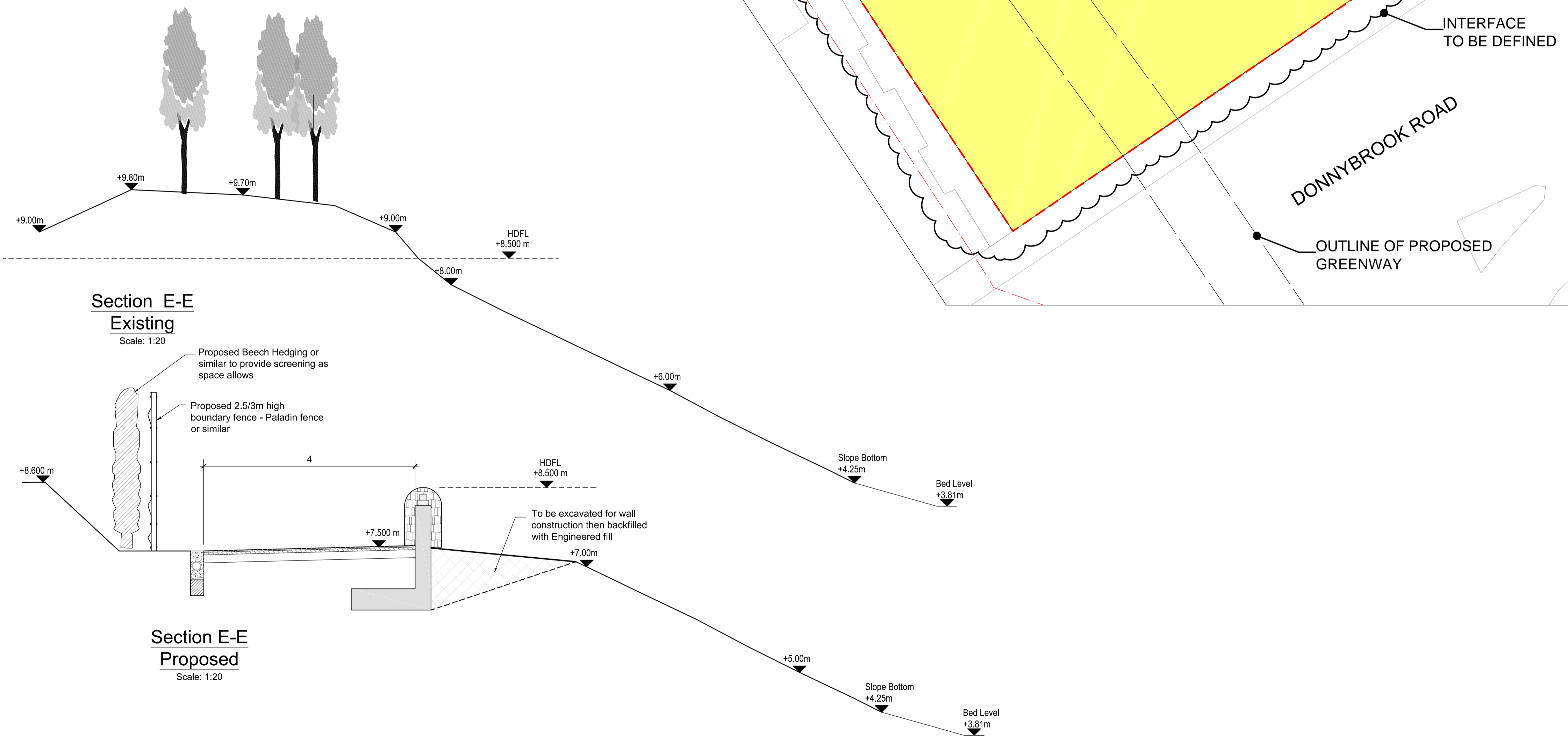
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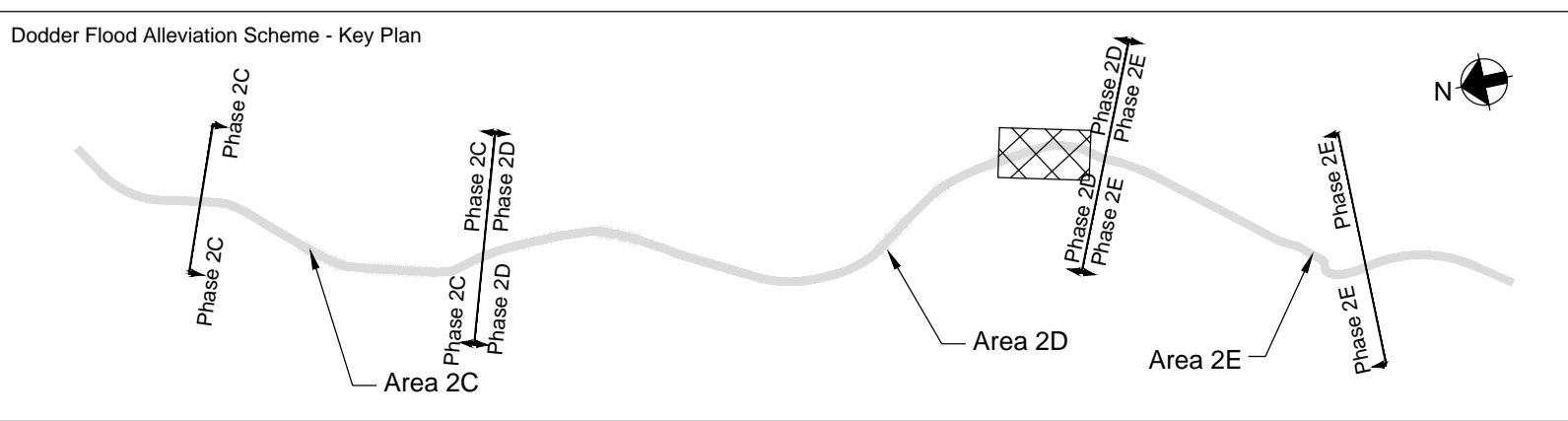
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Section E-E Proposed
Scale: 1:20

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Project Title
Donnybrook Greenway

Scale at A1
1:200 @ A1

Date:
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Drawing Title
**Area 2D - Donnybrook RFC
Chainage 16680 - 16580
Proposed Plan Layout - Cross Sections**

Drawing Status
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Project No 253355	Drawing No D-DL-A-0400	Issue P1
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A2 Photomontage

PHOTOMONTAGES

for
Project No. 5911
DODDER FLOOD WORKS

for
Client: Arup

Date: 10 March 2017
Document Number: RP03

Brady Shipman Martin

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Project Number:	5911	Document Number:	RP03	Revision:	02
Project Name:	DODDER FLOOD WORKS	Document Title:	PHOTOMONTAGES	Date:	10 March 2017



Figure: 1.0

Rev: 00
View Location Map

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Martin.
Built.
Environment.
Est. 1968

Project Number:	5911	Document Number:	RP03	Revision:	02
Project Name:	DODDER FLOOD WORKS	Document Title:	PHOTOMONTAGES	Date:	10 March 2017



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Figure: 1.1.1

Rev: 00
View 1
As Existing

BSM
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Environment.
Est. 1968

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Rev: 01
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 As Proposed

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Project Name:	DODDER FLOOD WORKS	Document Title:	PHOTOMONTAGES	Date:	10 March 2017



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 View 2
 As Existing

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Project Number:	5911	Document Number:	RP03	Revision:	02
Project Name:	DODDER FLOOD WORKS	Document Title:	PHOTOMONTAGES	Date:	10 March 2017



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 View 2
 As Proposed



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 Environment.
Est. 1968

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Rev: 00
 View 3
 As Proposed

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Appendix B

Environmental report

B1 Environmental report

Dublin City Council
**Dodder Flood Alleviation Works
Amendment**
Environmental Report

Ref/1

Issue| 5 April 2017

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 253355-00

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ARUP

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1 Introduction

1.1 Introduction

Arup has been commissioned by Dublin City Council (DCC) to undertake an Environmental Report for an Amendment to the Dodder Flood Alleviation Works Project Phase 2C-2E.

The purpose of this report is to provide a clear understanding of the likely environmental impacts regarding the implementation of the Amendment.

In 2013, Arup prepared an Environmental Report which described the potential environmental impact of the Dodder Flood Alleviation Works Phases 2C-2E. The Scheme was progressed through the Part 8 planning process. Construction of the scheme commenced in 2013 and is currently ongoing.

Arup has been commissioned to assess the environmental impact of the inclusion of a cycle route in the flood protection works proposed as part of Phase 2D of the original scheme. **Figure 1.1** shows the proposed location of the cycle route.

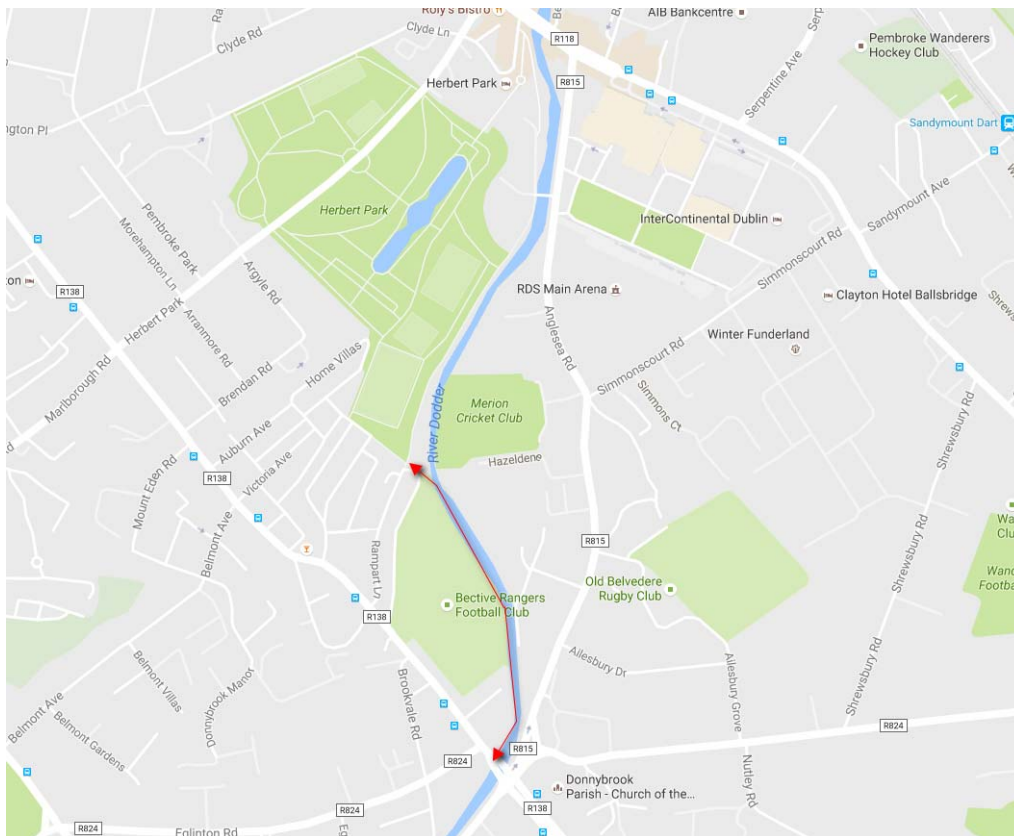


Figure 1.1: Proposed Location of Greenway Route

This Environmental Report assesses the potential environmental impact of the Proposed Amendment. There is expected to be no change in the environmental impact resulting from the Proposed Amendment on the following environmental aspects and on that basis, these have been screened out of this report:

Following the final date for submissions the Dublin City Council Manager will present a report to the members of the Council which in accordance with Section 179 of the Planning and Development Acts 2000-2009 shall:

- describe the Proposed Amendment and include a plan and location map;
- evaluate whether or not the Proposed Amendment is consistent with the proper planning and sustainable development of the area to which it relates;
- list the names of those who made submissions or observations and summaries, the points made by them; and
- arising from consideration of the representations, recommend whether or not it is proposed to proceed as originally planned or to proceed with a modified proposal.

Following consideration of the Manager's Report by Council Members the proposed development may be carried out as recommended in the report. The Council members may resolve to modify the proposal or not to proceed with the development; however resolution must be passed within six weeks of receipt of the Manager's Report.

1.3 Environmental Report Methodology and Consultation Process

This Environmental Report has been prepared in order to provide information on the likely significant environmental impacts of the Proposed Amendment to the Dodder Alleviation Works Phase 2C-2E.

For the purpose of this assessment it should be assumed that all mitigation measures proposed under the 2013 Environmental Report on the Dodder Flood Alleviation Works Phase 2C-2E have been, or will be implemented on site.

The primary mitigation is by avoidance. Where potential adverse impacts were identified, the project design has been modified if feasible, to avoid the impact.

Where impacts could not be avoided, mitigation measures have been incorporated into the scheme to reduce the potential adverse impacts to as low as is practicable. Where adverse impacts cannot be prevented, measures have been taken within a reasonable timeframe to restore the environment to an approximation of its previous condition or to a new equilibrium.

In general, this report was prepared in accordance with the methodology recommended in the following guidance:

- Environmental Protection Agency (EPA) 'Guidelines on the Information to be Contained in Environmental Impact Statements', (EPA, 2002).
- EPA 'Advice Notes on Current Practice in the Preparation of Environmental Impact Statements', (EPA, 2003).
- EPA 'Draft Revised Guidelines on the Information to be Contained in Environmental Impact Statements', (EPA, 2015).

- EPA 'Draft Revised Advice Notes on Current Practice in the Preparation of Environmental Impact Statements', (EPA, 2015).

The Environmental Report was prepared by Arup on behalf of Dublin City Council. Specialist contributions to the Environmental Report were made as follows:

- Ecology: Moore Archaeological and Environmental Services Ltd,
- Tree Survey: Brady Shipman Martin Limited.

2 Background and Project Description

2.1 Introduction

In this chapter, the background to and main design objectives of the Dodder Flood Alleviation Works Phase 2C-2E are outlined. A description of the Proposed Amendment is also provided.

2.2 Background to the Dodder Flood Alleviation Works

The River Dodder is one of Dublin's most important rivers. The River rises above Glenasmole in the Dublin Mountains. Its upper reaches form a reservoir system which supplies water to Dublin. The River then travels through bog, forest and agricultural land before entering Urban Dublin.

The River Dodder catchment is regarded as being "flashy", with a quick response to rain events. This is partly due to the catchment having a very steep gradient throughout its course, and in particular, in its upper reaches in the Dublin Mountains.

The Dodder has historically flooded along various stretches of its reach, most notably on 25 August 1986 (Hurricane Charlie). Over 300 buildings were affected by that flood.

The most recent significant flooding event occurred on 1 February 2002, when over 600 buildings were flooded in proximity to the Dodder downstream of Lansdowne Road Bridge. This flood was caused by the highest recorded tide in Dublin coinciding with some fluvial flow which significantly raised flood levels in the lower reaches.

A recent extreme flood event on 24 October 2011 resulted in significant flooding along the lower River Dodder which affected an estimated 300 buildings.

The need for flood defence measures has been identified by Dublin City Council following numerous previous studies including the Dodder Catchment Flood Risk Assessment and Management Study (CFRAMS), which report was adopted by Dublin City Council on the 4 February 2013.

The Dodder Flood Alleviation Scheme has been proposed to deal with the flood risk in the Lower Dodder Catchment, which is influenced by both coastal (or tidal) and fluvial flooding.

2.3 Dodder Flood Alleviation Works Phase 2C-2E

Dublin City Council (DCC) is currently undertaking flood defence measures along sections of both sides of the River Dodder between the Lansdowne Road Railway Bridge and the Smurfit weir and mill race in Clonskeagh County Dublin. These works comprise part of the Dodder Flood Relief Works Phase 2C-2E. The works consist primarily of flood defence walls, flood defence embankments, flood gates, infilling of bridge parapets and associated drainage and services alterations together with reinstatement and landscaping works. The Dodder flood alleviation works are summarised below:

- Existing walls/bridges- do nothing/ remedial works
- Existing Earth Embankments- do nothing/ increase height
- New earth embankments
- Raising of existing walls
- New walls
- Existing bridges
- Drainage and services
- Utility diversions
- Wall finishes
- Landscaping
- Maintenance

2.4 Need for the Proposed Amendment

The Dodder is an important amenity, bringing a rural environment and character to the heart of the Dublin City. Its diverse landscapes and views, habitats and heritage are enjoyed by anglers, walkers and runners, commuting and leisure cyclists and tourists.

DCC in conjunction with South Dublin County Council (SDCC), Dun Laoghaire Rathdown County Council (DLRCC) and the National Transport Authority (NTA) are currently developing a high quality greenway along the River Dodder in South Dublin- ‘The Dodder Greenway.’

The Dodder Greenway, a linked-up continuous linear park along the River Dodder, is one of a number of proposed off-road routes improving accessibility into the city centre from its hinterland. The Dodder Greenway will also serve as a primary tourist route from the city centre to the Dublin Mountains.

In order to provide for a continuous greenway from Grand Canal Dock to the Dublin Mountains as per DCC's vision, it is proposed to convert a section of flood wall proposed under the Dodder Flood Alleviation Works Phase 2C-2E to a cycleway. The section in question runs along the river at the back of Old Wesley RFC, Bective LTC and Bective Rangers playing fields at Donnybrook from Anglesea Bridge to the corner of Herbert Park.

The Proposed Amendment to the Dodder Flood Alleviation Works is required in order to prevent the future demolition of the flood wall that is currently proposed as part of Phase 2D of the works to allow construction of the cycleway in this location.

2.5 Description of the Proposed Amendment

This Environmental Report relates to a Proposed Amendment to Phase 2D of the Dodder Flood Alleviation Works Phase 2C-2E which is currently in construction.

The Proposed Amendment to the scheme involves the development of a cycle route along the existing embankment in order to facilitate the Dodder Greenway. This section runs along the river at the back of Old Wesley RFC, Bective LTC and Bective Rangers playing fields at Donnybrook from Anglesea Bridge to the corner of Herbert Park.

The proposed works have been designed so as to provide the function of flood alleviation as well.

The Proposed Amendment to the Dodder Flood Alleviation Scheme, Phase 2D involves the following changes at 5 distinct sections (Please refer to the scheme design drawings in Appendix A).

- **Section 1** -The original flood alleviation works entailed the construction of an embankment approximately 120m in length extending from Eglinton Terrace along the western bank of the Dodder. It is proposed to widen this embankment to allow for the construction of a 4m wide walking and cycling route (greenway) along its length.
- **Section 2** - Travelling upstream, the original flood alleviation works entailed the construction of a concrete parapet wall as flood defence in this section. It is proposed to construct this parapet wall as originally planned but to alter the line of the wall in order that the greenway pavement and the drainage system can be constructed without impacting on the neighbouring pitches and tennis courts.
- **Section 3** - For the next 120m the flood (parapet) wall that was previously proposed will be replaced by a 4m wide concrete platform and cantilevered parapet wall section.

The cantilever has been designed as a flood defence structure having an elevated stone-clad concrete parapet, thus providing the function of flood alleviation. It is proposed that a number of piles will be installed to support the cantilever along this section.

- **Section 4-** Along the next section (approximately 40m) it is proposed to construct a parapet wall as originally planned but to alter the line of the wall in order that the greenway pavement can be constructed.
- **Section 5** – The ground levels in this area are above the flood defence level and no works were previously proposed in this area. The Proposed Amendment would involve extending the greenway pavement through this area as far as Donnybrook Road.

The boundary fence will be a Paladin style fence or similar, except immediately adjacent to the tennis courts where a chain-link fence will be installed.

Beech hedging or similar will be planted on the Leinster Branch side of the boundary fence to provide screening. Native planting will also be provided on the greenway side of the boundary fence to provide additional screening.

Along the entire route the greenway pavement and the drainage system will be constructed between the flood relief wall and the new boundary fencing.

As part of the works some existing low value trees will be removed and a new tree planting scheme will be provided.

Please refer to the scheme design drawings in Appendix A for more details on the Greenway route layout and the sections in the Donnybrook area.

3 Planning and Policy

3.1 Introduction

The purpose of this chapter is to examine the Proposed Amendment to the Dodder Flood Alleviation Works Phase 2C-2E in the context of relevant national, regional and local planning and development policies.

3.2 EU Directive and Policy Guidance

3.2.1 Floods Directive

EU Directive 2007/60/EC on the assessment and management of flood risks (the “Floods Directive”) was transposed into Irish Law as SI 122 of 2010.

The Directive sets out a best practice framework for assessment and management of flood risk in Europe. The Directive requires:

- Preliminary Flood Risk Assessments (PFRAs) to be undertaken to identify areas of potentially significant flood risk (PFRAs were sent to the European Commission in March 2012);
- Production of flood hazard and risk maps for PFRA identified areas; and
- Preparation of Catchment or river basin Flood Risk Management Plans setting out measures aimed at management of flood risks.

The Directive requires member states to prepare flood maps by 2013 and flood risk management plans by 2015. The Directive also provides for integration with the Water Framework Directive through coordination with integrated river basin management plans.

The Office of Public Works is responsible at a national level for addressing flood risk and along with the Department of Environment, Heritage and Local Government has published a national policy guidance document on the consideration of flood risk within planning and development management. The OPW Flood Hazard Maps (www.floodmaps.ie) show information on maps on places that may be and have been at risk from flooding. In addition, the OPW Catchment Flood Risk Assessment and Management (CFRAM) Programme being delivered through CFRAM Studies will implement the Floods Directive in Ireland.

3.3 Irish National Policies, Guidance and Objectives

3.3.1 The Planning System and Flood Risk Management-Guidelines for Planning Authorities (November 2009)

The statutory guidelines were published by the Department of the Environment Community and Local Government and Office of Public Works and aimed to ensure a consistent and systematic approach to avoidance and minimisation of potential future flood risk.

Under the guidelines the planning system is required to avoid development in areas of flooding, incorporate flood risk assessment into the planning decision making process and adopt a sequential approach to flood risk management.

3.4 Regional Policy and Guidelines

3.4.1 Regional Planning Guidelines for the Greater Dublin Area 2010-2022

The purpose of the Regional Planning Guidelines are to give regional effect to the National Spatial Strategy. The guidelines set out the planned direction for growth with the Dublin area to 2022 including guidelines relating to Flood Risk Management within the region. Strategic recommendations relating to flood risk assessment are as follows:

Strategic Policy FP1: That flood risk be managed pro-actively at all stages in the planning process avoiding development in flood risk areas where possible and by reducing the risks of flooding to and from existing and future development.

Strategic Recommendations:

- **FR1:** New development should be avoided in areas at risk of flooding. Alongside this, the Regional Flood Risk Appraisal recognises the need for continuing investment and development within the urban centres of flood vulnerable designated growth towns and the City and for this to take place in tandem with the completion of CFRAM Studies and investment in comprehensive flood protection and management.
- **FR2:** Development and Local Area Plans should include a Strategic Flood Risk Assessment and all future zoning of land for development in areas at risk of flooding should follow the sequential approach set out in the Departmental Guidance on Flood Risk Management. All Flood Risk Assessments and CFRAM studies should take place in coordination and consultation with adjoining local authorities and regions and in coordination with the relevant River Basin Management Plans.
- **FR3:** Local authorities should take the opportunities presented to optimise improvements in biodiversity and amenity when including policies and actions in development plans/local area plans (such as flood plain protection and SuDS) for existing and future developments.
- **FR4:** Plans and projects associated with flood risk management that have the potential to negatively impact on Natura 2000 sites will be subject to a Habitats Directive Assessment (HDA) according to Article 6 of the habitats directive and in accordance with best practice and guidance.

In preparation of future Development and Local Area Plans, Local Authorities are advised to:

- Identify and consider at the earliest stage in the planning process flood hazard and potential risk.
- Identify flood risk areas on the Development Plan and Local Area Plan maps.
- Review existing Development Plans and Local Area Plans to ensure that issues of Flood Risk have been addressed in a manner consistent with the Flood Risk Management Guidelines. Where lands are already zoned for housing or other vulnerable development in flood risk areas, the Council should undertake a re-examination of the zoning in accordance with the sequential approach. RPGs may need to identify Plans which will require an Amendment to take account of FRA.
- Include policies which ensure that flood risk areas targeted for development following the sequential approach should be planned, designed and constructed to reduce and manage flood risk and be adaptable to changes in climate.

- Include policies to ensure that flood risk and impact is considered as a key element in the assessment of future waste and mineral planning strategies and developments.
- Include policies that ensure that the location of key infrastructure will be subject to FRA.
- Include policies on the importance of the inclusion of Sustainable Drainage Systems (SuDS) in future developments, in accordance with the recommendations of the Greater Dublin Strategic Drainage Study Guidelines and Appendix B of the Flooding Guidelines published by the Department and the OPW.

3.4.2 Eastern River Basin Management Plan

The Water Framework Directive (2000/60/EC) came into force on 22nd December 2000. The Directive which established a new framework for Community action in the field of water policy provides for water management on the basis of River Basin Districts. The River Dodder is located in the Irish Eastern River Basin Management Plan Region. The Eastern River Basin Management (ERBMP) was adopted in March 2010 and is subject to a 6 year review cycle. The plan records the condition of our waters at the start of the Plan, sets out objectives for our waters and Programmes of Measures to achieve those objectives. A second six year plan will be created in 2015 based in the results on the first, and a third plan in 2027.

The following table is an extract of Table 3.1 of the plan which summarises the assessed status of the Dodder water body.

Macro Invertebrates Status	Poor
General Physical Chemical Status	Moderate
Fish Status	Good
Plants Diatoms Status	Poor
Interim Overall Status	Poor

Basic measures recommended by Waterways Ireland, the South Eastern River Basin District Project (through DELG research project), and the Eastern River Basin District to improve the Dodder ecological potential are;

Water Body	Recommended Measure	Responsible Authorities
River Dodder	Install Fish Passes (provided a guaranteed rating can be provided to the EPA, DCC and OPW for the new configuration post-works) Protect and enhance ecological value of marginal aquatic habitat, banks and riparian zone.	LA, OPW, CFB

3.5 Local Policy and Guidelines

3.5.1 Dublin City Development Plan 2016-2022

3.5.1.1 Introduction

The proposed development is located within the Dublin City Council administrative area. The Dublin City Development Plan 2016-2022 sets out the spatial framework for the city. Taking account of the development framework set out in higher level regional and national plans, the proposed strategy for Dublin promotes the consolidation of the city, maximising efficient use of land and integrating land-use and transport, all within the context of an over-arching philosophy of sustainability and quality of life factors.

There are a number of objectives and policies set out in the Development Plan relating to Flood Risk Management, the River Dodder, and Green Infrastructure. Key aspects are summarised in this section.

3.5.1.2 Flood Risk Management Policy

Dublin City Council's recent achievements in the area of flood risk management policy are set out in Section of the Development Plan as follows:

Dublin has worked with the other 11 Local Authorities in the Eastern River Basin District (ERBD) to produce the ERBD 2009-2015 River Basin Management Plan and Programme of Measures. This Plan describes the actions to ensure the necessary protection of our waters over the coming years. It sets out how the aims and objectives of improving and protecting water quality and ecology in the waters of each river basin district could be achieved, by means of a Programme of Measures.

Catchment Flood Risk and Management (CFRAM) Studies are being undertaken by the Office of Public Works (OPW), in consultation with the Dublin Local Authorities for the River Liffey, Santry, Poddle, Camac as well as the city coastal zones. The associated latest available flood maps for all of these will be incorporated into the Dublin City Development Plan Strategic Flood Risk Assessment.

A number of flood protection works have been implemented and schemes have been constructed, are being constructed, or are at an advanced feasibility stage, to protect the city to a 1:100-year return period event from river flooding and 1:200-year event for coastal flooding. These include the Tolka Flood Alleviation Works, Spencer Dock Works, Lower Dodder Flood Alleviation Works, Clanmoyle Scheme on Wad River, Merrion Gates and Marine Drive. The South Campshires scheme from Butt Bridge to Cardiff Lane started construction in November 2014.

Relevant extracts from the Development Plan relating to flooding and the study area are as follows:

SI9: To assist the Office of Public Works in developing catchment-based Flood Risk Management Plans for rivers, coastlines and estuaries in the Dublin city area and have regard to their provisions/recommendations.

SI10: To have regard to the Guidelines for Planning Authorities on the Planning System and Flood Risk Management, and Technical Appendices, November 2009, published by the Department of the Environment, Community, and Local Government as may be revised/updated when assessing planning applications and in the preparation of plans both statutory and non-statutory.

SI11: To put in place adequate measures to protect the integrity of the existing Flood Defence Infrastructure in Dublin City Councils ownership and identified in the Strategic Flood Risk Assessment and to ensure that the new developments do not have the effect of reducing the effectiveness or integrity of any existing or new flood defence infrastructure and that flood defence infrastructure has regard also to nature conservation, open space and amenity issues.

SI12: To implement and comply fully with the recommendations of the Strategic Flood Risk Assessment prepared as part of the Dublin City Development Plan.

SI13: That development of basements or any above-ground buildings for residential use below the estimated flood levels for Zone A or Zone B will not be permitted.

SI14: To protect the Dublin City coastline from flooding as far as reasonably practicable, by implementing the recommendations of the Dublin Coastal Flood Protection Project and the Dublin Safer Project.

SI15: To minimise the risk of pluvial (intense rainfall) flooding in the city as far as is reasonably practicable and not to allow any development which would increase this risk. **SI16:** To minimise the flood risk in Dublin City from all other sources of flooding, including fluvial, reservoirs and dams and the piped water system.

It is the objective of Dublin City Council that:

SI08: All development proposals shall carry out, to an appropriate level of detail, a site-specific Flood Risk Assessment (SSFRA) that shall demonstrate compliance with:

- The Planning System and Flood Risk Management, Guidelines for Planning Authorities, Department of the Environment, Community and Local Government, November 2009, as may be revised/updated and the Strategic Flood Risk Assessment (SFRA) as prepared by this Development Plan.
- The site-specific flood risk assessment (SSFRA) shall pay particular emphasis to residual flood risks, site-specific mitigation measures, flood-resilient design and construction, and any necessary management measures (the SFRA and Appendix B4 of the above mentioned national guidelines refer).

Attention shall be given in the site-specific flood risk assessment to building design and creating a successful interface with the public realm through good design that addresses flood concerns but also maintains appealing functional streetscapes. All potential sources of flood risk must be addressed in the SSFRA.

SIO9: Proposals which may be classed as ‘minor development’, for example small-scale infill, small extensions to houses or the rebuilding of houses or paving of front gardens to existing houses, most changes of use and small-scale extensions to existing commercial and industrial enterprises in Flood Zone A or B, should be assessed in accordance with the Guidelines for Planning Authorities on the Planning System and Flood Risk Management & Technical Appendices, November 2009 as may be revised/ updated, with specific reference to Section 5.28 and in relation to the specific requirements of the Strategic Flood Risk Assessment. The policy shall be not to increase the risk of flooding and to ensure risk to the development is managed.

SIO10: That recommendations and flood maps arising from the Fingal-East Meath CFRAM Study, the Dodder CFRAM Study and the Eastern CFRAM Study are taken into account in relation to the preparation of statutory plans and development proposals. This will include undertaking a review of the Strategic Flood Risk Assessment for Dublin city following the publication of the Final Eastern CFRAM Study, currently being produced by the OPW.

SIO11: To work with neighbouring Local Authorities when developing cross-boundary flood management work programmes and when considering crossboundary development.

SIO12: To ensure each flood risk management activity is examined to determine actions required to embed and provide for effective climate change adaptation as set out in the Dublin City Council climate change adaptation policy and in the OPW Climate Change Sectoral Adaptation Plan Flood Risk Management applicable at the time.

3.5.1.3 The River Dodder and Greenway Policies

The Dublin City Development Plan 2016-2022 outlines Dublin City Council’s commitment to actively promote a green infrastructure strategy for the city. The strategy comprises a spatial strategic network to be delivered through local area plans and through the development management process.

Relevant extracts from the Development Plan relating to the River Dodder and the study area are as follows:

GI1: To develop a green infrastructure network through the city, thereby interconnecting strategic natural and semi-natural areas with other environmental features including green spaces, rivers, canals and other physical features in terrestrial (including coastal) and marine areas

GI3: To develop linear parks, particularly along waterways, and to link existing parks and open spaces in order to provide green chains throughout the city.

Where lands along the waterways are in private ownership, it shall be policy in any development proposal to secure public access along the waterway.

GI4: To co-ordinate open space, biodiversity and flood management requirements, in progressing a green infrastructure network.

GI5: To promote permeability through our green infrastructure for pedestrians and cyclists.

GI17: To develop sustainable coastal, estuarine, canal and riverine recreational amenities to enhance appreciation of coastal natural assets in a manner that ensures that any adverse environmental effects are avoided, remedied or mitigated

It is an objective of Dublin City Council:

GIO4: To improve pedestrian and cycle access routes to strategic level amenities while ensuring that ecosystem functions and existing amenity uses are not compromised and existing biodiversity and heritage is protected and enhanced biodiversity is conserved.

GIO16: To protect and improve the natural character of watercourses, including the Dodder, and to promote access, walkways, cycleways and other compatible recreational uses along them, having regard to environmental sensitivities.

3.5.1.4 Movement and Transport Objectives

Sustainable forms of transport such as public transport, walking and cycling are strongly promoted in the Dublin City Development Plan 2016-2022, which takes a pro-active approach to influencing travel behaviour and effective traffic management. These are seen as important elements of a progressive policy that can contribute to climate change mitigation and a more sustainable city.

Relevant extracts from the Development Plan relating to movement and transport and the study area are as follows:

MTO7: To promote and facilitate, in co-operation with key agents and stakeholders, the provision of high density cycle parking facilities at appropriate locations, taking into consideration (*inter alia*) the NTA's Cycle Network Plan and Dublin City Council's Public Realm strategy.

MTO8: To develop, within the lifetime of this plan, the Strategic Cycle Network for Dublin city – connecting key city centre destinations to the wider city and the national cycle network, and to implement the NTA's Greater Dublin Area Cycle Network Plan, to bring forward planning and design of the Santry River Greenway, incorporating strongly integrative social and community development initiatives.

3.5.1.5 Conservation Area Policies

Relevant extracts from the Development Plan relating to Conservation Areas and the study area are as follows:

CHC17: To support and promote a strategy for the protection and restoration of the industrial heritage of the city's waterways, such as the River Dodder, including retaining walls, weirs and millraces.

3.6 Zoning Objectives for the Site

There are a variety of use zoning objectives along the River Dodder as set out in **Table 3.1**.

Table 3.1: Zoning Objectives

Location		Use Zoning Objectives		
Area 2C	Ballsbridge to Lansdowne Railway Bridge	Western Bank	Zone Z1	To protect, provide and Improve residential amenities.
			Zone Z2	To protect and/or Improve the amenities of residential conservation areas.
			Zone Z4	To provide for and improve mixed service facilities.
			Zone Z10	To consolidate and facilitate the development of inner city and inner suburban sites for mixed use development of which office, retail and residential would be the predominant uses
		Eastern Bank	Zone Z1	To protect, provide and Improve residential amenities.
			Zone Z2	To protect and/or Improve the amenities of residential conservation areas.
			Zone Z	To provide for and improve mixed service facilities.
		Western Bank	Zone Z1	To protect, provide and Improve residential amenities.
			Zone Z2	To protect and/or Improve the amenities of residential conservation areas.
			Zone Z4	To provide for and improve mixed service facilities.

Area 2D	Stillorgan Road to Ballsbridge		Zone Z9	To preserve, provide and improve recreational amenity and open space and green networks.
		Eastern Bank	Zone Z1	To protect, provide and Improve residential amenities.
			Zone Z2	To protect and/or Improve the amenities of residential conservation areas.
			Zone Z9	To preserve, provide and improve recreational amenity and open space and green networks.
			Zone Z15	To provide for institutional, educational, recreational, community, green infrastructure & health uses.
Area 2E	Smurfit Weir to Stillorgan Road	Western Bank	Zone Z1	To protect, provide and Improve residential amenities
			Zone Z2	To protect and/or Improve the amenities of residential conservation areas.
		Eastern Bank	Zone Z1	To protect, provide and Improve residential amenities.
			Zone Z7	To provide for the protection and creation of industrial uses and facilitate opportunities for employment creation.
			Zone Z9	To preserve, provide and Improve recreational amenity and open space & green networks

3.7 Planning and Policy Objectives

The Dodder Flood Alleviation Works Phase 2C-2E and the Proposed Amendment is fully in compliance with the planning and policy objectives set out in the sections above.

3.8 References

Dublin City Development Plan 2016-2022.

Eastern River Basin Management Plan.

EU Directive 2007/60/EC on the assessment and management of flood risks.

European Communities (Assessment and Management of Flood Risks)
Regulations 2010 (S.I. No. 122 of 2010)

Department of the Environment, Heritage and Local Government (2009). The
Planning System and Flood Risk Management – Guidelines for Planning
Authorities.

Regional Planning Guidelines for the Greater Dublin Area 2010-2022

4 Scheme Construction

4.1 Construction duration and phasing

Construction of the Dodder Flood Alleviation Scheme is ongoing. Phase 2C construction began in 2013. Phases 2C and 2D are currently under construction. Substantial completion of the scheme is planned for the end of 2017. The Proposed Amendment relates to Phase 2D.

It is planned to commence the proposed works at the downstream extent of works and to move progressively upstream. In-stream works will be undertaken following approval from the National Parks and Wildlife Service and Inland Fisheries Ireland (see chapter 7 for further details).

It is expected that this particular section of the proposed Greenway route in Donnybrook will be completed in six months.

4.2 Site Boundary and Construction Compounds

The site boundaries of the proposed Greenway route in Donnybrook are defined between the left bank of the river and the existing boundaries (fences) of the sport facilities.

As part of the Dodder Flood Alleviation Scheme, the construction of the greenway route will require a compound for the duration of the works. This compound will need to provide accommodation for:

- Site offices for contractors, Dublin City Council site staff, etc. with canteen;
- Toilet/washing facilities, etc.,
- Car parking for site staff;
- Parking for site vehicles, plant and machinery; and
- Storage areas for construction materials.

In order to provide facilities close to the construction work fronts, a number of further sites have been identified for local construction compounds:

- It is noted that an existing compound is in place downstream of the new greenway path footprint in Donnybrook. This compound is currently required for the construction of the Dodder Flood Alleviation Scheme.
- Land at the rugby grounds – immediately downstream of Anglesea Road bridge.

It is intended that, with the agreement of the relevant landowners, these sites will be made available to the contractor for the construction of the greenway. Beyond the compound areas, the construction activities will be confined to the immediate vicinity of the works being constructed.

4.3 Piling and Concrete Deck at Cantilever Section

Generally the boundaries of the work areas will be established by the erection of hoarding around the affected areas. Where the concrete deck requires river works, hoarding lines will extend to the edge of the river bank. Within the hoarded areas, preparation works will typically consist of the following:

Site Clearance: removal of any trees, hedges and fencelines required to be removed to facilitate the works.

Topsoil Strip: Following site clearance the topsoil is generally stripped by machine scrapers and excavators, up to anticipated depths of about 0.5 m below existing ground level. It is anticipated that all of the topsoil will be temporarily stockpiled in mounds along the scheme, for later re-use in landscaping works.

Piling rig access: A level platform will be prepared to allow the piling rig to install the piles. It should be noted that substantial space is available on top of the existing embankment for the piling rig to process safely. Otherwise a haul road / working platform will need to be designed and placed by the piling contractor.

Concrete deck and defence wall: Scaffolding may be required on the river side of the embankment to allow construction of the concrete deck and defence wall. This will be part of temporary works design by contractor (or nominated party) prior to construction.

4.4 Construction Method

The construction methods as described in this chapter take environmental constraints into account. However, amendments to the construction methods are likely in certain instances and will depend on the specific plant and equipment employed by the contractor and the site conditions pertaining at the time of construction. The general sequence for construction will be as follows:

Section 1

- Preparation / protection of the site
- Extension of the existing embankment;
- Installation of drainage system
- Installation of cycle path pavement/ footpath surfaces / “street” furniture.
- Installation of fencing and planting

Section 2 and 4

- Preparation / protection of the site
- Excavation for foundations;
- Fixing steel reinforcing cages and formwork;
- Concreting of slab foundation;
- Fixing steel reinforcing cages, erection of formwork and falsework for wall stems;
- Concreting of wall;
- Stripping of formwork and falsework;
- Application of waterproofing on buried structural parts;
- Installation of limestone cladding of parapet wall
- Installation of drainage
- Installation of cycle path pavement/ footpath surfaces / “street” furniture.
- Installation of fencing and planting

Section 3

- Preparation / protection of the site
- Excavation for piling;
- Access of piling rig;
- Bored piling, reinforcement and concreting of piles
- Fixing steel reinforcing cages and formwork;
- Concreting of deck;
- Fixing steel reinforcing cages, erection of formwork and falsework for wall stems;
- Concreting of wall;
- Stripping of formwork and falsework;
- Application of waterproofing on buried structural parts;
- Installation of limestone cladding of parapet wall
- Installation of drainage system
- Installation of cycle path pavement / footpath surfaces / “street” furniture.
- Installation of fencing and planting

4.5 Landscaping

The proposed landscaping along the scheme will include extensive planting of new trees, hedges, etc. The landscaping works on site will be undertaken towards the end of the construction of the works, such that subsequent damage due to ongoing construction works is minimised.

Existing natural vegetation, particularly mature trees, river banks, etc. not requiring removal or alteration will be protected during construction.

Any areas where vegetation may need to be removed will be subject to landscaping, grass, tree and shrub replacement, where necessary. Species of the replacement vegetation will be chosen specifically to suit its surrounding environment and will be similar to the original landscaping where appropriate.

4.6 Utilities

Utilities at the proposed works area were recorded during a recent topographical survey. There is a HV ESB underground cable at the site in close proximity to the proposed works as shown on the design drawings in Appendix A.

The contractor shall take all appropriate measures to protect the existing ESB HV cable during the construction in compliance with the ESB regulations.

4.7 Accommodation Works

Accommodation works refer to the works required along the boundaries of the scheme with the adjoining land. They comprise:

- Boundary treatment in terms of fencing, walls, etc., and
- Reinstatement of existing access points and creation of new access points as required along the scheme.
- Connection to drainage system

Accommodation works are subject to agreement between Dublin City Council and each landowner affected.

The accommodation works for the Donnybrook greenway area are shown and outlined on the drawings for each section of works (Appendix A).

5 Noise and Vibration

5.1 Introduction

This section assesses the impact of the construction and operation of the Proposed Amendment to the Dodder Flood Alleviation Works Phase 2C-2E on the existing noise and vibration environment. The baseline noise environment is described, the potential impact during the construction and operational phases is determined and mitigation measures proposed as required.

It is assumed that all noise related mitigation measures proposed under the 2013 Environmental Report on the Dodder Flood Alleviation Works Phase 2C-2E have been, or are currently being implemented on site.

5.2 Assessment Methodology

5.2.1 Monitoring Methodology

Dublin City Council carry out continuous noise monitoring at nine locations around Dublin City. The results of the 2015 monitoring are presented in the *Ambient sound monitoring network annual report for 2015, DCC*.

The purpose of the network is to measure outdoor ambient sound levels in the City, at sites which are representative of typical sound levels to which the citizen is being exposed.

The nearest monitoring locations to the proposed scheme are at Irishtown Stadium, Ringsend and Woodstock Gardens Senior Citizens Residential Scheme, Ranelagh.

5.2.2 Impact Assessment Methodology

An increase of 25% in total traffic flows is considered approximately equivalent to a +1dB change in noise levels (ISO 1996), above which a detailed assessment is required. In this instance the increase in construction traffic relating to the Amendment will be less than 25% and therefore no detailed assessment is required.

5.2.3 Limits and Standards

There is currently no published statutory Irish guidance relating to the maximum allowable noise level that may be generated during the construction phase of a project BS5228 2009+A2014 sets relative construction noise criteria with reference to the existing noise environment.

These limits are considered the most appropriate noise limits to apply in this instance as they consider the existing baseline noise environment.

The significance criteria are the recommended range of ‘total noise’ (i.e. the ambient combined with the construction noise) which should not be exceeded for each assigned category. **Table 5.1** sets out construction noise criteria presented in BS5228.

Table 5.1: BS5228 (Part 1) ABC Assessment Categories and Thresholds (BSI)

Assessment Category and Threshold Value Period	Threshold Value in Decibels (dB)		
	A ^{A)}	B ^{B)}	C ^{C)}
Night (23:00-07:00hrs)	45	50	55
Evening 19:00 – 23:00)	55	60	65
Day (07:00-19:00hrs)	65	70	75

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A

D) 19:00 – 23:00hrs weekdays, 13:00-23:00hrs Saturdays and 07:00-23:00hrs Sundays

There is currently no published statutory Irish guidance relating to the maximum allowable vibration level that may be generated during the construction phase of a project.

The TII document Guidelines for the Treatment of Noise and Vibration in National Road Schemes contains information on the permissible construction vibration levels during the construction phase, refer to **Table 5.2**.

Table 5.2: Allowable Vibration at Sensitive Properties (TII, 2004)

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of		
Less than 11Hz	11 to 50Hz	50 to 110Hz (and above)
3 mm/s	3 to 8 mm/s	8 to 11 mm/s

5.3 Receiving Environment

The Dublin City Council monitoring report presents annual monitoring data for two locations in the vicinity of the proposed scheme; Ringsend and Ranelagh. The monitoring results for 2015 are presented in **Table 5.3** for daytime (L_{day}) evening time (L_{eve}), night-time (L_{night}) and L_{den} . L_{den} is calculated from the day, evening and night values based on a formula provided in the Environmental Noise Directive (2002/49/EC).

Table 5.3: Summary of Noise Monitoring Data (Dublin City Council 2015)

Parameter	Ringsend	Ranelagh
L_{day} (dB)	59	51
L_{eve} (dB)	60	49
L_{night} (dB)	59	46
L_{den} (dB)	65	54

As the ambient day-time L_{Aeq} noise levels recorded in the vicinity of the site range from 51 to 59 dB, the BS5228 A category is applicable as specified in **Table 5.1**.

Therefore the limits outlined in **Table 5.4** will be applied at the nearest sensitive receptor for the duration of the works.

Table 5.4: Noise Limits to be applied based on BS5228 Criteria

Assessment Category and Threshold Value Period L_{Aeq}	A
Night (23:00-07:00hrs)	45
Evening (19:00-23:00hrs)	55
Day (07:00-19:00hrs)	65

The total noise (L_{Aeq}) which should not be exceeded during daytime is therefore 65dB. In this event that evening time or night-time works are required, a limit of 55dB and 45dB, respectively will apply.

5.4 Characteristics of the Proposed Amendment

The Proposed Amendment to the Dodder Flood Alleviation Works Phase 2C-2E involves the provision of a new concrete cycle bridge/cantilever, immediately upstream of Ballsbridge. The cycle bridge/cantilever will take the place of the previously proposed flood wall. The cantilever has been designed so as to allow the potential utilisation of such a bridge as flood defence structure, thus providing the function of flood alleviation.

5.5 Predicted Impacts

5.5.1 Construction Phase

The Proposed Amendment is expected to take approximately 6 months to construct, with hours of construction from 08:00-16:30 Monday to Sunday. Although there may occasionally be the need to work outside the normal hours of construction, heavy or noisy construction activities will be minimised.

There is potential for generation of significant levels of noise during the localised installation of sheet piles which are required to provide support to the cantilever. This is expected to be the noisiest aspect of the construction works.

Noise levels have been predicted using guidance set out in BS 5228: Code of practise for noise and vibration control on construction and open sites (Part 1: Noise) (BSI, 2009). The assessment has been conducted to be representative of a worst case scenario. However, it should be noted that the predicted noise levels for construction activities are indicative only and are intended for comparison with the construction noise criteria. If additional noise sources are introduced, noise levels may be higher than those stated and an additional noise control measure may be deemed necessary.

For the purpose of the prediction calculation, it has been assumed that plant and equipment will be located 10m from the façade of the nearest noise sensitive locations. It has also been assumed that there will be a 50% utilisation of equipment over a working day.

However, it is noteworthy that plant and equipment will not remain in the one place for the duration of the construction period and it is likely that they will be positioned at greater distances from the nearest noise sensitive location for the majority of the works. This consequently will generate a lesser impact. However, as discussed previously, the assessment has been conducted to be representative of a worst-case scenario.

The results of the modelling assessment are summarised for the worst-case receptor (works 10m from the façade) in **Table 5.5**.

Table 5.5: Typical Construction Noise Levels at Worst-Case Noise Sensitive Location (dB $L_{Aeq,1hr}$)

Phase	Plant Item	Plant Sound Power, L_w (dB) ¹
Dam development	Vibratory piling	116
	Wheeled excavator	94
Predicted $L_{Aeq,1hr}$ at nearest sensitive receptor (dB)		78
General site works	Dumper	91
	Wheeled excavator	94
Predicted $L_{Aeq,1hr}$ at nearest sensitive receptor (dB)		58

1: BS 5228-1, 2009+A2014 (BSI, 2009+A2014)

During the noisiest site construction activities (installation of sheet piles), a total noise level (ambient and construction) of 78 dB is predicted which exceeds the BS5228 daytime limit of 65dB.

However, this is a short term, temporary daytime exceedence and mitigation measures, including advance communication with local residents prior to piling are recommended (refer to Section 5.6) to minimise impacts on sensitive receptors. No works likely to result in significant noise emissions are envisaged during the evening or night-time periods.

The installation of sheet piled support will be very temporary in nature and will only occur during daytime.

The general site works are predicted to generate noise levels of 58dB. This is in compliance with the BS5228 daytime limit of 65dB.

5.5.2 Operational Phase

There will be no noise and vibration impacts due to the Proposed Amendment during the operational phase.

5.6 Mitigation Measures

It is assumed that all mitigation measures proposed as part of the 2013 Environmental Report for the Dodder Flood Alleviation Works Phase 2C-2E have been, or will be implemented on site.

With regard to construction activities, reference will be made to BS5228 (BSI, 2009+A2014) which offers detailed guidance on the control of noise and vibration from demolition and construction activities. In general BS5228 advises the following noise mitigation measures, where necessary:

- Avoid unnecessary revving of engines and switch off equipment when not required.
- Keep internal haul routes well maintained and avoid steep gradients.
- Use rubber linings in, for example, chutes and dumpers to reduce impact noise.
- Minimise drop height of materials.
- Start-up plant and vehicles sequentially rather than all together.

The following more specific measures are also advised:

- In accordance with Best Practicable Means, plant and activities to be employed on site will be reviewed to ensure that they are the quietest available for the required purpose.
- Where required, improved sound reduction methods, e.g. enclosures should be used.
- Site equipment should be located away from noise sensitive areas, as much as is feasible.
- Regular and effective maintenance by trained personnel should be carried out to reduce noise and/or vibration from plant and machinery.
- Limiting the hours during which site activities likely to create high levels of noise or vibration are carried out.
- Establish channels of communication between the contractor/developer, Local Authority and residents.
- Appointing of a site representative responsible for matters relating to noise and vibration. This will include informing local residents of the time and duration of sheet piling works.
- Monitoring shall be carried out at the nearest sensitive receptor while activities that are likely to generate significant noise are carried out.

Where appropriate, it is also proposed to provide a 2.4m high solid hoarding along the boundary of the construction site.

It is proposed that vibration levels be maintained below those outlined in **Table 5.2**. Monitoring shall be carried out at the nearest sensitive receptor, as required where activities that are likely to generate vibration are carried out. Levels recorded will be compared to the limit values. If exceedances are recorded, alternative construction methodologies will be proposed to ensure limits are complied with. The following additional vibration mitigation measures are advised:

- Control of vibration at source, where possible.

- Informing local residents of the time and duration of possible vibration impact.

5.7 Residual Impacts

There is the potential for a residual impact associated with the installation of sheet piles as outlined in Section 5.5.1. However, this will be a short term, temporary daytime exceedence.

There will be no residual operational impacts.

6 Landscape and Visual

6.1 Introduction

This section of the Environmental Report focuses on the landscape and visual aspects of the proposed scheme. This assessment of landscape and visual impacts for has been carried out with regard to the EPA's Advice Notes (2003) and Guidelines (2002) on Environmental Impact Statements, the Draft Revised Guidelines (2015) and Advice Notes (2015) and the Landscape Institute (UK) Guidelines for Landscape and Visual Impact Assessment, 2013.

6.2 Assessment Methodology

Assessment of impact on landscape revolves around two closely related but separate considerations. The first is impact on character, which is concerned with alterations to physical structure of landscape or townscape that may give rise to changes in how it is experienced or perceived. The second is visual impact, which is concerned with changes that arise in existing views and the overall effects on the visual amenity of the area. Visual impact assessment is a measure of the significance of that change. In both instances a high degree of subjectivity may be involved in the consideration of how much a change matters to an individual.

The landscape impact assessment involved:

- Visit to the site and surrounding area;
- Tree survey of the proposed area;
- A review of statutory planning and other documentation in order to ascertain the local and wider significance of the area from a landscape and visual perspective;
- A review of plans, sections and elevations of the proposed scheme, and
- A review of other chapters of this Environmental Report in particular, Background and Project Description, (Chapter 2) and Biodiversity (Chapter 7).

The landscape impact assessment has had regard to the following legislation, policy documents and reference material:

- Dublin City Council, 2011, Dublin City Development Plan 2011 – 2017.
- Government of Ireland, Planning and Development Acts 2000-2010.
- Landscape Institute, and Institute of Environmental Management & Assessment, 2013, Guidelines for Landscape and Visual Impact Assessment, 3rd Ed.,

The assessment has also had regard to the EPA Guidelines and Advice Notes on EIS, as described in Section 1.4 of this report.

6.3 Baseline Environment

6.3.1 General Context

The River Dodder is a significant part of the urban fabric of the south city. For the majority of the time, the section between Clonskeagh and Lansdowne Road Rail Bridge is a visually attractive blend of strong-flowing meandering river with weirs, pools and gravel beds, enclosed in-part by heavily tree-lined banks and in-part by low old stone walls and railings along open sections. However, in times of heavy rain / flood the river can change dramatically, into a fast-flowing rapidly rising torrent of water that commonly breaks its banks.

As a natural ‘landscape’ feature, the river is a significant amenity providing for visual contrast and relief from background urban development. The river is popular for walking and cycling, fishing and as a general recreational and visual amenity. In addition the river and its corridor plays an important role in determining the character of immediately adjoining areas, particularly where urban development is close by such as from Angelsea Bridge to the Smurfit Weir.

6.3.2 The Area of the Proposed Scheme

The proposed scheme is described in Chapter 2 Background and Project Description and Chapter 4 Scheme Construction of this report.

North of Angelsea Bridge, in the area of the proposed scheme, the river corridor is enclosed by tree and woodland on the river bank. This mixed deciduous planting is dominated by self-seeded Sycamore and Poplar trees and many of the larger Poplar trees are in an over-mature condition. Access to the river bank is generally restricted where the river runs between private property, including residential properties, the Licensed Vintners Association and Merrion Cricket Club properties on the east bank and Bective and Old Wesley sports grounds on the west bank.

Works associated with the existing Flood Alleviation Works Phase 2C-2E on the west bank has necessitated the removal of what was a line of mature Poplar trees located on the river bank alongside the rugby grounds and the tennis courts, as well as some of the trees located on the bank between the tennis courts and Angelsea Bridge.

GI18: To liaise with relevant State agencies responsible for the city's waterways, including Waterways Ireland, Inland Fisheries Ireland, the Environmental Protection Agency and Dublin Port Company.

GIO17: To seek the continued improvement of water quality, bathing facilities and other recreational opportunities in the coastal, estuarine and surface waters in the city and to

Interalia, it is an Objective of Dublin City Council:

GIO17: To seek the continued improvement of water quality, bathing facilities and other recreational opportunities in the coastal, estuarine and surface waters in the city and to protect the ecology and wildlife of Dublin Bay.

GIO18: To protect and improve the natural character of watercourses, including the Dodder, and to promote access, walkways, cycleways and other compatible recreational uses along them, having regard to environmental sensitivities.

GIO20: To establish, where feasible, river corridors, free from development, along all significant watercourses in the city.

GIO21: To co-operate with the relevant adjoining local authorities of Dún Laoghaire Rathdown and South Dublin Councils in developing a strategy for the preparation and graduated implementation of an integrated Maintenance, Improvement and Environmental Management Plan for the entire length of the River Dodder and to support the establishment of a co-ordinating River Dodder Authority or equivalent body to implement that strategy. This plan should reflect the relevant recommendations of the Eastern Catchment Flood Risk Assessment and Management and associated Unit of Measurement Flood Risk Management Plan(s) and associated Environmental Reports.

The West and North Eastern banks of the river along the proposed scheme are zoned Z9: To preserve, provide and improve recreational amenity and open space and green networks.

The rear gardens of residences along the West bank of the Dodder to the North of Anglesea bridge are zoned Z2: To protect and/or improve the amenities of residential conservation area

The River itself is zoned Z11: To protect and improve canal, coastal and river amenities.

The Dodder River along its length within the Development Plan is zoned as a Conservation Area.

Appendix 11 of the development plan notes that "The Dodder, including the estuary, is the subject of on-going flood defence works." A summary of the works is presented including "7. Ballsbridge to Anglesea Bridge: Series of embankments and retaining walls. Upgrades necessary to bring to 100-year flood defence level on-going."

6.4 Predicted Impacts

There are no proposed works on the East Bank of the River Dodder and therefore the impact on the East Bank resulting from the proposed scheme will be negligible.

6.4.1 Predicted Impacts relating to the Proposed Amendment

Works associated with the existing Flood Alleviation Works Phase 2C-2E on the west bank necessitated the removal of what was a line of mature Poplar trees in Tree Survey Area 4b (refer to **Appendix 6.1** and **Figure 6.1**), located on alongside the rugby grounds and the tennis courts. In addition some of the trees located on the bank between the tennis courts and Anglesea Bridge have also been removed.

The now proposed works on the West Bank of the River will result in the removal or cutting down of most of the remaining bankside trees in along this location – i.e. the line of c.13 Poplar trees within Area 4a and the belt of river side trees in Area 4c (refer to **Appendix 6.1** and **Figure 6.1**). While many of the trees are of poor form, low amenity or arboricultural value, nevertheless, their removal will result in a significant localised negative short term construction impact. While the change in the environment of the west bank will remain significant after construction, the provision of the Greenway, together with the proposed reinstatement and planting will result in a moderate impact, consistent with the nature of similar impacts elsewhere along the river. This impact will reduce to a slight localised neutral impact in the medium and longer term as planting becomes established.

6.5 Mitigation Measures

It is assumed that all mitigation measures proposed as part of the 2013 Environmental Report for the Dodder Flood Alleviation Works Phase 2C-2E have been, or will be implemented on site.

For the purpose of mitigation the area in which the proposed scheme will take place is split into three sections as shown in **Figure 6.1** below. Proposed mitigation for each section is set out below.



Figure 6.1: Aerial View of the Proposed Scheme Area showing Sub-divisions

Section 4a

The tree group in section 4a may be retained if the flood defence structures and new cycleway can be constructed without significant disturbance within approximately 5m of the tree stems. Where this is not practicable and tree removal is required these shall be replaced with a new planting scheme containing native tree species such as willow, alder, hazel and oak etc.

Section 4b

The vast majority of trees within this part of the site are of very poor form and low quality and it was intended to remove these trees for the Flood Alleviation Works Phase 2C-2E. All of the trees in this area shall be coppiced back to stump; the Hybrid Poplar stumps (both young and old) shall be treated with herbicide to prevent regrowth or be removed by stump-grinder.

The stumps of willow, ash and sycamore shall be allowed to re-sprout into multi-stemmed trees of better, upright form; these trees should then be re-enforced with fresh planting of native tree species.

Section 4c

Trees likely to be significantly impacted by any of the proposed works in this location shall be coppiced to stump and allowed to regenerate where possible. A Japanese Knotweed Management Strategy will be developed and implemented in Consultation with the Parks Department and Flood Defence Unit of Dublin City Council.

Larger mature willow trees may be retained if possible; or with the stumps retained where practicable to allow re-growth if the stems have to be removed. Coppicing of willows will take place as required within the next three years to prevent stem collapse.

A well-executed tree planting scheme will be designed at detailed design stage and implemented following construction. This will create a stretch of native riparian woodland along the riverbank that would provide an attractive landscape screen as well as a valuable wildlife corridor.

6.6 Residual Impacts

The landscape and visual impacts of the works are limited and primarily restricted to construction stage works.

Following construction and implementation of mitigation, the proposed reinstatement and planting will result in a moderate impact. This will reduce to a slight localised neutral impact in the medium and longer term as planting becomes established.

7 Biodiversity

7.1 Introduction

This section of the Environmental Report provides information on ecological features of particular significance within or adjacent to the site of the proposed scheme, primarily designated habitats and species, including habitats/species listed in Annex I, II and IV of the EU Habitats Directive, rare flora listed in the Flora Protection Order, along with other semi-natural habitats of conservational value. In order to ensure that important habitats, plants and animals are protected at proposed works areas, an Ecological Impact Assessment was undertaken by Moore Group in January 2017 to assess plant and animal habitats along the river, in and beside proposed works to estimate the likely effects of the works and to propose mitigation of any negative impacts. The locations of the proposed works are presented in the scheme design drawings in Appendix A.

The following important ecological receptors were considered in the design of the overall scheme, and in assessing its likely ecological effects:

- Sites with nature conservation designations, including proposed Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Natural Heritage Areas (pNHAs), the reasons for their designation, and their conservation objectives, where available;
- Annex IV (Habitats Directive) species of fauna and flora, and their breeding sites and resting places, which are strictly protected under the European Communities (Birds and Natural Habitats) Regulations, 2011;
- Other species of fauna and flora which are protected under the Wildlife Acts, 1976-2012;
- ‘Protected species and natural habitats’, as defined in the Environmental Liability Directive (2004/35/EC) and European Communities (Environmental Liability) Regulations, 2008, including:
 - Birds Directive – Annex I species and other regularly occurring migratory species, and their habitats (wherever they occur).
 - Habitats Directive – Annex I habitats, Annex II species and their habitats, and Annex IV species and their breeding sites and resting places (wherever they occur).
- Other habitats of ecological value in a national to local context, including water courses in the general area;
- Stepping stones and ecological corridors including nature conservation sites (other than Natura 2000 sites) encapsulated by Article 10 of the Habitats Directive. Such features are those which, by virtue of their linear and continuous structure such as rivers with their banks or the traditional systems for marking field boundaries or their function as stepping stones (such as ponds or small woods) are essential for the migration, dispersal and genetic exchange of wild species.

The aims of this Ecological Impact Assessment were to:

- Review baseline ecological data for works areas.
- Determine the ecological value of the habitats present.
- Assess the impact of the proposed works on any ecological features of value.
- Propose mitigation measures to reduce or prevent any negative impacts.
- Identify any residual impacts after mitigation.

7.2 Assessment Methodology

7.2.1 Guidance and Legislation

7.2.1.1 EU Habitats Directive

The “Habitats Directive” (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) is the main legislative instrument for the protection and conservation of biodiversity within the European Union and lists certain habitats and species that must be protected within wildlife conservation areas, considered to be important at a European as well as at a national level. A “Special Conservation Area” or SAC is a designation under the Habitats Directive. The Habitats Directive sets out the protocol for the protection and management of SACs.

The Directive sets out key elements of the system of protection including the requirement for “Appropriate Assessment” of plans and projects. The requirements for an Appropriate Assessment are set out in the EU Habitats Directive. Articles 6(3) and 6(4) of the Directive.

7.2.1.2 EU Birds Directive

The “Birds Directive” (Council Directive 79/409/EEC as codified by 2009/147/EC) provides for a network of sites in all member states to protect birds at their breeding, feeding, roosting and wintering areas.

This Directive identifies species that are rare, in danger of extinction or vulnerable to changes in habitat and which need protection (Annex I species). Appendix I of the Directive indicates Annex I bird species. A “Special Protection Area” or SPA, is a designation under The Birds Directive.

7.2.1.3 Appropriate Assessment

Special Areas of Conservation and Special Protection Areas form a pan-European network of protected sites known as Natura 2000 sites.

Article 6(3) of the Habitats Directive requires that any plan or project that is not directly connected with or necessary to the management of the Natura 2000 site concerned but is likely to have a significant effect on it, on its own or in combination with other plans and projects, is to be authorised only if it will not adversely affect the integrity of that site.

Screening for AA and, if screening indicates the need, AA itself, must be carried out and the assessment and conclusions recorded to ensure that existing and future plans or projects are authorised only if they will not adversely affect the integrity of a site. These safeguards are designed to ensure the conservation of Natura 2000 sites.

The core principal objectives of the Planning and Development (Amendment) Act 2010 envisage a closer alignment of the National Spatial Strategy with Regional Planning Guidelines, Development Plans and Local Area Plans, while also clarifying the key obligations required of Planning Authorities under the Birds and Habitats Directives.

A report for the purposes of AA Screening is presented in Appendix 7.1

7.2.1.4 Wildlife Acts 1976 – 2012

The primary domestic legislation providing for the protection of wildlife in general, and the control of some activities adversely impacting upon wildlife is the Wildlife Act of 1976. The aims of the Wildlife Act, according to the National Parks and Wildlife Service are “... to provide for the protection and conservation of wild fauna and flora, to conserve a representative sample of important ecosystems, to provide for the development and protection of game resources and to regulate their exploitation, and to provide the services necessary to accomplish such aims.” All bird species are protected under the Act. The Wildlife (amended) Act of 2000 amended the original Act to improve the effectiveness of the Act in order to achieve its aims.

7.2.2 Study Area

The project entails a Proposed Amendment to the Part 8 planning for the Dodder Flood Alleviation Works Phase 2C-2E which is currently under construction. This involves conversion of a proposed flood wall to a cycleway. The section in question runs along the river at the back of Old Wesley RFC, Bective LTC and Bective Rangers playing fields at Donnybrook from Anglesea Bridge to the corner of Herbert Park.

7.2.3 Site Visits

A site visit was undertaken on the 31st January 2017 by the project ecologist. The study area was traversed in all accessible areas up and down the river bank to survey for any flora present and in particular for signs of mammals such as badger and otters.

It is acknowledged that the survey was undertaken outside the optimum botanical period. However, the original survey carried out by the same ecologist did not reveal any rare or protected species in the same study area. However, the timing was suitable for surveying large mammals.

7.2.4 Categorisation of the Baseline Environment

This assessment identifies areas of designated nature conservation, including Special Areas of Conservation, (SACs), Special Protection Areas (SPAs), Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) within 15 km of the project site and identifies areas where rare or protected species of flora and fauna may occur within the study area. In addition, undesignated natural or semi-natural areas of biodiversity value are identified.

7.2.5 Impact Assessment Methodology

The assessment was carried out in three stages, firstly through desktop assessment to determine existing records in relation to habitats and species present in the study area. This included research on the National Parks and Wildlife Service (NPWS) website (www.npws.ie) the National Biodiversity Data Centre (NBDC) database (www.biodiversityireland.ie), BirdWatch Ireland (www.birdwatchireland.ie) and a literature review of published information on flora and fauna occurring in and adjacent to the development area.

The following resources assisted in the production of this section of the assessment:

- *Ordnance Survey Ireland maps;*
- *OSI, Google & Bing Aerial photography;*
- *National Biodiversity Data Centre data: <http://www.biodiversityireland.ie/>;*
- *National Parks and Wildlife Service (NPWS) Mapviewer: <http://www.npws.ie/en/MapsData/>*
 - Designated sites (SACs, SPAs, NHAs);
 - Records of protected species from 10km squares; and
 - Species related publications.

Other environmental information for the area was reviewed, e.g. in relation to hydrology and hydrogeology. Interactions in terms of the chapters on these topics presented in the overall project Environmental Report were important in the determination of source vector pathways and links with potentially hydrogeologically connected areas outside the proposed scheme site.

The second phase of the assessment involved site visits to establish the existing environment in the footprint of the proposed scheme.

Areas which are highlighted during the desktop assessment were investigated in closer detail according to the Heritage Council Publication *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al.*, 2011) which is the agreed national methodology.

Flora and habitats at the site of the proposed scheme were classified according to the Heritage Council publication ‘*A Guide to Habitats in Ireland*’ (Fossitt, 2000). This publication sets out a standard scheme for identifying, describing and classifying wildlife habitats in Ireland according to a hierarchical framework, with Level One habitats representing broad habitat groups, Level Two representing habitat sub-groups and Level Three representing individual habitat types.

The Habitat Survey focused on identifying habitats to Level Three of the *Guide to Habitats in Ireland*. The annotation of vegetation occurring within sites was undertaken using the DAFOR scale. This scale refers to plant species in terms of dominance, abundance, frequency, occasional and rare (DAFOR). Species recorded in this report are given in both their Latin and English names. Latin names for plant species follow the nomenclature of Webb's "An Irish Flora" (Parnell & Curtis, 2012).

Fauna were surveyed in the context of direct and indirect disturbance effects, especially for mammals and birds. Any mammalian fauna, their tracks etc. observed during the visit were identified, and the potential value of the site to mammals was assessed in terms of potential disturbance, loss of feeding, resting/roosting or breeding habitat.

Birds present on site were recorded while undertaking habitat surveys. Species descriptions are based on BirdWatch Ireland data (www.birdwatchireland.ie/IrelandsBirds) and the Collins Bird Guide App.

Amphibians, reptiles and invertebrates if present were recorded as casual observations.

The final part of the assessment involves an evaluation of the proposed scheme area and determination of the potential impacts of the proposed scheme on the flora and fauna of the area. Habitat evaluation is based on the Institute of Ecology and Environmental Management's *Guidelines for Ecological Impact Assessment* (2006) according to the Natura Scheme for evaluating ecological sites (after Nairn & Fossitt, 2004). Judgments on the evaluation are made using geographic frames of reference, e.g. European, National, Regional or Local.

This part of the assessment forms the basis for impact assessment and is based on the following guidelines and publications:

- *Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities* (DEHLG, December 2009, Rev 2010);
- Fossitt, J. (2000) *A Guide to Habitats in Ireland*. The Heritage Council;
- *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al.*, 2011);

The assessment has also had regard to the EPA Guidelines and Advise Notes on EIS, as described in Section 1.5 of this report.

The EPA set out a system of impact assessment and rating of significance in Section 3.7.7 of the draft EIS Guidelines (EPA, 2015a).

7.3 Baseline Environment

7.3.1 Designated Conservation Areas

There are no designated conservation areas on the site of the proposed scheme. The nearest designated areas with biological connectivity include the Grand Canal pNHA at Grand Canal Dock and Natura 2000 sites located in Dublin Bay, see **Figure 7.1**.

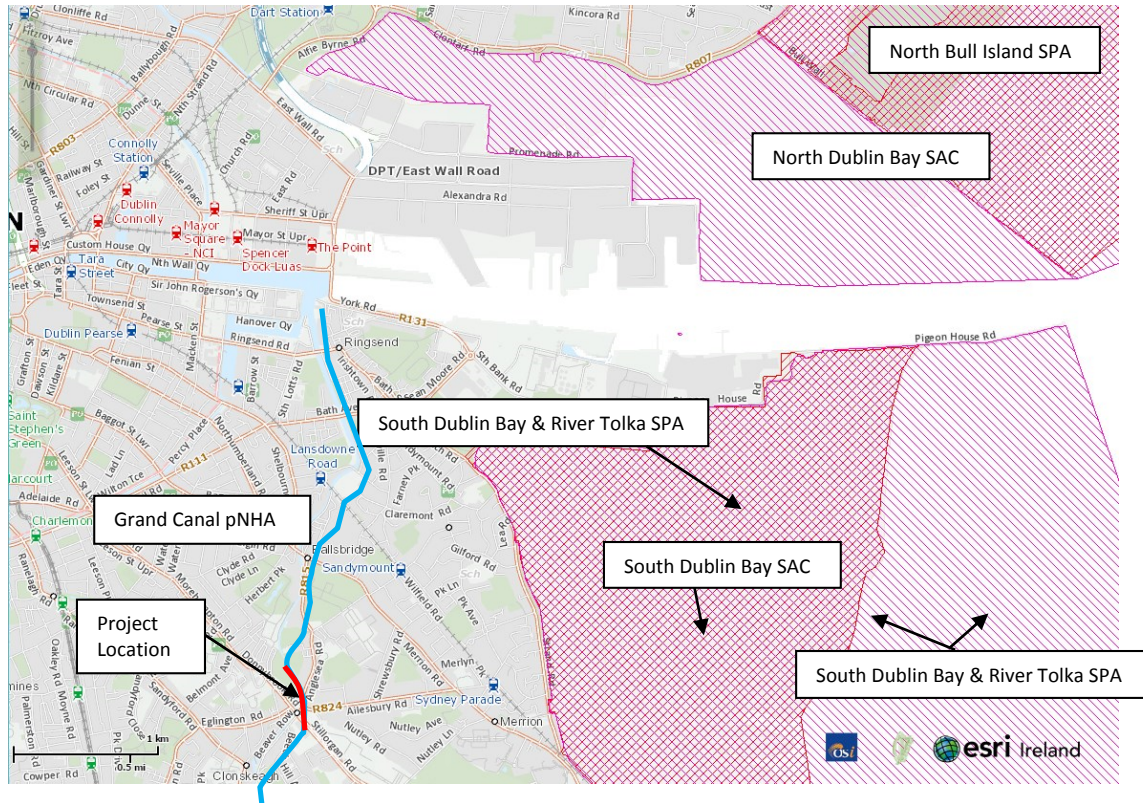


Figure 7.1: Site Location at in relation to the downstream Natura 2000 sites.

The Dodder River discharges into the River Liffey approximately 2.6 km upstream of the aquatic boundary of the South Dublin Bay and River Tolka SPA (Site Code 004024). In addition, the project has potential biological connectivity with a number of other inter-designated sites.

A detailed assessment of these sites for the purposes of Appropriate Assessment Screening is presented in Appendix 7.1.

7.3.2 Undesignated Habitats

The bank of the river was accessed through the OPW construction compound at the corner of Herbert Park and access gate at the end of Eglinton Tce. to the rear Old Wesley RFC, Bective LTC and Bective Rangers FC and the river bank was surveyed in that order starting at Anglesea Bridge.

The bank is densely colonised by Hedge Mustard (*Sisymbrium officinale*), Rapeseed (*Brassica napus*) and Smooth sow thistle (*Sonchus oleraceus*). Dock (*Rumex obtusifolius*, *crispus*), Nettle (*Urtica dioica*), Cleavers (*Galium aparine*), Alexanders (*Smyrniolum olusatrum*), Cow parsley (*Anthriscus sylvestris*) and Hemlock water dropwort (*Oenanthe crocata*) were all present along the bank. Winter heliotrope (*Petasites fragrans*) is abundant and ubiquitous in the survey area.

The broader part of the bank downstream of Anglesea Bridge is colonised by abundant Winter heliotrope, Alexanders, Cleavers and Ivy (*Hedera helix*). The bank in this area has been modified several times in terms of local development and there are patches of disturbed ground which have recolonised with Ivy predominating.

The upper bank presents more wood like understorey with abundant Ivy, Nettle and Bramble patches (*Rubus fruticosus* agg.). The lower bank is regularly accessed for fishing and a rough lean-to has been erected near the water's edge in this area. There are some unusual species present at the water's edge, e.g. Daffodil and Wild oat (*Avena fatua*) having been washed down from further upstream.

The area to the rear of the tennis court presents the same species with more ruderal species occupying the upper bank, including; Annual wall rocket (*Diplotaxis muralis*), Nipplewort (*Lapsana communis*), Sow thistle (*Sonchus oleraceus*), Willow-herb (*Epilobium hirsutum*). Hogweed (*Heracleum sphondylium*) was recorded as occasional on the bank and Figwort (*Scropularia nodosa*) was recorded by the water's edge.

To the rear of the football pitch the upper bank area presents a similar species composition along a raised earth bank which has been placed since the previous fieldwork was carried out in May 2012. The lower bank is colonised by several outcrops of Butterfly bush (*Buddleja davidii*). Cleavers were more abundant in this area and Ragwort (*Senecio jacobaea*) was recorded as occasional.

7.3.3 Fauna

7.3.3.1 Invertebrates, Amphibians and Fish

Invertebrates

Butterflies included in the River Dodder Habitat Management Plan (Tubridy *et al.*, 2007) include several Holly Blue and Large White butterflies seen in and around Herbert Park. Other species recorded by the Dublin Naturalists' Field Club include Speckled Wood in Herbert Park and Holly Blue at Ballsbridge and Red Admiral at Donnybrook.

Amphibians

Common frogs (*Rana temporaria*) are protected under the Wildlife Acts. No adult amphibians, spawn or larvae were observed during field surveys. As water is fast flowing and prone to variable levels, it is possible that the study area may be suitable for adults, but not for spawning or tadpoles.

Fish

Atlantic salmon are listed on Annex II of the EU Habitats Directive, and are protected under national legislation as an important fisheries resource. They are vulnerable to pollution and morphological disturbance of rivers, and of sedimentation of spawning beds (which are often in gravelly river beds).

In a major study in 1998 (in Tubridy *et al.*, 2007) characterised the fishery in the Dodder, as primarily a brown trout fishery with numbers supplemented with stockable catchable fish. They concluded that the survival of the wild stocks is dependent on the conservation of spawning streams such as the Owendoher, Churchtown and Upper Dodder. This paper stated that sea trout run in the lower river as far as Beaver Row.

Other fish which occur include eel, minnow, stone loach and stickleback. Local information confirmed that the River Dodder is still a good brown trout fishery. The occasional presence of salmon as far upstream as Ballsbridge, and sea trout as far as Beaver Row is also noted.

The Dodder Anglers and Inland Fisheries Ireland stock the river with trout specimens ranging in weight from 4 oz to over 1 lb. In December 2006, the Dodder was stocked at locations from Tallaght all the way to Clonskeagh with 2,300 juvenile trout (www.fishingireland.net).

The best of the brown trout fishing is between Old Bawn in Tallaght and Ballsbridge. The best of the sea trout fishing is to be found downstream of Ballsbridge. In the tidal area near Ringsend mullet is fished. The river is a public fishery and thus fishing is available to all under a license from the Dodder Anglers.

Tubridy *et al.*, 2007 reports that no improvement works to improve in stream habitats for salmonids were planned in 2007, as it was considered that the river has such a fast flow that the gravel is constantly on the move. Action was however taken to improve the structure of the river was the insertion of large boulders, near Ballsbridge.

Lamprey

All three Irish lamprey species are listed on Annex II of the European Union Habitats Directive (92/43/EEC). The presence of lamprey in the Dodder is shown in NPWS data sets. Kruz and Costello (in Tubridy *et al.*, 2007), reported that Brook Lamprey (*Lampetra planeri*) was observed in the River Dodder by Dr Evelyn Moorkens and by Dr Michael Kennedy. The record from Moorkens comes from a section of the middle Dodder (probably outside the city section) while the Kennedy record most likely comes from the Little Dargle tributary. Both these records referred to adult lamprey. Older records from lamprey in the Dodder indicate that the River Lamprey (*Lampetra fluviatilis*) occurred in the River Dodder in 1889 (loc. cit.).

Consultation on lamprey distribution in 2007 with Jim O'Brien of the Eastern Regional Fisheries Board, Redmond O'Hanlon of the Dodder Anglers, Dr Julian Reynolds and Dr. Ken Whelan of the Marine Institute resulted in scepticism that lamprey are present in the city section due to the very fast current, unsuitability of sediments and presence of weirs.

However, none of these consultees could be certain in 2007. The potential presence of lamprey is significant as these species are protected under the Habitats Directive. Lamprey was to be surveyed during the present assessment; however, water levels were too turbulent at the time of surveying habitats to enter the river.

7.3.3.2 Mammals

Bats

The River Dodder Habitat Management Plan 2007 (RDHMP) bat survey recorded six bat species commuting and/or foraging within the overall flood alleviation works area.

A bat detector survey was carried out on May 2nd 2012 as part of the environmental survey at Smurfit Weir paying particular attention to the retaining wall at the cottages and in the vicinity of Ballsbridge itself and along Beatty's Avenue from Ballsbridge to Lansdowne Railway Bridge. Common Pipistrelles were again recorded downstream along the walkway adjacent to Herbert Park.

Otters

Otters are protected under Annex II of the Habitats Directive and their resting place is fully protected and any interference with a holt or access to it is prohibited except under an EU derogation. Hamilton and Rochford (2000) in a Heritage Council funded study surveyed water sampling stations for otter (in Tubridy et al., 2007). Signs of otter were found in the city sections of the Dodder.

No holts or signs were observed in the present survey. Anecdotal evidence for a holt observed near Smurfit Weir referred to an area upstream of the weir near Clonskeagh Bridge.

There have been several recent sightings of a family of three otters reported on the Dodder Action Facebook page (Winter 2016/2017) between Clonskeagh and Milltown and adjacent to the Milltown cycleway.

An otter holt was installed adjacent to the Aviva Stadium and downstream of Newbridge as part of previous construction works. A male, female and juvenile were observed in this area in 2011.

There was one small burrow low on the riverbank opposite the end of the football pitch. It appeared shallow with crossing tree roots and could have been created by scouring by the river or by a smaller mammal such as a rat or possibly started and abandoned by a mink which have been recorded further upstream on the river.

Badgers

Badgers are protected under the Wildlife Act 1976 (as amended 2000). No setts were observed in the study area. Badgers are present on the land of the upper bank opposite the present survey area and will not be affected by the Proposed Amendment to works.

Foxes

Urban foxes are very common in Dublin and are found throughout the city and suburbs. There are not afforded protection under the law. The fox den or "earth" is usually a hole in the ground beneath rocks or tree roots. In Ireland mating is in January and the first half of February, the young being born from late February to the end of March. Cubs are practically full-grown in seven months.

The watercourse is an essential part of this corridor for fish and otter. Without the river wetland birds and bat species such as Daubenton's bat would be absent. Common bat and bird species would be present in lower numbers in the inner city.

7.4.3 Direct Impacts

7.4.3.1 Construction Phase

Habitats & Flora

Machinery working immediately adjacent to the river bank will cause disturbance of the bank as well as works associated with replacement of new river walls. There will be a temporary loss of vegetation which is considered a low local neutral impact.

Invertebrates

There is low potential for direct impact on invertebrates.

Amphibians

Frogs were not recorded in the study area and will not be affected by the proposed works.

Fish

Of the fish recorded in the River Dodder, salmonids including sea trout, brown trout and occasional salmon and lamprey are of greatest concern with regard to potential impacts. The movement of machinery in the river and the creation of temporary working banks have the potential to impact fish species through direct mortality, disturbance and reduction of water quality. While the presence of lamprey in the lower river section is uncertain, any direct impact would be significant and as such precautionary measures for the avoidance of direct impact and fish mortality are included in the existing Construction Management Plan.

Bats

The removal of bankside vegetation on the study area is almost complete and there is no predicted impact on bats from the Proposed Amendment.

Otters

Otters or signs of otters were not observed in the study area. Desktop assessment returned records from upstream of Smurfit Weir. Potential impacts are considered under indirect impacts below.

Badgers

Badgers were not recorded in the study area.

Foxes

There will be a temporary disturbance to foxes foraging along the river banks where bankside works are required. The works are unlikely to affect their survival.

Birds

Disturbance from construction noise is likely to have a short-term neutral impact on birds in the immediate area of the site works.

7.4.3.2 Indirect Impacts

Water Quality & Aquatic Fauna

Any significant deterioration in water quality that would affect the River Liffey and downstream Natura 2000 sites in Dublin Bay could be considered significant. Indirect impacts from upstream disturbance have implications for aquatic species such as Otters, Lamprey and Salmonids. Mortality or loss of habitat due to a reduction in water quality or a pollution event could be considered as significant negative impacts. However, the proposed measures outlined in the CFRMP Appropriate Assessment Report will avoid indirect impacts on downstream European sites.

7.5 Mitigation Measures

A detailed construction method statement will be prepared by the construction contractor which appreciates the ecological value of the River Dodder. The construction method statement outlines the ecological value of the River Dodder as an ecological corridor and will include the following avoidance and remedial measures.

7.5.1 Construction Phase General

The following general mitigation measures will be implemented during the construction phase:

- The Construction Method Statement will be approved and signed by Site Construction engineer and read by Site Foreman.
- The Works Team will be inducted on the ecological considerations listed in the Construction Method Statement by the Site Foreman and a signed copy will be submitted to the District Conservation Officer of the NPWS.
- Impacts on breeding birds will be avoided by carrying out tree felling and hedge cutting outside the breeding season March 1st to August 31st. Tree felling and hedge cutting inside this period is illegal except where there is overriding reasons for an exemption including health and safety or projects of major human concern such as national or regional infrastructure.
- If vegetation removal is required and approved within the breeding season, trees should be examined prior to felling by a suitable qualified ecologist for birds and bats. Birds' nests can only be intentionally destroyed under licence issued under the Wildlife Acts. In order to apply for any such licenses or derogations as mentioned by the NPWS in their response to scoping, a detailed survey should be submitted to NPWS which should be carried out by appropriately qualified person/s.

Nash, D., Boyd, T. and D. Hardiman. 2012. Ireland's Butterflies; A Review. The Dublin Naturalists' Field Club.

Nairn, R. and J. Fossitt (2004) *The Ecological Impacts of Roads, and an Approach to their Assessment for National Road Schemes*. In: J. Davenport and J.L Davenport (eds) *The Effects of Human Transport on Ecosystems: Cars and Planes, Boats and Trains*, 98-114. Dublin. Royal Irish Academy.

Parnell, J. and T. Curtis (2012) *Webb's An Irish Flora*. Cork University Press.

Smith, G.F., O'Donoghue, P., O'Hora, K. and E. Delaney (2011) *Best Practice Guidance for Habitat Survey and Mapping*. The Heritage Council.

Tubridy, M. & Associates. 2007. River Dodder Habitat Management Plan. Report to Dublin City Council.

8 Hydrology

8.1 Introduction

This chapter provides a description of the existing hydrological environment and a statement of the likely significant hydrological impacts associated with both the construction and operational phases of the Proposed Amendment to the Dodder Flood Alleviation Works Phase 2C-2E. Measures to mitigate the likely significant impacts are outlined, and residual impacts are described.

8.2 Assessment Methodology

8.2.1 Environmental Guidance

This section of the environmental report was prepared in accordance with the EPA Guidelines and Advice Notes on EIS, as described in Section 1.5 of this report.

Other reference documents used in the preparation of this assessment include the following:

- Transport Infrastructure Ireland (TII) Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA).
- Pollution Prevention Guidelines developed by the Environment Agency (EA), the Scottish Environmental Protection Agency (SEPA) and the Northern Ireland Environment Agency (NIEA).

While this act has also largely been superseded by the 2009 Regulations, current impact assessment and monitoring methodologies must still be cognisant of this legislation.

8.2.3 Water Quality Assessment

The assessment of water quality for the Proposed Amendment to the Dodder Flood Alleviation Works Phase 2C-2E is a desk-top study examining water quality data gathered by the EPA and Dublin City Council compared to relevant water quality standards and guidance.

The ecological quality of Irish rivers is assessed, using a biotic index scheme (known as the Quality Rating System (Q-value), developed by the EPA and its predecessor organisations, An Foras Forbartha and the Environmental Research Unit, since 1971. A summary of the biotic indices and quality classes used in this system is provided in **Table 8.1**. In addition, **Table 8.2** describes in detail the classification system combined with the Biological Quality Q-Ratings, basic physico-chemical water quality, the status of the ecosystem and the human value associated with surface water systems.

Table 8.1: River and Stream Water Quality Classes

Biotic Indices	Community Diversity	Quality Status	Condition
Q5	High	Good	Satisfactory
Q4	Reduced	Fair	Satisfactory
Q3	Low	Doubtful	Unsatisfactory
Q2	Very Low	Poor	Unsatisfactory
Q1	Little/None	Bad	Unsatisfactory
Where:			
'Condition' refers to the likelihood of interference with beneficial or potential beneficial uses.			
The intermediate values (Q1-2, 2-3, 3-4 etc.) below denote transitional conditions.			
Biotic Indices	Quality Status	Quality Class	
Q5, Q4-5, Q4	Unpolluted	Class A	
Q3-4	Slightly polluted	Class B	
Q3, Q2-3	Moderately polluted	Class C	
Q2, Q1-2, Q1	Seriously polluted	Class D	

Where:

Biotic indices or Quality (Q) value indicates specified groups of macroinvertebrates sensitivity to pollution, with:

Q5 = Mostly pollution sensitive, a few to numerous less pollution sensitive, a few pollution tolerant, and no very pollution tolerant or most pollution tolerant macro-invertebrate species.

Q4 = At least one pollution sensitive, few to numerous less pollution sensitive, numerous pollution tolerant, and a few or no very pollution tolerant or mostly tolerant macro-invertebrate species.

Q3 = No pollution sensitive, few or no less pollution sensitive, dominant in pollution tolerant, a few to common in very pollution tolerant, and few or no most pollution tolerant macro-invertebrate species.

Q2 = No pollution sensitive or less sensitive, few or no pollution tolerant, dominant in very pollution tolerant, and few to common in most pollution tolerant macro-invertebrate species.

Q1 = No pollution sensitive, less sensitive, and pollution tolerant, a few to no very pollution tolerant, and dominant in most pollution tolerant macroinvertebrate species.

Where a toxic effect is apparent or suspected, the suffix 0 is added to the biotic indices, for example Q2/0.

In summary, quality classes relate to the potential beneficial use of a water body, with:

A = Highest water quality, suitable for abstraction, game fisheries, very high amenity value, orthophosphate ~ 0.015 mg P/L, dissolved oxygen close to 100%, maximum BOD is < 3mg/L.

B = Variable water quality, potential problems for abstraction, game fish at risk, considerable amenity value, orthophosphate ~ 0.045 mg P/L, dissolved oxygen <80% to >120%, maximum BOD is occasionally elevated.

C = Doubtful water quality, advanced treatment of abstracted water, coarse fisheries, reduced amenity value, orthophosphate ~ 0.070 mg P/L, dissolved oxygen is very unstable with potential fish kills, maximum BOD is high at times.

D = Poor to bad water quality, low grade to limited abstraction, fish usually absent, low or no amenity, orthophosphate >0.1 mg P/L, dissolved oxygen is low to zero, maximum BOD is usually high to very high.

Table 8.2: General Characteristics of the various Biological Quality Classes (DRA, 2006)

Quality Classes	Class A		Class B	Class C	Class D	
Quality Ratings	Q5	Q4	Q3-4	Q3	Q2	Q1
Pollution Status	Pristine, unpolluted	Unpolluted	Slight Pollution	Moderate Pollution	Heavy Pollution	Gross Pollution
Organic Waste Load	None	None	Light	Considerable	Heavy	Excessive
Maximum BOD	Low (< 3 mg/l)	Low (< 3 mg/l)	Often elevated	High at times	Usually high	Usually very high
Dissolved Oxygen	Close to 100%	80%-120%	<80% to >120%	Very unstable.	Low to zero	Very low or zero
Annual Median ortho-Phosphate	~0.015 mg P/l	~0.030 mg P/l	~0.045 mg P/l	~0.070 mg P/l	usually > 0.1 mg P/l	usually > 0.1 mg P/l
Siltation	None	May be light	May be light	May be considerable	Usually heavy	Usually v. heavy and anaerobic
'Sewage Fungus'	Never	Never	Never	May be some	Usually abundant	May be abundant
Filamentous Algae	Limited Development	Diverse communities	Cladophora may be abundant	Cladophora may be excessive	May be abundant	Usually none

Macrophytes	Good delivery	Considerable growths	Reduced diversity Luxuriant growths	Limited diversity Excessive growths	Tolerant species only. May be abundant.	Usually none or tolerant species only.
Macroinvertebrates (from shallow riffles)	Diverse communities. Normal density. Sensitive forms usually numerous.	High diversity. Increased density. Sensitive forms scarce or common.	Very high diversity. Very high density. Sensitive forms scarce.	Sensitive forms absent. Tolerant forms common. Low diversity.	Tolerant forms only. Very low diversity.	Most tolerant forms. Minimal diversity.
Water Quality	Highest quality	Fair quality	Variable quality	Doubtful quality	Poor quality	Bad quality
Abstraction Potential	Suitable for all	Suitable for all	Potential problems	Advanced treatment	Low grade abstractions	Extremely limited
Fishery Potential	Game fisheries	Good game fisheries	Game fish at risk	Coarse fisheries	Fish usually absent	Fish absent
Amenity Value	Very high	High	Considerable	Reduced	Low	Zero
Condition	Satisfactory	Satisfactory	Transitional	Unsatisfactory	Unsatisfactory	Unsatisfactory

In 2006, this scheme was intercalibrated and applied as the metric for ascribing Ecological Quality Ratios (EQRs) for the benthic invertebrate fauna element in the Operational river-monitoring programme under the Water Framework Directive (WFD). When the EQR is derived from the Q-value the site is assigned to one of five ecological status classes ranging from High to Bad. **Table 8.3** provides detail on the relationship between Q-values, EQRs' and the WFD classes.

Table 8.3: Relationship between Q-Values, EQR's and WFD Classes (EPA, 2009)

Quality Rating System (Q-Value)	Ecological Quality Ration (EQR)	WFD Ecological Status
5	1.0	High
4-5	0.9	High
4	0.8	Good
3-4	0.7	Moderate
3	0.6	Poor
2-3	0.5	Poor
2	0.4	Bad
1-2	0.3	Bad
1	0.2	Bad

8.2.4 Existing Hydrological Environment Categorisation

Characterisation of surface water systems is based on the identification of features of the baseline hydrological environment that are relevant and can be assigned a functional value. The functional value of each of these features is compiled through the relevance of three factors: the importance of the feature, the sensitivity of the feature and the existing adverse pressures affecting the feature. The assignment of functional values is also cognisant of technical standards, regulations and relevant legislation.

8.2.4.1 Importance

Surface water systems act as resources for both aquatic and terrestrial ecosystems and are an essential factor to sustain human life. Surface water floodplains can also act as a reserve or store for floodwaters during times of significant flooding and this can prevent floodwaters from impacting farther downstream.

The Q-value reflects impacts from surface water run-off (including run-off from agricultural land which may contain nutrients and run-off from roads and buildings which may contain solids, hydrocarbons and heavy metals). The existing pressures are also apparent in the physico-chemical status of the surface water feature with both organic and inorganic pollutants altering the physico-chemical status.

8.2.4.4 Functional Value

The functional value of the existing hydrological environment is evaluated through the assessment of surface water criteria and the importance and sensitivity of the surface water features. The surface water criteria are described below.

8.2.4.5 Impact Assessment

The source and type of all potential impacts is described in **Section 8.4**. The criteria and durations used to assess the different impacts associated with the project are shown in **Table 8.5** and **Table 8.6**. The criteria have been defined in accordance with the aforementioned EPA and TII Guidelines.

Table 8.5: Criteria for Assessment of Hydrological Impact Magnitude Criteria Impact

Criteria	Impact Magnitude
<ul style="list-style-type: none"> Long-term to permanent change to a designated conservation site or designated salmonid river. Medium-term to permanent contamination of surface water over entire surface water catchment. Medium-term to permanent potential changes in drainage patterns over entire catchment. 	Profound
<ul style="list-style-type: none"> Medium term change to a designated conservation site or a designated salmonid river. Temporary to short-term contamination of surface water over entire surface water catchment. Temporary to short 	Significant
<ul style="list-style-type: none"> Temporary to short-term change to a designated conservation site or a designated salmonid river. Medium to long-term contamination of local surface water. Medium to long-term potential changes in local drainage patterns. 	Noticeable
<ul style="list-style-type: none"> Short-term contamination of local surface water. Short term potential changes in local drainage patterns. 	Slight
<ul style="list-style-type: none"> Temporary contamination of local surface water. Temporary potential changes in local drainage patterns. 	Imperceptible

The catchment covers a total area of 12,080 ha.

The River Dodder flows from its source in a North Westerly direction. From Old Bawn in Tallaght it changes course to flow from to a North Easterly direction. It flows through Milltown, Donnybrook and Ballsbridge and enters the River Liffey Estuary at Ringsend. The first 7.6km of the River has a gradient of 1 in 16 with the lower reaches having a gradient of 1 in 120.

The Bohernabreena reservoirs are located in the Upper reaches of the River at an elevation of 180mOD approximately. Of the total river catchment approximately 28km² drains to the reservoirs. The Upper Reservoir provides water supply to Dublin.

The remaining 92.8km² of the catchment drains directly to the River Dodder downstream of the lower reservoir spillway.

There are five main tributaries whose sub-catchments drain into the River Dodder as follows:

- the Dundrum Slang;
- the Little Dargle;
- the Owendoher;
- the Tallaght Streams.

The River is tidal up to Ballsbridge. The Upper Catchment flows through bog, forestry and agricultural lands, while the Lower reaches flow predominantly through residential and commercial areas and parkland.

8.3.2.1 Monitoring

As part of the Eastern River Basin District programme the River Dodder is monitored at Milltown Bridge and the footbridge at Beaver Row, Donnybrook.

Water quality monitoring is carried out by Dublin City Council's Central Laboratory upstream of Clonskeagh Bridge and at Ballsbridge.

These stations are sampled at least once a month for Ammonia, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), coliforms, conductivity, dissolved oxygen, E. coli, nitrate, nitrite, pH, phosphorous, suspended solids, temperature and total organic nitrogen.

8.3.2.2 Discharge Points

There are approximately seven open facilities with Integrated Pollution Control/Industrial Emissions (IPC/IE) licences permitted to discharge into the watercourses of the Dodder Catchment. There are also 13 combined sewer overflows (CSOs) as well as possible misconceptions discharging into the Dodder catchment. Of these, no facilities with IPC/IE licences and six CSOs discharge into the River where the proposed scheme would take place. All discharge points to the River will be maintained during construction of the scheme.

Flap valves would be installed along the length of the scheme at each discharge point as a flood mitigation measure.

8.3.2.3 Eastern River Basin District (ERBD) Characterisation Report

The ERBD Characterisation Report classifies the main River Dodder as overall “at risk” status. The lower reaches are considered to be at risk from a number of sources including morphological, diffuse and point source risks. In addition, the Lower River Dodder is the only River in Hydrometric Area 09 to be considered at risk from hydrological pressures i.e. abstraction.

8.3.3 Biological Water Quality

The EPA measures water quality at six stations along the River Dodder. Results from 1998 to the most recent tests in 2010 are shown in Table 8.7.

Table 8.7: EPA water quality monitoring data

Monitoring Station No.	Location	Biological Quality Rating (Q Value)				
		1998	2002	2005	2007	2010
09D010010	1.3 km u/s Reservoir u/s distributary	5	5	4	-	4
09D010100	U/s Piperstown Stream	4-5	4	4-5	4	3-4
09D010300	Old Bawn Bridge	4	3-4	3-4	4	4
09D010620	Br on Springfield Ave	3	3	3	3-4	3
09D010800	Milltown Bridge	3	3	3	-	3-4
09D010900	Footbridge Beaver Row				3	4

The last EPA Water Quality Survey published is from 2010. According to the EPA, ecological status continued to be good in the upper reaches (monitoring Stations 09D00010, 09D00100 & 09D00300) of the Dodder in 2010.

Water quality deteriorates however when the River enters the city. In 2010, there was a minor improvement at Milltown (09D010800) and a significant improvement to Good status at the Beaver Row Footbridge in Donnybrook (09D010900) indicating recent commitment to Good water quality status has resulted in improved water quality.

8.3.4 Physico-chemical Water Quality

Water quality monitoring is carried out by Dublin City Council's Central Laboratory upstream of Clonskeagh Bridge, at Ballsbridge and at the Footbridge on Beaver Row. **Table 8.8** shows the results from Q1 2012. The River has an adequate status of physico-chemical water quality.

Table 8.8: Dodder River Physico-Chemical Quality Data (Q1, 2012)

Parameter	Unit	Surface Water Sampling Stations		
		U/s of Clonskeagh Bridge	Ballsbridge	Footbridge, Beaver Row
pH		8.2	8.1	8.2
Conductivity	µS/cm	304	366	304
Total Suspended Solids	mg/l	<10	<10	-
Biological Oxygen Demand	mg/l	<2	<2	<2
Chemical Oxygen Demand	mg/l	14.67	15.67	-
Dissolved Oxygen	%	102	100	102
Ammonia	mg/l as N	≤0.05	≤0.05	≤0.04
Nitrate	mg/l as N	1.27	1.18	1.23
Nitrite	mg/l as N	0.01	0.01	0.01
Phosphorous	mg/l as P	<0.03	≤0.04	<0.03
Total Coliforms	No./100ml	9062	7820	-
E Coli	No./100ml	1592	1277	-

8.3.5 Aquatic Ecology

Protected species within the River Dodder include atlantic salmon and lamprey. The quality of water in the River Dodder is linked to those species dependant on good or high quality water such as salmonids, lamprey and otter. A full ecological impact assessment of the proposed scheme is included in Chapter 7, Biodiversity. The River Dodder can be described as having a high aquatic ecology value.

8.4.2.2 Bankside Works

No further mitigation measures are proposed with regards the Proposed Amendment.

8.4.2.3 Instream Works

No further mitigation measures are proposed with regards the Proposed Amendment.

8.4.3 Residual Impacts

The residual impacts from the proposed works is negligible providing the above mitigation is implemented.

9 Soils, Geology and Hydrogeology

9.1 Introduction

This chapter provides a description of the existing soils, geology and hydrogeology environment, and a statement of the likely soils, geology and hydrogeology impacts associated with the Proposed Scheme Mitigation measures are proposed and residual impacts are described.

9.2 Assessment Methodology

The chapter has been prepared in accordance with the following guidelines:

- Geology in Environmental Impact Statements – a Guide. Institute of Geologists of Ireland, 2002.
- Environmental Impact Assessment of National Road Schemes – A Practical Guide. TII, 2009.
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII, 2009).

The assessment has also had regard to the EPA Guidelines and Advise Notes on EIS, as described in Section 1.5 of this report.

The following site investigations were undertaken on the River Dodder, the findings of which have been taken into account in this assessment:

- S.I. Ltd (2010). Site Investigation for the Proposed River Dodder Flood Alleviation Scheme (Phase 2B Advanced Works), Dublin, Report No. 4972.

The vulnerability is determined by the permeability and the attenuation capacity of any overlying deposits. For example, bedrock with a thick, low permeability, clay-rich overburden is less vulnerable than bedrock with a thin, high permeability, gravelly overburden. The vulnerability of the aquifer directly beneath the site is classified by the GSI as having ‘High to Low’ vulnerability. This indicates that only an interim study of the vulnerability in the area has taken place. However the vulnerability is noted as “Extreme (X) -Rock near surface or Karst” at Beaver Row Donnybrook where calc limestone outcrops.

The criteria for determining groundwater vulnerability, as developed by the GSI, are shown in **Table 9.1** below. The Extreme vulnerability class is further subdivided into Extreme (X) – rock near Surface or Karst and Extreme (E) – subsoils <3m thick.

Table 9.1: GSI Groundwater Vulnerability Mapping Guidelines (DoEHLG 1999)

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) & Thickness			Unsaturated Zone	Karst Features
	High Permeability (sand/gravel)	Moderate permeability (e.g. sandy subsoil)	Low permeability (e.g. clayey subsoil, clay, peat)	(sand/gravel aquifers only)	(<30m radius)
Extreme (E)	0 – 3.0m	0 – 3.0m	0 – 3.0m	0 – 3.0m	-
High (H)	>3.0m	3.0 – 10.0m	3.0 – 5.0m	>3.0m	N/A
Moderate (M)	N/A	>10.0m	5.0 – 10.0m	N/A	N/A
Low (L)	N/A	N/A	>10.0m	N/A	N/A

Notes: (1) N/A = not applicable

(2) Precise permeability values cannot be given at present

(3) Release point of contaminants is assumed to be 1-2m below ground surface

The Geological Survey of Ireland (GSI) denotes the region along the length of the River Dodder as a locally important aquifer, bedrock which is moderately productive in local zones.

The vulnerability of all aquifer units is High to Low from Lansdowne bridge to Anglesea Bridge which indicates that only an interim study took place.

9.4 Proposed Scheme

The site is located in an urban area and is bounded by sports grounds to the West and residential gardens to the East. The site is located to the North of Anglesea Road Bridge. Refer to **Chapter 3 Background and Project Description** for a detailed description of the proposed scheme. Proposed works include:

- Earthworks including excavation for foundations and piling;
- Bored piling, reinforcement and concreting of piles;
- Installation of wall, cladding, cycle path/ footpath surfaces and “street” furniture; and

- Installation of drainage system, fencing and planting.

9.5 Predicted Impacts

There are a number of elements associated with the construction of the proposed scheme which have the potential to impact on the environment with respect to soils, geology and hydrogeology. These are outlined in the following sections.

9.5.1 Soils and Geology

- Excavated soils (predominantly made ground but some natural ground may be encountered) can be disturbed and eroded by vehicular activity during the construction. Winds and heavy precipitation can also impact on non-vegetated areas (e.g. stockpiles) resulting in soil disturbance, which can enter water bodies as runoff and/or be dispersed as dust.
- The soil quality within and around the proposed scheme may be at risk, during construction from contamination from wastewater or hydrocarbon spills, accidents, chemical and residue spillages.
- Invasive plant species in the form of Japanese Knotweed has been identified within the study area. Earthworks associated with the scheme may result in the mobilisation of invasive species. Excavated material containing invasive species require removal from site to an appropriately regulated waste facility.
- The diversion of existing utilities will require the excavation of soil but this is likely to be restricted to the shallow subsoil and in most cases to made ground although some locally deep services may exist.
- In urban areas there is the possibility that contaminated soil may be encountered during excavation.

The use of piling is a discreet construction method. Limited spoil waste is generated from piling. Typically environmental impacts from piling are lower than traditional excavation methods. The potential impact in terms of soils and geology prior to implementation of mitigation is considered to be small and adverse.

9.5.2 Hydrogeology

- The groundwater quality within and around the proposed scheme may be at risk, during construction from contamination from wastewater or hydrocarbon spills, accidents, chemical and residue spillages.
- The Dodder Catchment CFRAM Study notes that high groundwater levels are not a significant source of flood hazard in the Dodder Catchment.

The potential impact in terms of hydrogeology prior to implementation of mitigation is considered to be small and adverse.

9.6 Mitigation Measures

9.6.1 Construction Phase

9.6.1.1 Soils and Geology

The following mitigation measures are proposed:

- As part of the Dodder Flood Alleviation Works Phase 2C-2E the minimum amount of soil and rock will be excavated.
- Sloped surfaces, in particular on embankments and River banks will be designed with adequate falls, profiling and drainage to control run-off and prevent ponding and flooding.
- Care will be taken to ensure that embankment and river bank surfaces are stable in order to minimise erosion.
- Soils which are contaminated with other materials will be assessed, characterised, excavated and managed in accordance with the waste hierarchy set out in the European Communities (Waste Directive) Regulations, 2011 and in accordance with the Waste Management Acts, 1996-2011.
- To mitigate the risk of soil contamination from substances such as lubricants, fuels and oils, good housekeeping (daily site clean-ups, use of disposal bins, etc.) will be employed on the site, and the proper use, storage and disposal of these substances and their containers will be used to mitigate the risk of contamination. Refer to Chapter 8, Hydrology for mitigation relating to bunding.
- Excavations for the diversion of utilities will be excavated using trenches to minimise the amount of soil being generated. While the excavations are likely to be restricted to the shallow subsoil and to made ground, trench support will be utilised to avoid any trench instability or run-off of poorly consolidated soil.

9.6.1.2 Hydrogeology

Recommended mitigation measures are as follows:

- Dewatering may be required as part of cofferdam construction. Consideration will need to be given, during dewatering, to the management of water to protect groundwater quality.

9.6.2 Operational Phase

Operational mitigation includes the following:

- Weep holes and drainage are recommended behind walls to maintain existing soil drainage conditions as far as possible.
- With appropriate design and construction, no other specific operational mitigation measures are required.

10 Cumulative Impacts and Interactions of Effects

10.1 Introduction

This chapter addresses the cumulative impacts, indirect impacts and main interactions between different aspects of the environment likely to be significantly affected by the Proposed Amendment to the Dodder Flood Alleviation Works Phase 2c – 2e on the Dodder River. This chapter also addresses environmental effects which have not been specifically addressed in the individual chapters of the Environmental Report.

Only topics that could be logically linked to the scheme have been examined in detail. Where the Proposed Amendment is likely to result in a change to the environmental impact of the Dodder Flood Alleviation Works (Phase 2C-2E), the proposed change is described in the relevant sections of the report.

10.2 Assessment Methodology

In assessing the potential for cumulative and indirect impacts and interactions, cognisance was given to the following EPA Documents:

- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002),
- Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) (EPA, 2003),
- Revised Guidelines on the Information to be Contained in Environmental Impact Statements, Draft (EPA, 2015),
- Revised Advise Notes for Preparing Environmental Impact Statements, Draft (EPA, 2015).

The EU has also prepared guidance entitled, Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions, published by the Office for Official Publications of the European Communities in May 1999 (EU, 1999).

The approaches outlined in the EU Guidelines, were used in the identification of the potential for significant cumulative and indirect impacts and interactions.

Reference was also made to the aforementioned EPA Guidelines for the following project type:

- Project Type 12A - Development Type Category: “Canalisation and Flood Relief Works”

Table 10.1: Potential Interaction of Effects Matrix(C=Construction, O=Operational)

	Noise and Vibration	Landscape and Visual	Biodiversity	Soils, Geology & Hydrogeology	Hydrology
Noise and Vibration		-	-	-	
Landscape and Visual	-		C	-	
Biodiversity	-	C		-	-
Soils, Geology & Hydrogeology	-	-	-		C
Hydrology	-	-	-	C	

11 Summary of Mitigation Measures and Residual Impacts

11.1 Introduction

Mitigation is a description of the measures proposed in order to avoid, reduce and where practicable remedy significant adverse impacts. It is also a means by which decisions about a proposed scheme are modified to avoid, reduce or remedy the adverse environmental effects that are identified.

Mitigation measures have been incorporated into the design of the Proposed Amendment and will be applied during the construction and operation of the proposed scheme. A summary of these mitigation measures is included in the following section. The mitigation measures for both the construction and operational phases are detailed as appropriate. All mitigation measures are based on the proposed scheme as described in Chapter 2, Background and project description and Chapter 4, Scheme Construction. Individual chapters of the Environmental Report should be referred to for context and detail.

It is assumed that all mitigation measures proposed under the 2013 Environmental Report for the Dodder Flood Alleviation Works Phase 2C-2E have been, or will be implemented on site.

Residual Impacts are considered in Section 11.3.

11.2 Mitigation Measures

11.2.1 Noise and Vibration

It should be assumed that all mitigation measures proposed as part of the 2013 Environmental Report for the Dodder Flood Alleviation Works Phase 2C-2E have been, or will be implemented on site.

With regard to construction activities, reference will be made to BS5228 (BSI, 2009+A2014) which offers detailed guidance on the control of noise and vibration from demolition and construction activities. In general BS5228 advises the following noise mitigation measures, where necessary:

- Avoid unnecessary revving of engines and switch off equipment when not required.
- Keep internal haul routes well maintained and avoid steep gradients.
- Use rubber linings in, for example, chutes and dumpers to reduce impact noise.
- Minimise drop height of materials.
- Start-up plant and vehicles sequentially rather than all together.

The following more specific measures are also advised:

- In accordance with Best Practicable Means, plant and activities to be employed on site will be reviewed to ensure that they are the quietest available for the required purpose.
- Where required, improved sound reduction methods, e.g. enclosures should be used.
- Site equipment should be located away from noise sensitive areas, as much as is feasible.
- Regular and effective maintenance by trained personnel should be carried out to reduce noise and/or vibration from plant and machinery.
- Limiting the hours during which site activities likely to create high levels of noise or vibration are carried out.
- Establish channels of communication between the contractor/developer, Local Authority and residents.
- Appointing of a site representative responsible for matters relating to noise and vibration.
- Monitoring shall be carried out at the nearest sensitive receptor while activities that are likely to generate significant noise are carried out.

Where appropriate, it is also proposed to provide a 2.4m high solid hoarding along the boundary of the construction site.

It is proposed that vibration levels be maintained below those outlined in **Table 5.2**. Monitoring shall be carried out at the nearest sensitive receptor, as required where activities that are likely to generate vibration are carried out. Levels recorded will be compared to the limit values. If exceedances are recorded, alternative construction methodologies will be proposed to ensure limits are complied with. The following additional vibration mitigation measures are advised:

- Control of vibration at source, where possible.
- Informing local residents of the time and duration of possible vibration impact.

11.2.2 Landscape and Visual

It is assumed that all mitigation measures proposed as part of the 2013 Environmental Report for the Dodder Flood Alleviation Works Phase 2C-2E have been, or will be implemented on site.

For the purpose of mitigation the area in which the proposed scheme will take place is split into three sections as shown in Figure 6.1 below. Proposed mitigation for each section is set out below.



Figure 6.1: Aerial View of the Proposed Scheme Area showing Sub-divisions

Section 4a

The tree group in section 4a shall be retained if the flood defence structures and new cycleway can be constructed without significant disturbance within approximately 5m of the tree stems.

Where this is not practicable and tree removal is required these shall be replaced with a new planting scheme containing native tree species such as willow, alder, hazel and oak etc.

Section 4b

The vast majority of trees within this part of the site are of very poor form and low quality. All of the trees in this area shall be coppiced back to stump; the Hybrid Poplar stumps (both young and old) shall be treated with herbicide to prevent regrowth or be removed by stump-grinder.

The stumps of willow, ash and sycamore shall be allowed to re-sprout into multi-stemmed trees of better, upright form; these trees should then be re-enforced with fresh planting of native tree species.

Section 4c

Trees likely to be significantly impacted by any of the proposed works in this location shall be coppiced to stump and allowed to regenerate where possible. A Japanese Knotweed Management Strategy will be developed and implemented in Consultation with the Parks Department and Flood Defence Unit of Dublin City Council.

Larger mature willow trees may be retained if possible; or with the stumps retained where practicable to allow re-growth if the stems have to be removed. Coppicing of willows will take place as required within the next three years to prevent stem collapse.

A well-executed tree planting scheme will be designed at detailed design stage and implemented following construction. This will create a stretch of native riparian woodland along the riverbank that would provide an attractive landscape screen as well as a valuable wildlife corridor.

11.2.4.1 Construction- General

No further mitigation measures are proposed with regards the Proposed Amendment.

11.2.4.2 Bankside Works

No further mitigation measures are proposed with regards the Proposed Amendment.

11.2.4.3 Instream Works

No further mitigation measures are proposed with regards the Proposed Amendment.

11.2.5 Soils, Geology and Hydrogeology

11.2.5.1 Construction Phase

Soils and Geology

The following mitigation measures are proposed:

- As part of the Dodder Flood Alleviation Works Phase 2C-2E the minimum amount of soil and rock will be excavated.
- Sloped surfaces, in particular on embankments and River banks will be designed with adequate falls, profiling and drainage to control run-off and prevent ponding and flooding.
- Care will be taken to ensure that embankment and river bank surfaces are stable in order to minimise erosion.
- Soils which are contaminated with other materials will be assessed, characterised, excavated and managed in accordance with the waste hierarchy set out in the European Communities (Waste Directive) Regulations, 2011 and in accordance with the Waste Management Acts, 1996-2011.
- To mitigate the risk of soil contamination from substances such as lubricants, fuels and oils, good housekeeping (daily site clean-ups, use of disposal bins, etc.) will be employed on the site, and the proper use, storage and disposal of these substances and their containers will be used to mitigate the risk of contamination. Refer to Chapter 14, Hydrology for mitigation relating to bunding.
- Excavations for the diversion of utilities will be excavated using trenches to minimise the amount of soil being generated. While the excavations are likely to be restricted to the shallow subsoil and to made ground, trench support will be utilised to avoid any trench instability or run-off of poorly consolidated soil.

Hydrogeology

Proposed mitigation measures are as follows:

- Dewatering may be required as part of cofferdam construction. Consideration will need to be given during dewatering to the management of water to protect groundwater quality.

11.2.5.2 Operational Phase

Operational mitigation includes the following:

- Weep holes and drainage are recommended behind walls to maintain existing soil drainage conditions as far as possible.
- With appropriate design and construction, no other specific operational mitigation measures are required.

11.3 Residual Impacts

Residual impacts relating to the Proposed Amendment are summarised in relation to each environmental topic heading below.

11.3.1 Noise and Vibration

There is the potential for a residual impact associated with the installation of sheet piles as outlined in Section 5.5.1. However, this will be a short term, temporary daytime exceedence. There will be no residual operational impacts.

11.3.2 Landscape and Visual

The landscape and visual impacts of the works are limited and primarily restricted to construction stage works.

Following construction and implementation of mitigation, the proposed reinstatement and planting will result in a moderate impact. This will reduce to a slight localised neutral impact in the medium and longer term as planting becomes established.

11.3.3 Biodiversity

There will be no significant impact on biodiversity resulting from the proposed works following the proposed best practice construction management measures.

Construction management measures to prevent impacts on surface water quality which will be included in a Construction Management Plan to ensure these measures are fully implemented by the Contractor. There will be no significant residual impacts on surface water quality once these measures have been employed.

Following the implementation of the above construction management measures, there would be no significant negative residual impacts on the River Dodder

habitats and species. There will be no significant negative impact on Natura 2000 sites in Dublin Bay.

11.3.4 Hydrology

The residual impacts from the proposed works is negligible providing the above mitigation is implemented.

11.3.5 Soils, Geology and Hydrogeology

The Dodder Flood Alleviation Works Phase 2C-2E has been designed to have minimum negative impact on soils, geology and hydrogeology. Following the implementation of the mitigation measures outlined above for the Proposed Amendment, there will be a negligible residual impact on soils, geology and hydrogeology.

Appendices

Environmental Report

Appendix 6.1- Landscape and Visual

Area 4 Tree Survey Update

River Dodder Flood Relief Scheme Dublin

Proposed Greenway: Area 4 Tree Survey Update

**Brady Shipman
Martin**
Built.
Environment.

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1968

Survey Assessment **Built Environment**

DATE:
REPORT:

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5911_TS_GW01

5911 River Dodder Flood Relief Scheme
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Tree Survey Update February 2017

This document has been issued and amended as follows:

Issue	Revision	Description/Status	Date	Prepared by	Checked by
01	00	Tree Survey Update	17/02/17	JM	TB

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1 INTRODUCTION

Construction works to deliver the River Dodder Flood Relief Project in Dublin are well underway; the section of the project between Herbert Park and the Donnybrook Road Bridge has been subject to some design changes since the original tree survey was carried out in July 2012. This supplementary report has been prepared to provide an update on the tree cover in the area (described as Area 4 in the 2012 survey) in respect of a proposal to incorporate a Greenway along river as part of the Flood Relief Works.

2 METHODOLOGY

The section of the west bank of the River Dodder between the Donnybrook Road Bridge and Herbert Park was accessed on foot on the 16th of February 2017 and the trees and shrubs inspected and assessed using VTA (visual tree assessment) methods only.

The trees were not inspected or measured as individuals; but were assessed collectively where they shared broad characteristics such as species, age class and size. Field data notes and photographs were taken on-site. For clarity the section of river bank was sub-divided into 3 parts; described as 4a-c (see aerial image 1 below).



1. Aerial view of Area 4 showing sub-divisions a-c

5911 River Dodder Flood Relief Scheme

Donnybrook Tree Survey Update

3 FINDINGS

3.1 Section 4a

The northern part of the riverbank surveyed appears relatively unchanged since the original survey; this section is characterised by a linear group of 13 young Poplar trees (a mixture of Lombardy and Hybrid Poplar) planted parallel to the river (see image 2 below).

The trees are in reasonable physiological and structural condition and although they are not of high arboricultural or conservation value, they do contribute some landscape amenity and mark the line of the riverbank while providing some landscape screening to the sports ground. Tree height is between 8-16m and stem diameter between 250mm-450mm.

The rest of the riverbank is relatively devoid of woody vegetation, with only some scattered semi-mature Sycamore and Buddleia present.

There is some work activity underway at the northern end of the tree group where construction materials are being stored and the main site access gate is located.



2. Section 4a Row of young Poplars viewed from the north-west.

3.2 Section 4b

Section 4b includes the length of riverbank formerly dominated by a row of large late mature Poplar trees; these trees were noted to be in very poor structural condition in 2012 and were subsequently felled to stump level. Many of the cut stumps have been left in place and have produced considerable fresh growth up to 4m in places. Some Willow, Sycamore, Ash and Elder stems were also coppiced during the clearance works along the riverbank; and again many of these stumps are also re-sprouting.

The remaining trees are mostly semi-mature or early mature hybrid Poplars, with scattered Sycamore, Ash and Willow present in much smaller numbers. The trees are mostly between 100-300mm diameter and 8-16m in height. Many of the stems are of poor form and are leaning out over the river channel; probably as a result of competition and suppression from the large Poplars that have since been removed. Overall the trees are of very low amenity or Arboricultural value.

Many of the remaining trees are being impacted by the ongoing construction works alongside the tennis courts and rugby club; including by the creation of a track down the western riverbank to allow access across the river channel for construction works (see photo 4 below).



3. Section 4b Young Hybrid Poplar stems left leaning out over the river channel following the felling of the large mature trees – viewed from the south.

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Donnybrook Tree Survey Update



4. Section 4b Young Hybrid Poplar stems (plus some semi-mature Sycamore trees) along the river channel next to a work access route across to the east bank of the river.

3.3 Section 4c

Section 4c includes the length of riverbank extending from the current work-site security fence (next to the corner of the rugby pitch) up to the Donnybrook Road Bridge. This section has been subject to some coppicing and crown reduction works carried out on numerous (mostly Willow) trees growing along the riverbank, however a significant number of mature and semi-mature trees (Willow, Sycamore and Ash of low or moderate value) remain in place. Some of the Willow trees by the river are substantial specimens; several of which are multi-stemmed coppice stools with stem diameters of 200-500mm and heights of 15-17m. The Ash and Sycamore stems are mostly of poor form and relatively low value.



5. Section 4c Cluster of mature Willow and younger Ash and Sycamore growing on the western riverbank at the southern end of Area 4



6. Section 4c Mature Willow coppice stool growing close to Donnybrook Road Bridge at the southern end of Area 4 – note Japanese Knotweed at the top of the bank.

5911 River Dodder Flood Relief Scheme

Donnybrook Tree Survey Update

4 RECOMMENDATIONS

4.1 Section 4a

The tree group in section 4a should be retained if the flood defence structures and new cycleway can be constructed without significant disturbance within around 5m of the tree stems. Where this is not practicable the trees should be removed and replaced with a new planting scheme containing native tree species such as Willow, Alder, Hazel, Oak etc.

4.2 Section 4b

The vast majority of trees within this part of the site are of very poor form and low quality. I would recommend that all of the trees be coppiced back to stump; the Hybrid Poplar stumps (both young and old) should be treated with herbicide to prevent regrowth or be removed by stump-grinder. The stumps of Willow, Ash and Sycamore may be allowed to re-sprout into multi-stemmed trees of better, upright form; these trees could then be re-enforced with fresh planting of native tree species.

4.3 Section 4c

Trees likely to be significantly impacted by any of the new works should be coppiced to stump and allowed to regenerate where possible. These works should include any major groundworks needed to remove the Japanese Knotweed infestation on the riverbank. The larger mature Willow trees should be retained if possible; or with the stumps retained where practicable to allow re-growth if the stems have to be removed. Several of these Willows would benefit from coppicing at some point over the next few years to prevent stem collapse.

The section would be improved by removal of the Knotweed and by a well-executed tree planting scheme to create a stretch of native riparian woodland along the riverbank that would provide an attractive landscape screen as well as a valuable wildlife corridor.

Appendix 7.1- Biodiversity

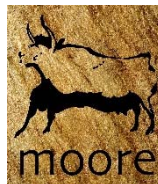
Appropriate Assessment Screening

**Report for the purposes of
Appropriate Assessment Screening**

**as required under Article 6(3) of the Habitats Directive
(Council Directive 92/43/EEC)**

**River Dodder Flood Alleviation Works
Phase 2C-2E Amendment**

**Prepared by: Moore Group – Environmental Services
6th February 2017**



On behalf of Dublin City Council

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Client	Dublin City Council
Project	River Dodder Flood Alleviation Works Phase 2C-2E Amendment
Title	Report for the purposes of Appropriate Assessment Screening River Dodder Flood Alleviation Works Phase 2C-2E Amendment


Project Number	16249	Document Reference	16249 R. Dodder Flood Works Amendment AAS1 Rev0.docx	
Revision	Description	Author	Date	
Rev0	Issued for Client Review	G. O'Donohoe 	6 th February 2017	
Moore Archaeological and Environmental Services Limited				

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Appendix A – Finding Of No Significant Effect Report

1. Introduction

1.1. General Introduction

This report contains information required for the competent authority to undertake an Appropriate Assessment (AA) Screening process on the effects of a project consisting of an Amendment to the River Dodder Flood Alleviation Works Phase 2C-2E which is currently in construction. The Amendment involves conversion of a proposed flood wall to a cycleway to the rear of Donnybrook Stadium.

Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3):

- i) whether a plan or project is directly connected to or necessary for the management of the site, and
- ii) whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site in view of its conservation objectives.

If the effects are deemed to be significant, potentially significant, or uncertain, or the screening process becomes overly complicated, then the process must proceed to Stage 2 (AA). Screening should be undertaken without the inclusion of mitigation, unless potential impacts clearly can be avoided through the modification or redesign of the plan or project, in which case the screening process is repeated on the altered plan or project.

When screening the project there are two possible outcomes:

- the project poses no risk of a significant effect and as such requires no further assessment; and
- the project has potential to have a significant effect (or this is uncertain) and AA of the project is necessary.

This report has been prepared by Moore Group - Environmental Services for Dublin City Council and assesses the potential for the proposed development to impact on sites of European-scale ecological importance in accordance with Articles 6(3) and 6(4) of the Habitats Directive. The report was compiled by Ger O'Donohoe (B.Sc. Applied Aquatic Sciences (GMIT, 1993) & M.Sc. Environmental Sciences (TCD, 1999)) who has over 20 years' experience in environmental impact assessment and has completed numerous Appropriate Assessment Screening Reports and Natura Impact Statements in terrestrial and aquatic habitats.

The report assesses the potential for the proposed development to impact on sites of European-scale ecological importance. It is necessary that the Project has regard to Article 6 of the Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (referred to as the Habitats Directive). This is transposed into Irish Law by the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477) (referred to as the Habitats Regulations).

1.2. Legislative Background - The Habitats and Birds Directives

The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) is the main legislative instrument for the protection and conservation of biodiversity in the EU. Under the Directive Member States are obliged to designate Special Areas of Conservation (SACs) which contain habitats or species considered important for protection and conservation in a European Union context.

The Birds Directive (Council Directive 79/409/EEC as codified by Directive 2009/147/EC), is concerned with the long-term protection and management of all wild bird species and their habitats in the EU. Among other things, the Directive requires that Special Protection Areas (SPAs) be established to protect migratory species and species which are rare, vulnerable, in danger of extinction, or otherwise require special attention.

Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas, designated under the Birds Directive, form a pan-European network of protected sites known as Natura 2000. The Habitats Directive sets out a unified system for the protection and management of SACs and SPAs.

Articles 6(3) and 6(4) of the Habitats Directive set out the requirement for an assessment of proposed plans and projects likely to affect Natura 2000 sites.

Article 6(3) establishes the requirement to screen all plans and projects and to carry out a further assessment if required (Appropriate Assessment (AA)):

Article 6(3): "Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to an appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the

conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.”

Article 6(4): “If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of the Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species the only considerations which may be raised are those relating to human health or public safety, to the beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.”

This Report for Screening is a documentary record of the Appropriate Assessment process on the effects of a project consisting of an Amendment to the River Dodder Flood Alleviation Works Phase 2C-2E which is currently in construction, referred to in this case as the Project.

2. Methodology

The Commission’s methodological guidance (EC, 2002) promotes a four-stage process to complete the AA, and outlines the issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

Stages 1-2 deal with the main requirements for assessment under Article 6(3). Stage 3 may be part of Article 6(3) or may be a necessary precursor to Stage 4. Stage 4 is the main derogation step of Article 6(4).

Stage 1 Screening: This stage examines the likely effects of a project either alone or in combination with other projects upon a Natura 2000 site and considers whether it can be objectively concluded that these effects will not be significant.

Stage 2 Appropriate Assessment: In this stage, there is a consideration of the impact of the project with a view to ascertain whether there will be any adverse effect on the integrity of the Natura 2000 site either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are predicted impacts, an assessment of the potential mitigation of those impacts.

Stage 3 Assessment of Alternative Solutions: This stage examines alternative ways of implementing the project that, where possible, avoid any adverse impacts on the integrity of the Natura 2000 site.

Stage 4 Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the sites will be necessary.

To ensure that the Project complies fully with the requirements of Article 6 of the Habitats Directive and all relevant Irish transposing legislation, Moore Group compiled this report for screening of the Project to determine if Stage 2 AA is required.

2.1. Guidance

The AA has been compiled in accordance with guidance contained in the following documents:

- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities. (Department of Environment, Heritage and Local Government, 2010 rev.).
- Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPWS 1/10 & PSSP 2/10.
- Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission Environment Directorate-General, 2001); hereafter referred to as the EC Article Guidance Document.
- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC Environment Directorate-General, 2000); hereafter referred to as MN2000.

2.2. Data Sources

Sources of information that were used to collect data on the Natura 2000 network of sites are listed below:

- Ordnance Survey of Ireland mapping and aerial photography available from www.osi.ie and Bing and Google Earth aerial photography (2017).
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including; the Natura 2000 network Data Form; Site Synopsis; Generic Conservation Objective data;
 - Online database of rare, threatened and protected species,
 - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2013),
- Relevant Development Plans and Local Area Plans in neighbouring areas.

3. Description of the Project

The project consisting of an Amendment to the River Dodder Flood Alleviation Works Phase 2C-2E which is currently in construction. The Amendment involves conversion of a proposed flood wall to a cycleway to the rear of Donnybrook Stadium.

The section in question runs along the river at the back of Old Wesley RFC, Bective LTC and Bective Rangers playing fields at Donnybrook from Anglesea Bridge to the corner of Herbert Park, see Figure 1 for the site location in Dublin. A cross section of an example of the proposed cycleway is presented in Figure 2.

The works underway have previously been assessed as part of the River Dodder Catchment Flood Risk Management Plan and Appropriate Assessment found that after Construction Management Measures were employed, there would be no significant impact on the European Sites located in Dublin Bay as having connectivity to the project.

The same measures will be included in the addition to the plan of the proposed Amendment.

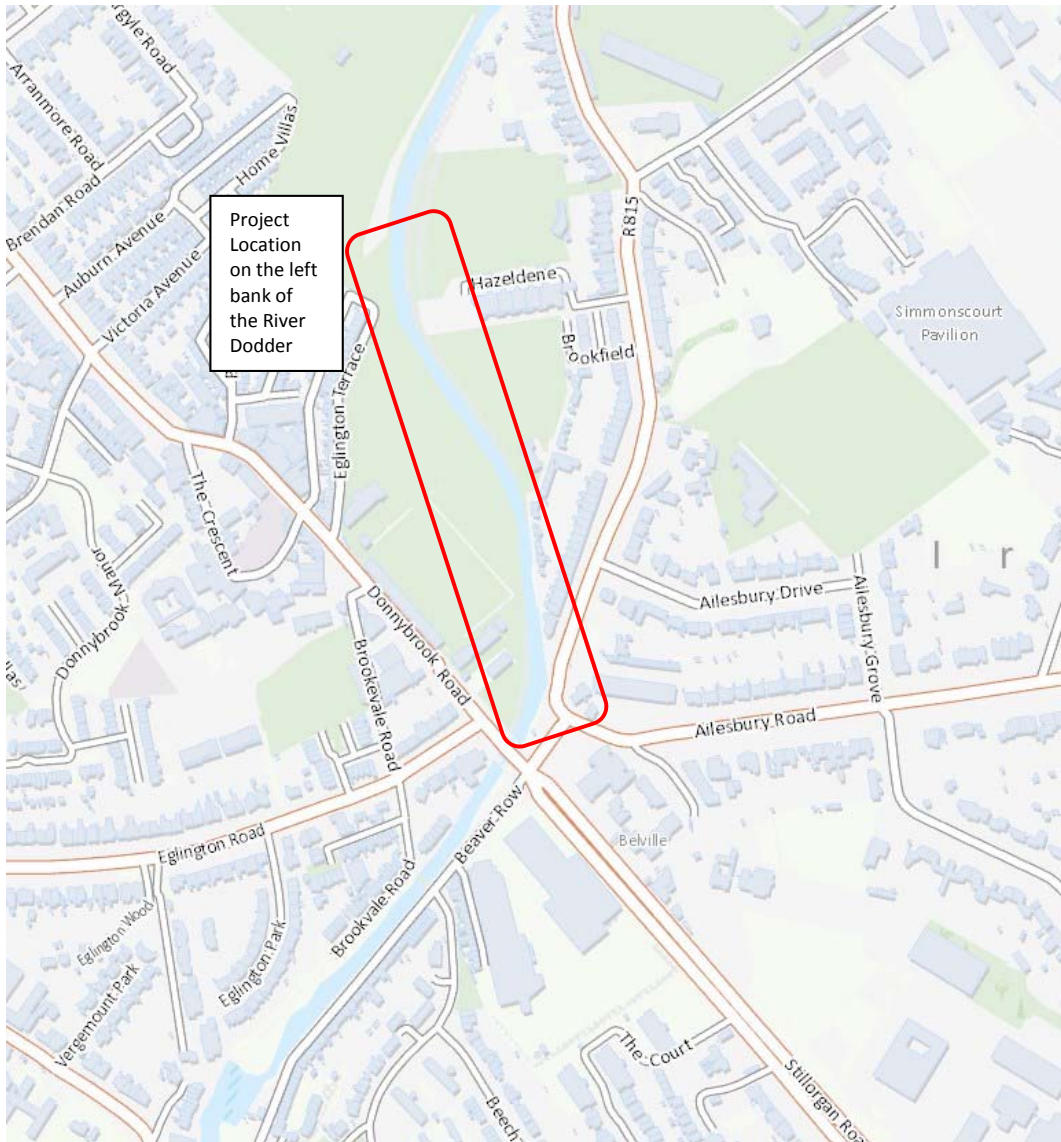


Figure 1. Site Location at Donnybrook, Dublin 4.

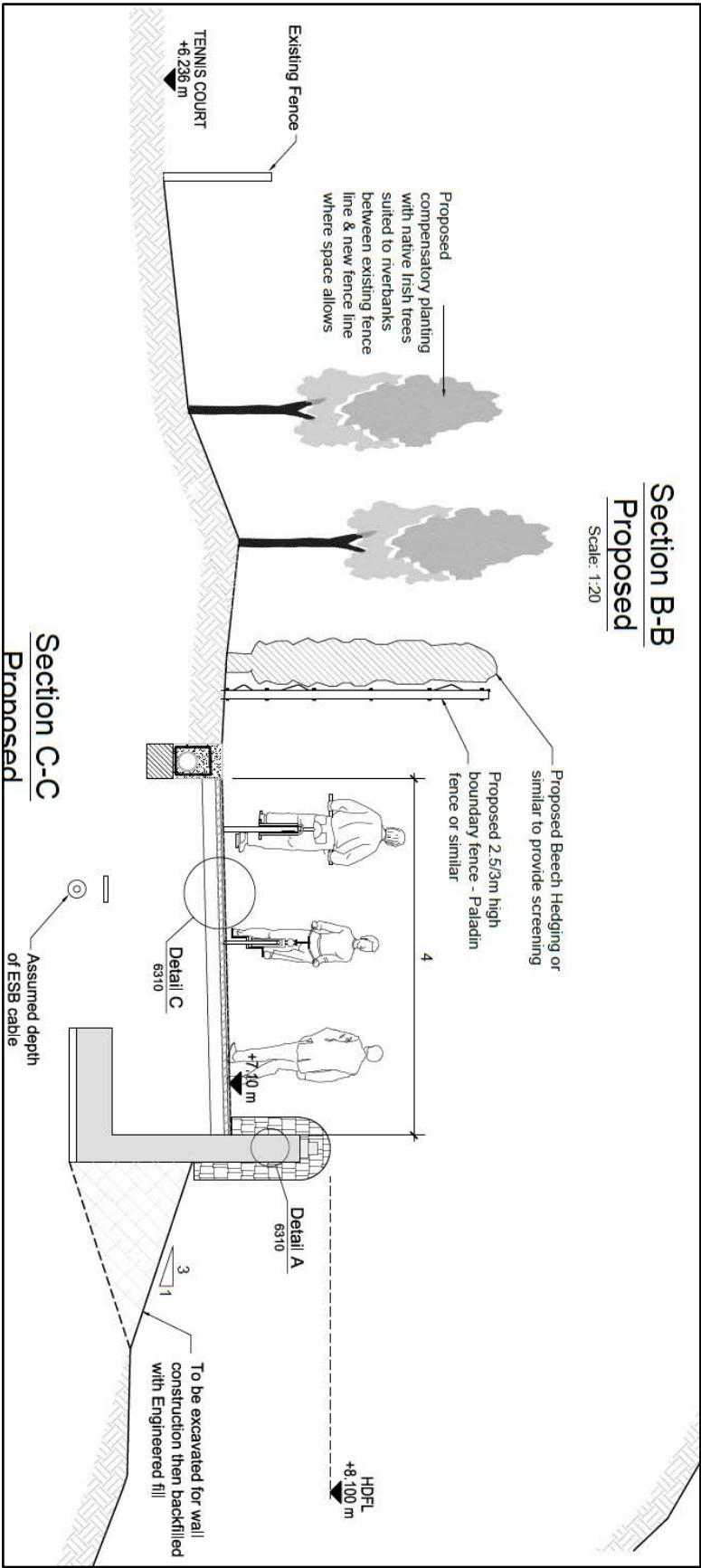


Figure 2. Example of a cross-section of the proposed cycleway amendment showing the proposed flood alleviation works and additional cycleway.

4. Identification of Natura 2000 Sites

4.1. Description of Natura Sites Potentially Affected

Departmental guidance suggests an assessment of Natura 2000 sites within a zone of influence of 15 km which can be revised down depending on the proposed development and location of Natura 2000 sites. There are 16 Natura 2000 sites located within a 15km radius of the project study area including the following:

- 000199 Baldoyle Bay SAC (10.5 km)
- 000202 Howth Head SAC (11.5 km)
- 000205 Malahide Estuary SAC (14 km)
- 000206 North Dublin Bay SAC (5.5 km)
- 000210 South Dublin Bay SAC (2.5 km)
- 001209 Glenasmole Valley SAC (13 km)
- 002193 Ireland's Eye SAC (14.5 km)
- 003000 Rockabill to Dalkey Island SAC (11.5 km)
- 004006 North Bull Island SPA (7 km)
- 004016 Baldoyle Bay SPA (10.5 km)
- 004024 South Dublin Bay and River Tolka Estuary SPA (3.5 km)
- 004025 Malahide Estuary SPA (14 km)
- 004040 Wicklow Mountains SPA (12 km)
- 004113 Howth Head Coast SPA (11.5 km)
- 004117 Ireland's Eye SPA (14.5 km)
- 004172 Dalkey Island SPA (13 km)

The proposed development site has limited biological and hydrological connectivity to the following sites:

- 000199 Baldoyle Bay SAC
- 000202 Howth Head SAC
- 000205 Malahide Estuary SAC
- 001209 Glenasmole Valley SAC
- 002193 Ireland's Eye SAC
- 003000 Rockabill to Dalkey Island SAC
- 004016 Baldoyle Bay SPA
- 004025 Malahide Estuary SPA
- 004040 Wicklow Mountains SPA

- 004113 Howth Head Coast SPA
- 004117 Ireland's Eye SPA
- 004172 Dalkey Island SPA

It is considered that there is no ecological pathway or linkage by which a significant impact could arise on these latter listed Natura 2000 sites. It is determined that there is no potential for significant effect on these sites and they are screened out at this preliminary stage for the following reasons:

- Distance from the development site,
- There is no direct connection between the site of the proposed development and these three sites,
- The potential for indirect impacts is unlikely due to distance and lack of connectivity.

The project location at Donnybrook is then considered in terms of source-pathway-receptor relationship and the proximity of the only water course in the vicinity, the River Liffey and hydrological connectivity to Dublin Bay. Thus, there are four Natura 2000 sites located within a potential zone of influence of the Project:

- 000206 North Dublin Bay SAC
- 000210 South Dublin Bay SAC
- 004006 North Bull Island SPA
- 004024 South Dublin Bay and River Tolka Estuary SPA

The location of the development site is presented in Figure 3 below in relation to the Natura 2000 sites considered within the potential zone of influence. These are listed in Tables 1 and 2 below and Site Synopses are available on the NPWS metadata site. Spatial boundary data on the Natura 2000 network was extracted from the NPWS website on 6th February 2017.

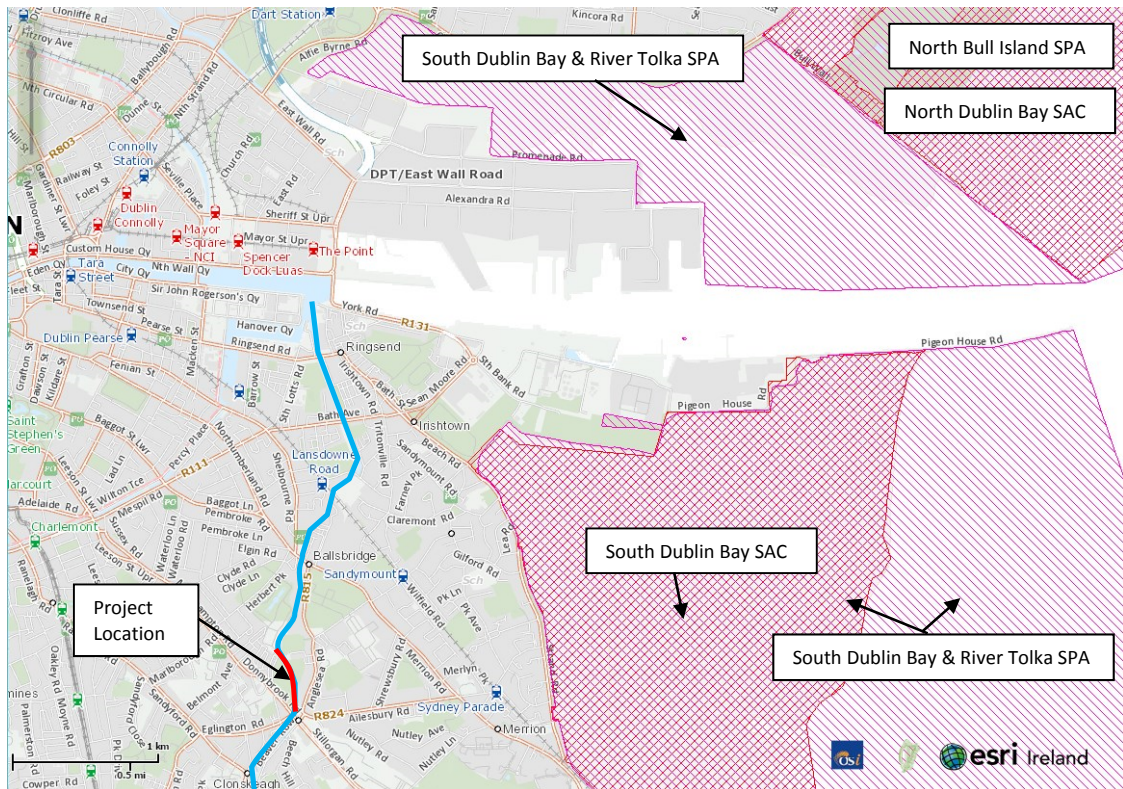


Figure 3. Site Location at in relation to the downstream Natura 2000 sites.

Table 1. SACs located within the zone of influence of the Project (*indicates priority habitat).

Site Code	Site Name	Qualifying Habitats	Qualifying Species
000206	North Dublin Bay SAC	[1140] Mudflats and sandflats not covered by seawater at low tide [1210] Annual vegetation of drift lines [1310] Salicornia and other annuals colonizing mud and sand [1330] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1410] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [2110] Embryonic shifting dunes [2120] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes") [2130] * Fixed coastal dunes with herbaceous vegetation ("grey dunes") [2190] Humid dune slacks	[1395] <i>Petalophyllum ralfsii</i>
000210	South Dublin Bay SAC	[1140] Mudflats and sandflats not covered by seawater at low tide	

Table 2. SPAs located within the zone of influence of the Project.

Site Code	Site Name	Qualifying Habitats	Qualifying Species
004006	North Bull Island SPA	Wetlands [A999]	Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162] Turnstone (<i>Arenaria interpres</i>) [A169] Black-headed Gull (<i>Larus ridibundus</i>) [A179]
004024	South Dublin Bay and River Tolka Estuary SPA	Wetlands [A999]	Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Dunlin (<i>Calidris alpina</i>) [A149] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Redshank (<i>Tringa totanus</i>) [A162] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Roseate Tern (<i>Sterna dougallii</i>) [A192] Common Tern (<i>Sterna hirundo</i>) [A193] Arctic Tern (<i>Sterna paradisaea</i>) [A194]

4.2. Conservation Objectives of the Natura 2000 Sites

The following Conservation Objectives, available from the NPWS, are set out for the SAC. Specific attributes, measures and targets are presented in the Conservation Objectives document and will be addressed in more detail if required after potential impacts have been determined.

North Dublin Bay SAC [000206]. Version 1. 6th November 2013;

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- The permanent habitat area is stable or increasing, subject to natural processes.

Community extent: Hectares- Maintain the extent of the *Mytilus edulis*-dominated community, subject to natural processes.

Community structure: *Mytilus edulis* density: Individuals/m²- Conserve the high quality of the *Mytilus edulis* dominated community, subject to natural processes.

Community distribution: Hectares- Conserve the following community types in a natural condition: Fine sand to sandy mud with *Pygospio elegans* and *Crangon crangon* community complex; Fine sand with *Spio martinensis* community complex.

1210 Annual vegetation of drift lines

To restore the favourable conservation condition of Annual vegetation of drift lines in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- Area increasing, subject to natural processes, including erosion and succession. Total area mapped: South Bull - 0.11ha.

Habitat distribution: Occurrence- No decline, or change in habitat distribution, subject to natural processes.

Physical structure: functionality and sediment supply: Presence/ absence of physical barriers- Maintain the natural circulation of sediment and organic matter, without any physical obstructions.

Vegetation structure: zonation: Occurrence- Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation composition: typical species and sub-communities: Percentage cover- at a representative number of monitoring stops Maintain the presence of species-poor communities with typical species: sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*), prickly saltwort (*Salsola kali*) and oraches (*Atriplex* spp.).

Vegetation composition: negative indicator species: Percentage cover- Negative indicator species (including non-natives) to represent less than 5% cover

1310 Salicornia and other annuals colonising mud and sand

To restore the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares Area- stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 29.10ha.

Habitat distribution: Occurrence- No decline, or change in habitat distribution, subject to natural processes.

Physical structure: sediment supply: Presence/ absence of physical barriers- Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions.

Physical structure: creeks and pans: Occurrence- Maintain creek and pan structure, subject to natural processes, including erosion and succession.

Physical structure: flooding regime: Hectares- flooded; frequency Maintain natural tidal regime.

Vegetation structure: zonation: Occurrence- Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation structure: vegetation height: Centimetres- Maintain structural variation within sward.

Vegetation structure: vegetation cover: Percentage cover at a representative number of monitoring stops- Maintain more than 90% of area outside creeks vegetated.

Vegetation composition: typical species and sub-communities: Percentage cover- Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009).

Vegetation structure: negative indicator species - *Spartina anglica*: Hectares- No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%.

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

To maintain the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 81.84ha.

Habitat distribution: Occurrence- No decline or change in habitat distribution, subject to natural processes.

Physical structure: creeks and pans: Occurrence- Maintain creek and pan structure, subject to natural processes, including erosion and succession.

Physical structure: flooding regime: Hectares- flooded; frequency Maintain natural tidal regime.

Vegetation structure: zonation: Occurrence- Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation structure: vegetation height: Centimetres- Maintain structural variation within sward.

Vegetation structure: vegetation cover: Percentage cover at a representative number of monitoring stops- Maintain more than 90% area outside creeks vegetated.

Vegetation composition: typical species and sub-communities: Percentage cover at a representative sample of monitoring stops- Maintain range of sub-communities with typical species listed in SMP (McCorry and Ryle, 2009).

Vegetation structure: negative indicator species - *Spartina anglica*: Hectares- No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%.

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

To maintain the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 7.98ha.

Habitat distribution: Occurrence- No decline or change in habitat distribution, subject to natural processes.

Physical structure: sediment supply: Presence/absence of physical barriers- Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions.

Physical structure: creeks and pans: Occurrence- Maintain creek and pan structure, subject to natural processes, including erosion and succession.

Physical structure: flooding regime: Hectares- flooded; frequency Maintain natural tidal regime.

Vegetation structure: zonation: Occurrence- Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation structure: vegetation height: Centimetres- Maintain structural variation in the sward.

Vegetation structure: vegetation cover: Percentage cover at a representative sample of monitoring stops- Maintain more than 90% of area outside creeks vegetated.

Vegetation composition: typical species and sub-communities: Percentage cover at a representative number of monitoring stops- Maintain range of sub-communities with characteristic species listed in SMP (McCorry and Ryle, 2009).

Vegetation structure: negative indicator species - *Spartina anglica*: Hectares- No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%.

2110 Embryonic shifting dunes

To restore the favourable conservation condition of Embryonic shifting dunes in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: North Bull - 2.64ha; South Bull - 3.43ha.

Habitat distribution: Occurrence- No decline or change in habitat distribution, subject to natural processes.

Physical structure: functionality and sediment supply: Presence/absence of physical barriers- Maintain the natural circulation of sediment and organic matter, without any physical obstructions.

Vegetation structure: zonation: Occurrence- Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation composition: plant health of foredune grasses: Percentage cover- More than 95% of sand couch (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present).

Vegetation composition: typical species and sub-communities: Percentage cover at a representative number of monitoring stops- Maintain the presence of species-poor communities with typical species: sand couch (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*).

Vegetation composition: negative indicator species: Percentage cover- Negative indicator species (including non-native species) to represent less than 5% cover.

2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- Area stable or increasing, subject to natural processes including erosion and succession. North Bull - 2.20ha; South Bull - 0.97ha.

Habitat distribution: Occurrence- No decline, or change in habitat distribution, subject to natural processes.

Physical structure: functionality and sediment supply: Presence/ absence of physical barriers- Maintain the natural circulation of sediment and organic matter, without any physical obstructions.

Vegetation structure: zonation: Occurrence- Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation composition: plant health of dune grasses: Percentage cover- 95% of marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present).

Vegetation composition: typical species and sub-communities: Percentage cover at a representative number of monitoring stops- Maintain the presence of species-poor communities dominated by marram grass (*Ammophila arenaria*) and/or lyme grass (*Leymus arenarius*).

Vegetation composition: negative indicator species: Percentage cover- Negative indicator species (including non-natives) to represent less than 5% cover.

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)

To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- Area stable or increasing, subject to natural processes including erosion and succession. For subsites mapped: North Bull - 40.29ha; South Bull - 64.56ha.

Habitat distribution: Occurrence- No decline, or change in habitat distribution, subject to natural processes.

Physical structure: functionality and sediment supply: Presence/ absence of physical barriers- Maintain the natural circulation of sediment and organic matter, without any physical obstructions.

Vegetation structure: zonation: Occurrence- Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation structure: bare ground: Percentage cover- Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes.

Vegetation structure: sward height: Centimetres- Maintain structural variation within sward.

Vegetation composition: typical species and sub-communities: Percentage cover at a representative number of monitoring stops- Maintain range of sub-communities with typical species listed in Delaney et al. (2013).

Vegetation composition: negative indicator species (including *Hippophae rhamnoides*): Percentage cover- Negative indicator species (including non-natives) to represent less than 5% cover.

Vegetation composition: scrub/trees: Percentage cover- No more than 5% cover or under control.

2190 Humid dune slacks

To restore the favourable conservation condition of Humid dune slacks in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped: North Bull - 2.96ha; South Bull - 9.15ha.

Habitat distribution: Occurrence- No decline or change in habitat distribution, subject to natural processes.

Physical structure: functionality and sediment supply: Presence/ absence of physical barriers- Maintain the natural circulation of sediment and organic matter, without any physical obstructions.

Physical structure: hydrological and flooding regime: Water table levels; groundwater fluctuations (metres)- Maintain natural hydrological regime.

Vegetation structure: zonation: Occurrence- Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.

Vegetation structure: bare ground: Percentage cover- Bare ground should not exceed 5% of dune slack habitat, with the exception of pioneer slacks which can have up to 20% bare ground.

Vegetation structure: vegetation height: Centimetres- Maintain structural variation within sward.

Vegetation composition: typical species and sub-communities: Percentage cover at a representative number of monitoring stops- Maintain range of sub-communities with typical species listed in Delaney et al. (2013).

Vegetation composition: cover of *Salix repens*: Percentage cover; centimetres- Maintain less than 40% cover of creeping willow (*Salix repens*).

Vegetation composition: negative indicator species: Percentage cover- Negative indicator species (including non-natives) to represent less than 5% cover.

Vegetation composition: scrub/trees: Percentage cover- No more than 5% cover or under control.

1395 Petalwort *Petalophyllum ralfsii*

To maintain the favourable conservation condition of Petalwort in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Distribution of populations: Number and geographical spread of populations- No decline.

Population size: Number of individuals- No decline. Population at Bull Island estimated at a maximum of 5,824 thalli. Actual population is more likely to be 5% of this, or c. 300 thalli.

Area of suitable habitat: Hectares- No decline. Area of suitable habitat at Bull Island is estimated at c. 0.04ha.

Hydrological conditions: soil moisture: Occurrence- Maintain hydrological conditions so that substrate is kept moist and damp throughout the year, but not subject to prolonged inundation by flooding in winter.

Vegetation structure: height and cover: Centimetres and percentage- Maintain open, low vegetation with a high percentage of bryophytes (small acrocarps and liverwort turf) and bare ground.

South Dublin Bay SAC [000210]. Version 1. 22nd August 2013;

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in South Dublin Bay SAC, which is defined by the following list of attributes and targets:

Habitat area: Hectares- The permanent habitat area is stable or increasing, subject to natural processes.

Community extent: Hectares- Maintain the extent of the *Zostera*-dominated community, subject to natural processes.

Community structure: *Zostera* density: Shoots/m²- Conserve the high quality of the *Zostera*-dominated community, subject to natural processes.

Community distribution: Hectares- Conserve the following community type in a natural condition: Fine sands with *Angulus tenuis* community complex.

North Bull Island SPA [004006]. Version 1. 9th March 2015;

To maintain the favourable conservation condition of [Bird Species] in North Bull Island SPA, which is defined by the following list of attributes and targets:

Population trend: Percentage change- Long term population trend stable or increasing

Distribution: Range, timing and intensity of use of areas- No significant decrease in the range, timing or intensity of use of areas by [Bird Species], other than that occurring from natural patterns of variation.

A999 Wetlands

To maintain the favourable conservation condition of the wetland habitat in North Bull Island SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

Habitat area: Hectares- The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 1,713 hectares, other than that occurring from natural patterns of variation.

South Dublin Bay and River Tolka Estuary SPA [004024]. Version 1. 9th March 2015;

To maintain the favourable conservation condition of [Bird Species] in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

Population trend: Percentage change- Long term population trend stable or increasing.

Distribution: Range, timing and intensity of use of areas- No significant decrease in the range, timing or intensity of use of areas by [Bird Species], other than that occurring from natural patterns of variation.

The following species have the same COs:

A192 Roseate Tern *Sterna dougallii*

A193 Common Tern *Sterna hirundo*

A194 Arctic Tern *Sterna paradisaea*

To maintain the favourable conservation condition of Roseate/ Common/Arctic Tern in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

Passage population: Number of individuals- No significant decline.

Distribution: roosting areas: Number; location; area (hectares)- No significant decline.

Prey biomass available: Kilogrammes- No significant decline.

Barriers to connectivity: Number; location; shape; area (hectares)- No significant increase.

Disturbance at roosting site: Level of impact- Human activities should occur at levels that do not adversely affect the numbers of Arctic tern among the post-breeding aggregation of terns.

A999 Wetlands

To maintain the favourable conservation condition of the wetland habitat in South Dublin Bay and River Tolka Estuary SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

Habitat area: Hectares- The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 2,192 hectares, other than that occurring from natural patterns of variation.

4.3. Assessment Criteria**4.3.1. Examples of Direct, Indirect or Secondary Impacts**

To identify those sites that could be potentially affected, it is necessary to describe the Natura 2000 site in the context of why it has been designated i.e. in terms of its Qualifying Interests and the environmental and ecological conditions that maintain the condition of these features. The underpinning conditions that are required to maintain the 'health' of these features are listed in Table 3 below.

Table 3. Qualifying Interests and Key environmental conditions supporting site integrity.

Qualifying Interests	Key environmental conditions supporting site integrity	Current Threats to Qualifying Interests
Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Overgrazing, erosion and accretion.	Overgrazing; erosion; invasive species, particularly common cordgrass (<i>Spartina anglica</i>); infilling and reclamation.
Annual vegetation of drift lines	Marine and groundwater dependent. Sensitivity to hydrological change. Changes in salinity and tidal regime. Overgrazing, erosion and accretion.	Grazing, Sand and gravel extraction – removal of beach materials, Walking, horse riding and non-motorised vehicles, Outdoor sports and leisure activities – motorised vehicles, Other leisure and tourism impacts (beach cleaning), Trampling, overuse, Sea defence or coastal protection works
Embryonic shifting dunes	Marine and groundwater dependent. Substrate is highly unstable, availability of nutrients is low and there is an absence of organic soil and humus. The habitat is subject to salt spray and occasional tidal inundation. Exposure increases the risk of water loss.	Walking, horseriding and non-motorised vehicles, Motorised vehicles, Trampling, overuse, Sea defence or coastal protection works, Erosion, Other natural processes (depletion of sediment source)
* Fixed coastal dunes with herbaceous vegetation ("grey dunes")	Marine and groundwater dependent. Once a complete sward is established and sand mobility has effectively ceased, dunes are said to be stable or 'fixed' and are referred to as 'fixed dunes'. A combination of geomorphologic, edaphic, climatic and anthropogenic factors determine the composition of the fixed dune vegetation that develops at a particular site.	Mowing/cutting, Agricultural improvement, Fertilisation, Grazing, Abandonment of pastoral systems, Overgrazing by sheep, Overgrazing by cattle, Overgrazing by hares, rabbits, small mammals, Undergrazing, Restructuring agricultural holding, Stock feeding, Burning, Sand and gravel extraction, Urbanised areas, human habitation, urbanization, Dispersed habitation, Disposal of household waste, Other urbanisation, industrial or similar activities, Paths, tracks, cycling routes, Routes, autoroutes, course, Sports pitch, Camping and caravans, Walking, horseriding and non-motorised vehicles,

		Motorised vehicles, , Trampling, overuse, pollution or human activities, Sea defence or coastal protection works, Erosion, Invasion by a species, Competition
Humid dune slacks	Marine and groundwater dependent. Sensitivity to hydrological change. Changes in salinity and tidal regime.	Agricultural improvement, Fertilisation, Grazing, Overgrazing by sheep, Overgrazing by cattle, Overgrazing by hare, rabbits, small mammals, Undergrazing, Restructuring agricultural land holding, Forestry, Stock feeding, Golf course, Walking, horseriding and non-motorised vehicles, Motorised vehicles, Trampling, overuse, Drainage, human induced changes in hydraulic conditions, Drying out, Invasion by a species
Mediterranean salt meadows (<i>Juncetalia maritimi</i>)	Marine and groundwater dependent. Sensitivity to hydrological change. Changes in salinity and tidal regime. Overgrazing, erosion and accretion	Overgrazing; erosion; invasive species, particularly common cordgrass (<i>Spartina anglica</i>); infilling and reclamation.
Mudflats and sandflats not covered by seawater at low tide	Surface and marine water dependent. Low sensitivity to hydrological changes. Aquaculture, fishing and pollution.	Aquaculture, fishing, dumping of wastes and water pollution.
<i>Petalophyllum ralfsii</i>	Lime-rich sandy habitat. Overgrazing. Water supply for damp conditions.	Grazing Imbalance, Physical Disturbance, Pollution, Desiccation, trampling from stock and recreation, changes in land use.
Salicornia and other annuals colonizing mud and sand	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Infilling, reclamation, invasive species.	Invasive Species; erosion and accretion.
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes")	Marine habitat subject to accretion (sand accumulation) and ablation (sand removal). Plants highly specialised and can cope with some degree of salinity (in the form of salt spray and occasional periods of inundation), an unstable substrate and limited levels of nutrients and moisture.	Grazing, Sand and gravel extraction, Removal of beach materials, Paths, tracks, cycling routes, Walking, horseriding and non-motorised vehicles, Motorised vehicles, Trampling, overuse, Sea defence or coastal protection works, Erosion, Other natural processes (depletion of sediment source)

Wetlands & Waterbirds	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	A number of pressures have been identified by Crowe (2005). These pressures include: the modification of wetland sites, particularly for industry or housing and increased levels of disturbance, largely related to recreational activity. Eutrophication at a number of wetland sites as a result of nutrient inputs from a range of polluting activities were also identified as a potential pressure. However this latter pressure is now being alleviated through stricter control of activities associated with water discharge/runoff etc. Climate change was also noted as a significant factor underlying changes in trends of wintering waterbirds in Ireland.
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4.3.2. Ecological Network Supporting Natura 2000 Sites

An analysis of the proposed Natural Heritage Areas and designated Natural Heritage Areas in terms of their role in supporting the species using Natura 2000 sites was undertaken. It was assumed that these supporting roles mainly related to mobile fauna such as mammals and birds which may use pNHAs and NHAs as “stepping stones” between Natura 2000 sites.

Article 10 of the Habitats Directive and the Habitats Regulations 2011 place a high degree of importance on such non-Natura 2000 areas as features that connect the Natura 2000 network. Features such as ponds, woodlands and important hedgerows were considered during the rest of the AA process.

The ESB Dolphins in Dublin Docks are a pNHA and are included in the South Dublin Bay and River Tolka Estuary SPA. The Royal and Grand Canals pNHAs have no relevant connectivity with the project and will not be affected.

5. Identification of Potential Impacts & Assessment of Significance

The project is not directly connected with or necessary to the management of the sites considered in the assessment and therefore potential impacts must be identified and considered.

5.1. Potential Impacts

This section uses the information collected on the sensitivity of each Natura 2000 site and describes any likely significant effects of implementation of the Project. This assumes the absence of any controls, conditions or assumption mitigation measures.

The likely significant effects of the Project are presented in Table 4 below, both in isolation and potentially in combination with other plans and projects.

A worst-case scenario would occur whereby the project would result in a significant detrimental change in water quality in Dublin Bay either alone or in combination with other projects or plans. The effect would have to be considered in terms of changes in water quality which would affect the habitats or food sources for which the SACs and SPA species are designated.

The works will be carried out under a Construction Management Plan which includes design measures to avoid unforeseen discharges to surface water.

Table 4. Outlining the potential impacts in the absence of mitigation of the Project.

Site	Distance from Project	Potential Direct Impacts e.g. Habitat Loss	Potential Indirect Impacts e.g. alteration to hydrological regime	Surface or Groundwater Contamination	Disturbance to Protected Species (Habitats Directive Annex II & IV)	Stage 2 AA Required
000206 North Dublin Bay SAC	c. 5 km	No	None	No – CMP Measures included.	No	No
000210 South Dublin Bay SAC	c. 3 km	No	None	No – CMP Measures included.	No	No
004006 North Bull Island SPA	c. 7 km	No	None	No – CMP Measures included.o	No	No
004024 South Dublin Bay and River Tolka Estuary SPA	2.6 km	No	None	No – CMP Measures included.	No	No

5.2. Assessment of Potential Cumulative Effects

Cumulative impacts or effects are changes in the environment that result from numerous human-induced, small-scale alterations. Cumulative impacts can be thought of as occurring through two main pathways: first, through persistent additions or losses of the same materials or resource, and second, through the compounding effects as a result of the coming together of two or more effects.

As part of the Screening for an Appropriate Assessment, in addition to the proposed works, other relevant projects and plans in the region must also be considered at this stage. This step aims to identify at this early stage any possible significant in-combination or cumulative effects / impacts of the proposed development with other such plans and projects on the Natura 2000 sites.

The only project with direct bearing on the proposed amendment is the existing Flood Alleviation Works. The ongoing construction works are following the avoidance measures outlined in the Construction Management Plan for that project and the proposed amendment will be required to follow same and as such there will be no in-combination impacts from the addition of the amendment.

Any development in Dublin City with potential surface water connectivity to the River Liffey is required to comply with Best Practice Construction Methodology to avoid surface water contamination/runoff. In this way, these developments would be unlikely to have in-combination effects.

The Dublin City Development Plan in complying with the requirements of the Habitats Directive requires that all Projects and Plans that could affect the Natura 2000 sites in the same zone of influence of the project site would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative impacts. In this way, any in-combination impacts with Plans or Projects for the area in which the development is located, would be avoided.

Any new applications for the project area will be assessed on a case by case basis by Dublin City Council which will determine the requirement for AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

6. Screening Statement

The conclusion of this Screening Report is that given the employment of best practice construction methods, there would be no significant impacts on the Qualifying interests or Conservation Objectives of the European sites considered in this assessment.

It has been objectively concluded by Moore Group Environmental Services that:

1. The project is not directly connected with, or necessary to the conservation management of the European sites considered in this assessment.
2. The implementation of the project will not have a direct impact on the European sites considered in this assessment.
3. The project has been designed to include best practice construction methodology which avoids indirect impacts on the European sites considered in this assessment.
4. The project, alone or in combination with other projects or plans, is not likely to have a significant effect on the European sites considered in this assessment in view of their conservation objectives.

It is the view of Moore Group Environmental Services that it is not necessary to undertake any further stage of the Appropriate Assessment process.

A finding of no significant effects report is presented in Appendix A in accordance with the EU Commission's methodological guidance (European Commission, 2001).

7. References

Crowe, O. (2005) Ireland's Wetlands and their Waterbirds; Status and Distribution. Birdwatch Ireland.

Department of the Environment, Heritage and Local Government (2010) Guidance on Appropriate Assessment of Plans and Projects in Ireland (as amended February 2010).

European Commission (2000) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

European Commission Environment DG (2001) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. European Commission, Brussels.

European Commission (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC: Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interests, compensatory measures, overall coherence and opinion of the Commission. European Commission, Brussels.

NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.

NPWS (2013) Site Synopsis: North Dublin Bay SAC 000206. Version date: 12.08.2013_000206_Rev13.Doc. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013) Conservation Objectives: North Dublin Bay SAC 000206. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013) Conservation Objectives: South Dublin Bay SAC 000210. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2014) Site synopsis of the North Bull Island SPA 004006. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2015) Site Synopsis: South Dublin Bay SAC 000210. Version date: 10.12.2015_000210_Rev15.Docx. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2015) Conservation Objectives: North Bull Island SPA 004006. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht

NPWS (2015) Site synopsis of the South Dublin Bay and River Tolka Estuary SPA. Version date: 30.05.2015. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2015) Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Appendix A
FINDING OF NO SIGNIFICANT EFFECTS REPORT
Finding no significant effects report matrix

Name of project or plan

River Dodder Flood Alleviation Works Phase 2C-2E Amendment

Name and location of the Natura 2000 site(s)

Departmental guidance suggests an assessment of Natura 2000 sites within a zone of influence of 15 km which can be revised down depending on the proposed development and location of Natura 2000 sites. There are 16 Natura 2000 sites located within a 15km radius of the project study area including the following:

- 000199 Baldoyle Bay SAC (10.5 km)
- 000202 Howth Head SAC (11.5 km)
- 000205 Malahide Estuary SAC (14 km)
- 000206 North Dublin Bay SAC (5.5 km)
- 000210 South Dublin Bay SAC (2.5 km)
- 001209 Glenasmole Valley SAC (13 km)
- 002193 Ireland's Eye SAC (14.5 km)
- 003000 Rockabill to Dalkey Island SAC (11.5 km)
- 004006 North Bull Island SPA (7 km)
- 004016 Baldoyle Bay SPA (10.5 km)
- 004024 South Dublin Bay and River Tolka Estuary SPA (3.5 km)
- 004025 Malahide Estuary SPA (14 km)
- 004040 Wicklow Mountains SPA (12 km)
- 004113 Howth Head Coast SPA (11.5 km)
- 004117 Ireland's Eye SPA (14.5 km)
- 004172 Dalkey Island SPA (13 km)

The proposed development site has limited biological and hydrological connectivity to the following sites:

- 000199 Baldoyle Bay SAC
- 000202 Howth Head SAC
- 000205 Malahide Estuary SAC
- 001209 Glenasmole Valley SAC
- 002193 Ireland's Eye SAC
- 003000 Rockabill to Dalkey Island SAC
- 004016 Baldoyle Bay SPA
- 004025 Malahide Estuary SPA
- 004040 Wicklow Mountains SPA
- 004113 Howth Head Coast SPA
- 004117 Ireland's Eye SPA
- 004172 Dalkey Island SPA

It is considered that there is no ecological pathway or linkage by which a significant impact could arise on these latter listed Natura 2000 sites. It is determined that there is no potential for significant effect on these sites and they are screened out at this preliminary stage for the following reasons:

- Distance from the development site,
- There is no direct connection between the site of the proposed development and these three sites,
- The potential for indirect impacts is unlikely due to distance and lack of connectivity.

The project location at College Green is then considered in terms of source-pathway-receptor relationship and the proximity of the only water course in the vicinity, the River Liffey and hydrological connectivity to Dublin Bay. Thus, there are four Natura 2000 sites located within a potential zone of influence of the Project:

- 000206 North Dublin Bay SAC
- 000210 South Dublin Bay SAC
- 004006 North Bull Island SPA
- 004024 South Dublin Bay and River Tolka Estuary SPA

Description of the project or plan

The project consisting of a Amendment to the River Dodder Flood Alleviation Works Phase 2C-2E which is currently in construction. The Amendment involves conversion of a proposed flood wall to a cycleway to the rear of Donnybrook Stadium.

The section in question runs along the river at the back of Old Wesley RFC, Bective LTC and Bective Rangers playing fields at Donnybrook from Anglesea Bridge to the corner of Herbert Park.

The works underway have previously been assessed as part of the River Dodder Catchment Flood Risk Management Plan and Appropriate Assessment found that after Construction Management Measures were employed, there would be no significant impact on the European Sites located in Dublin Bay as having connectivity to the project.

The same measures will be included in the addition to the plan of the proposed Amendment.

Is the project or plan directly connected with or necessary to the management of the site(s)

No

Are there other projects or plans that together with the projects or plan being assessed could affect the site

The only project with direct bearing on the proposed Amendment is the existing Flood Alleviation Works. The ongoing construction works are following the avoidance measures outlined in the Construction Management Plan for that project and the proposed Amendment will be required to follow same and as such there will be no in-combination impacts from the addition of the Amendment.

Any development in Dublin City with potential surface water connectivity to the River Liffey is required to comply with Best Practice Construction Methodology to avoid surface water contamination/runoff. In this way, these developments would be unlikely to have in-combination effects.

The Dublin City Development Plan in complying with the requirements of the Habitats Directive requires that all Projects and Plans that could affect the Natura 2000 sites in the same zone of influence of the project site would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative impacts. In this way, any in-combination impacts with Plans or Projects for the area in which the development is located, would be avoided.

Any new applications for the project area will be assessed on a case by case basis by Dublin City Council which will determine the requirement for AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

The assessment of significance of effects

Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site.

A worst-case scenario would occur whereby the project would result in a significant detrimental change in water quality in Dublin Bay either alone or in combination with other projects or plans. The effect would have to be considered in terms of changes in water quality which would affect the habitats or food sources for which the SACs and SPA species are designated.

Explain why these effects are not considered significant

The works will be carried out under a Construction Management Plan which includes design measures to avoid unforeseen discharges to surface water.

List of agencies consulted: provide contact name and telephone or e-mail address

Dublin City Council.

Response to consultation

The need for Appropriate Assessment Screening was determined in pre-planning consultation with Dublin City Council.

Data collected to carry out the assessment

Who carried out the assessment

Moore Group Environmental Services.

Sources of data

NPWS database of designated sites at www.npws.ie
National Biodiversity Data Centre database <http://maps.biodiversityireland.ie>

Level of assessment completed

Desktop Assessment with updated EclA.

Where can the full results of the assessment be accessed and viewed

Dublin City Council Planning.

Overall Conclusions

The conclusion of this Screening Report is that given the employment of best practice construction methods, there would be no significant impacts on the Qualifying interests or Conservation Objectives of the European sites considered in this assessment.

It has been objectively concluded by Moore Group Environmental Services that:

1. The project is not directly connected with, or necessary to the conservation management of the European sites considered in this assessment.
2. The implementation of the project will not have a direct impact on the European sites considered in this assessment.
3. The project has been designed to include best practice construction methodology which avoids indirect impacts on the European sites considered in this assessment.
4. The project, alone or in combination with other projects or plans, is not likely to have a significant effect on the European sites considered in this assessment in view of their conservation objectives.

It is the view of Moore Group Environmental Services that it is not necessary to undertake any further stage of the Appropriate Assessment process.

Appendix 9.1 Soils, Geology and Hydrogeology

Impact Assessment Criteria

Appendix 9.1 Soils, Geology and Hydrogeology Impact Assessment Criteria

To assess the extent and degree of impacts associated with both the construction and operational phases of the development may have on the soils and geological aspects of the environment, an approach has been prepared with reference to the document produced by the Institute of Geologists of Ireland (IGI) entitled *Geology in Environmental Impact Statements – a Guide* (IGI, 2002).

No significance rating criteria are provided in this document or any others in Ireland. For this reason, the significance criteria from the NRA guidance document, *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes* (NRA, 2009b), was used to provide the significance ratings for this impact assessment.

The NRA document was developed for road schemes, however many of the soil/geology and hydrogeological impacts that may occur on the Dodder Flood Alleviation Scheme Phase 2C-2E (e.g. potential for contamination from spills and during excavation) are similar to those that occur on road schemes so the use of this document was deemed most appropriate.

Table 9.1 shows the criteria for assessing the importance of soil and geology features within the study area.

Table 9.1: Criteria for Rating Soil and Geology Site Attributes (based on Box 4.1, NRA 2009b)

Importance	Criteria	Typical Example
Very High	Attribute has a high quality, significance or value on a regional or national scale Degree or extent of soil contamination is significant on a national or regional scale Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale	Geological feature rare on a regional or national scale (NHA) Large existing quarry or pit Proven economically extractable mineral resource
High	Attribute has a high quality, significance or value on a local scale Degree or extent of soil contamination is significant on a local scale Volume of peat and/or soft organic soil underlying route is significant on a local scale	Contaminated soil on site with previous heavy industrial usage Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site) Well drained and/or highly fertility soils
Medium	Attribute has a medium quality, significance or value on a local scale Degree or extent of soil contamination is moderate on a local scale Volume of peat and/or soft organic soil underlying route is moderate on a local scale*	Contaminated soil on site with previous light industrial usage Small recent landfill site for mixed wastes Moderately drained and/or moderate fertility soils Small existing quarry or pit

Importance	Criteria	Typical Example
Low	<p>Attribute has a low quality, significance or value on a local scale</p> <p>Degree or extent of soil contamination is minor on a local scale</p> <p>Volume of peat and/or soft organic soil underlying route is small on a local scale*</p>	<p>Large historical and/or recent site for construction and demolition wastes</p> <p>Small historical and/or recent landfill site for construction and demolition wastes</p> <p>Poorly drained and/or low fertility soils</p> <p>Uneconomically extractable mineral resource</p>

*relative to the total volume of inert soil disposed of and/or recovered

Table 9.2 shows the criterion for assessing the importance of hydrogeology features within the study area.

Table 9.2: Criteria for Rating Hydrogeology Site Attributes (based on Box 4.3, NRA 2009b)

Importance	Criteria	Typical Example
Extremely High	Attribute has a high quality or value on an international scale	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status
Very High	Attribute has a high quality or value on a regional or national scale	<p>Regionally Important Aquifer with multiple wellfields.</p> <p>Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – e.g. NHA status</p> <p>Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source</p>
High	Attribute has a high quality or value on a local scale	<p>Regionally Important Aquifer</p> <p>Groundwater provides large proportion of baseflow to local rivers</p> <p>Locally important potable water source supplying >1000 homes</p> <p>Outer source protection area for regionally important water source</p> <p>Inner source protection area for locally important water source</p>
Medium	Attribute has a medium quality or value on a local scale	<p>Locally Important Aquifer Potable water source supplying >50 homes</p> <p>Outer source protection area for locally important water source</p>
Low	Attribute has a low quality or value on a local scale	<p>Poor Bedrock Aquifer</p> <p>Potable water source supplying <50 homes</p>

The criterion for establishing the magnitude of impacts on soil/geology attributes, based on the NRA Guidelines (NRA, 2009b) is outlined in **Table A13.3**.

Table 9.3: Criteria for rating Soil and Geology impact significance at EIS stage (based on Box 5.1, NRA 2009b)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute	Loss of high proportion of future quarry or pit reserves Irreversible loss of high proportion of local high fertility soils Removal of entirety of geological heritage feature Requirement to excavate / remediate entire waste site Requirement to excavate and replace high proportion of peat, organic soils and/or soft mineral soils beneath alignment
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Loss of moderate proportion of future quarry or pit reserves Removal of part of geological heritage feature Irreversible loss of moderate proportion of local high fertility soils Requirement to excavate / remediate significant proportion of waste site Requirement to excavate and replace moderate proportion of peat, organic soils and/or soft mineral soils beneath alignment
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Loss of small proportion of future quarry or pit reserves Removal of small part of geological heritage feature Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils Requirement to excavate / remediate small proportion of waste site Requirement to excavate and replace small proportion of peat, organic soils and/or soft mineral soils beneath alignment
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	No measurable changes in attributes
Minor Beneficial	Results in minor improvement of attribute quality	Minor enhancement of geological heritage feature
Moderate Beneficial	Results in moderate improvement of attribute quality	Moderate enhancement of geological heritage feature
Major Beneficial	Results in major improvement of attribute quality	Major enhancement of geological heritage feature

The criterion for establishing the magnitude of impacts on hydrogeology attributes, based on NRA Guidelines (2009) is outlined in **Table 9.4**.

Table 9.4: Criteria for rating hydrogeology impact significance at EIS stage (based on Box 5.3, NRA 2009b)

Magnitude of Impact	Criteria	Typical Examples ¹
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute	Removal of large proportion of aquifer Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems Potential high risk of pollution to groundwater from routine run-off ² Calculated risk of serious pollution incident >2% annually ³
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Removal of moderate proportion of aquifer Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems Potential medium risk of pollution to groundwater from routine run-off ² Calculated risk of serious pollution incident >1% annually ³
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Removal of small proportion of aquifer Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems Potential low risk of pollution to groundwater from routine run-off ² Calculated risk of serious pollution incident >0.5% annually ³
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Calculated risk of serious pollution incident <0.5% annually ³

¹ Additional Examples are provided in the NRA Guidance Document, 2009

² refer to Annex 1, Method C, Annex 1 of HA216/06

³ refer to Appendix B3/Annex 1, Method D, Annex 1 of HA216/06

The significance of potential environmental impacts on the soils/geology and on the hydrogeological environments are based on the matrix presented in **Table A13.5** which takes account of both the importance of an attribute and the magnitude of the potential environmental impacts on the attribute.

Table 9.5: Rating of Significant Environmental Impacts at EIA Stage (based on Box 5.4, NRA 2009b)

		Magnitude of Impact			
		Negligible	Small	Moderate	Large
Importance of Attribute	Extremely High	Imperceptible	Significant	Profound	Profound
	Very High	Imperceptible	Significant/ Moderate	Profound/ Significant	Profound
	High	Imperceptible	Moderate/ Slight	Significant/ Moderate	Severe/ Significant
	Medium	Imperceptible	Slight	Moderate	Significant
	Low	Imperceptible	Imperceptible	Slight	Slight/Moderate