Appendix F

EIA Screening

Wicklow County Council

Bray Sustainable Transport Bridge

Environmental Impact Assessment Screening Report

RDPTB - ARUP - ZZZ - ZZZ - RP - LE - 0002

P02 | 9 July 2021

Job number 268095-00

Ove Arup & Partners Ireland Ltd

50 Ringsend Road
Dublin 4
D04 T6X0
Ireland
www.arup.com

ARUP

Contents

Appendices

1 Introduction

Arup has prepared an Environmental Impact Assessment (EIA) screening report on behalf of Wicklow County Council (WCC) for the proposed Bray Sustainable Transport Bridge and road link in Bray, County Wicklow. The proposed development will include the construction of a road link and bridge that will cater for buses, taxis, cyclists and pedestrians, and will not be accessible by private vehicles. The proposed bridge will be a bowstring arch bridge which crosses the river with a single span of c. 63m. The road link will be approximately 225m length north and 175m south of the river. Therefore, the entire length of new two-lane carriageway will be approximately 460m. The proposed development is intended to alleviate current traffic congestion within Bray and to encourage a move towards more sustainable transport patterns.

Whilst not forming part of the current proposals, it is intended that the road link and bridge will be capable of accommodating the future Luas Line B2 extension to Bray Station. This document provides the competent authority (Wicklow County Council (WCC)), with the information necessary to determine whether EIA is required for the proposed development.

The proposed development is broadly located in Bray Town Centre, between Ravenswell Road and Seapoint Road, and will cross the River Dargle. There is a newly constructed school complex to the immediate north, which has been constructed on former golf course lands. Further undeveloped golf course lands and a mix of residential and commercial uses lie to the west of the proposed development. The main Dublin-Bray railway line is located immediately east of the proposals, with Bray Harbour located further east, along with its road link to the town centre, and a mix of associated industrial and recreational uses. Bray railway station and the tourist area of Bray Promenade is located directly south. Refer to **Figure 1.**

Figure 1: Location of the proposed development (indicated by red star) | Not to Scale | Source: Open Street Maps

2 Legislation, Guidance and Requirements for EIA Screening

2.1 Overview

This section outlines the relevant legislation and guidance reviewed in the compilation of this EIA screening report. This section also examines the mandatory requirement for EIA against the relevant EIA classes and outlines the requirement for screening of sub-threshold developments.

2.2 Introduction

The current requirements for EIA for projects are set out by the European Union in Council Directive 2011/92/EU[1] on the Assessment of the Effects of Certain Public and Private Projects on the Environment as amended by Directive 2014/52/EU[2].

The Planning and Development Act 2000, as amended and the Planning and Development Regulations, 2001, as amended, have been amended by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (SI No. 296 of 2018) to take account of the requirements of the EIA Directive (Directive 2014/52/EU).

The Roads Act (1993), has also been amended by the European Union (Road Act 1993) (Environmental Impact Assessment) (Amendment) Regulations 2019 (SI 296 of 2019) to take account of the requirements of the EIA Directive (Directive 2014/52/EU).

The proposed development is considered to be a “road development” under the meaning of the Roads Act (1993), as amended (Refer to Section 2.4 below). Therefore, the requirements for EIA Screening under the Roads Act (1993), as amended, have been followed in this report.

A review of the above legislation was undertaken for the purpose of this EIA screening report and is further analysed in the sections below. The following guidance and consultation documents have also been considered during the preparation of this report:

- Department of Housing, Planning, Community and Local Government (2018) *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018);*
- Department of Housing, Planning, Community and Local Government (2017) *Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems*;

[1] Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification).
[2] Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

- Department of Housing, Planning, Community and Local Government (2017) *Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on the Administrative Provisions in Advance of Transposition*;
- Department of the Environment, Heritage and Local Government (2003) Environmental Effect Assessment (EIA) *Guidance for Consent Authorities regarding Sub-Threshold Development*;
- Environmental Protection Agency (2017) *Revised Guidelines on the Information to be contained in Environmental Impact Statements (Draft August 2017)*;
- Environmental Protection Agency (2015) *Advice Notes for Preparing Environmental Impact Statements Draft September 2015*;
- Environmental Protection Agency (2003) *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*;
- Environmental Protection Agency (2002) *Guidelines on the Information to be contained in Environmental Impact Statements*;
- European Commission (2017) *Guidance on EIA Screening*;
- European Commission (2015) *Interpretation of definitions of project categories of annex I and II of the EIA Directive*; and
- National Roads Authority (2008) *Environmental Impact Assessment of National Road Schemes – A Practical Guide.*

2.3 EIA Directive 2014/52/EU

Directive (2014/52/EU) sets out the requirements of the EIA process, including screening the need for an EIA. Projects listed in Annex I of the EIA Directive require a mandatory EIA whilst projects listed in Annex II require screening to determine whether an EIA is required.

Articles 4(4) and 4(5) of the EIA Directive set out the requirements for EIA screening of Annex II projects as set out below. Annex III sets out the criteria to be examined when carrying out EIA screening.

The Roads Act (1993), has been amended by the European Union (Road Act 1993) (Environmental Impact Assessment) (Amendment) Regulations 2019 (SI 279 of 2019) to take account of the requirements of the EIA Directive (Directive 2014/52/EU). Annex III is specifically referenced in Section 50(1)(e) of the Roads Act (1993), as amended, to be considered when carrying out EIA Screening.

Articles 4(4) and 4(5) of the EIA Directive

"4(4) Where Member States decide to require a determination for projects listed in Annex II, the developer shall provide information on the characteristics of the project and its likely significant effects on the environment. The detailed list of information to be provided is specified in Annex IIA. The developer shall take into account, where relevant, the available results of other relevant assessments of the effects on the environment carried out pursuant to Union legislation other than this Directive. The developer may also provide a description of

any features of the project and/or measures envisaged to avoid or prevent what might otherwise have been significant adverse effects on the environment.

4(5) The competent authority shall make its determination, on the basis of the information provided by the developer in accordance with paragraph 4 taking into account, where relevant, the results of preliminary verifications or assessments of the effects on the environment carried out pursuant to Union legislation other than this Directive. The determination shall be made available to the public and:

(a) where it is decided that an environmental effect assessment is required, state the main reasons for requiring such assessment with reference to the relevant criteria listed in Annex III; or

(b) where it is decided that an environmental effect assessment is not required, state the main reasons for not requiring such assessment with reference to the relevant criteria listed in Annex III, and, where proposed by the developer, state any features of the project and/or measures envisaged to avoid or prevent what might otherwise have been significant adverse effects on the environment."

Annex III of the EIA Directive

1. Characteristics of projects

The characteristics of projects must be considered, with particular regard to: (a) the size and design of the whole project; (b) cumulation with other existing and/or approved projects; (c) the use of natural resources, in particular land, soil, water and biodiversity; (d) the production of waste; (e) pollution and nuisances; (f) the risk of major accidents and/or disasters which are relevant to the project concerned, including those caused by climate change, in accordance with scientific knowledge; (g) the risks to human health (for example due to water contamination or air pollution).

2. Location of projects

The environmental sensitivity of geographical areas likely to be affected by projects must be considered, with particular regard to: (a) the existing and approved land use; (b) the relative abundance, availability, quality and regenerative capacity of natural resources (including soil, land, water and biodiversity) in the area and its underground; (c) the absorption capacity of the natural environment, paying particular attention to the following areas: (i) wetlands, riparian areas, river mouths; (ii) coastal zones and the marine environment; (iii) mountain and forest areas; (iv) nature reserves and parks; (v) areas classified or protected under national legislation; Natura 2000 areas designated by Member States pursuant to Directive 92/43/EEC and Directive 2009/147/EC; (vi) areas in which there has already been a failure to meet the environmental quality standards, laid down in Union legislation and relevant to the project, or in which it is considered that there is such a failure; (vii) densely populated areas; (viii) landscapes and sites of historical, cultural or archaeological significance.

3. Type and characteristics of the potential impact

The likely significant effects of projects on the environment must be considered in relation to criteria set out in points 1 and 2 of this Annex, with regard to the impact of the project on the factors specified in Article 3(1), taking into account: (a) the magnitude and spatial extent of the impact (for example geographical area and size of the population likely to be affected); (b) the nature of the impact; (c) the transboundary nature of the impact; (d) the intensity and

complexity of the impact; (e) the probability of the impact; (f) the expected onset, duration, frequency and reversibility of the impact; (g) the cumulation of the impact with the impact of other existing and/or approved projects; (h) the possibility of effectively reducing the impact.

2.3.4 Roads Act, 1993, as amended

Given that the proposed bridge and link road development is considered to be a "road development" under the meaning of the Roads Act (1993), as amended, the requirements for EIA Screening under this legislation have been followed in this report. The definition of a 'road' is defined in Section 2 of the Roads Act (1993), as amended, and is set out below.

"(a) any street, lane, footpath, square, court, alley or passage,

(b) any bridge, viaduct, underpass, subway, tunnel, overpass, overbridge, flyover, carriageway (whether single or multiple), pavement or footway,

(c) any weighbridge or other facility for the weighing or inspection of vehicles, toll plaza or other facility for the collection of tolls, service area, emergency telephone, first aid post, culvert, arch, gulley, railing, fence, wall, barrier, guardrail, margin, kerb, lay-by, hard shoulder, island, pedestrian refuge, median, central reserve, channelliser, roundabout, gantry, pole, ramp, bollard, pipe, wire, cable, sign, signal or lighting forming part of the road, and

(d) any other structure or thing forming part of the road and—

(i) necessary for the safety, convenience or amenity of road users or for the construction, maintenance, operation or management of the road or for the protection of the environment, or

(ii) prescribed by the Minister";

A "road authority" is defined as:

"road authority", except in Part V, means the council of a county, the corporation of a county or other borough, or the council of an urban district";

A "public road" is defined as:

"public road" means a road over which a public right of way exists and the responsibility for the maintenance of which lies on a road authority.

The proposed development is interpreted to be a "road" development under the legislation and WCC is a "road authority". The proposed construction of the bridge is interpreted as the construction of a "public road" under the Act.

2.3.5 Requirement for Mandatory EIA under the Roads Act 1993, As Amended

Section 50(1) of the Roads Act (1993) (as amended by S.I No 279 of 2019) relates to road developments subject to Environmental Impact Assessment.

The thresholds for mandatory EIA of a road development are set out specifically in Section 50(1)(a) below.

Roads Act (1993), as amended

"50. (1) (a) A road development that is proposed that comprises any of the following shall be subject to an environmental impact assessment:

(i) the construction of a motorway;

(ii) the construction of a busway;

(iii) the construction of a service area;

(iv) any prescribed type of road development consisting of the construction of a proposed public road or the improvement of an existing public road."

The prescribed types of proposed road development for the purposes of Section 50 (1)(a)(iv) are defined in Article 8 of SI 119 of 1994 Roads Regulations and set out below.

SI 119 of 1994 Roads Regulations[3]. Part V Environmental Impact Assessment

"(8). The prescribed types of proposed road development for the purpose of subsection (1)(a)(iv) of section 50 of the Act shall be—

(a) the construction of a new road of four or more lanes, or the realignment or widening of an existing road so as to provide four or more lanes, where such new, realigned or widened road would be eight kilometres or more in length in a rural area, or 500 metres or more in length in an urban area;

(b) the construction of a new bridge or tunnel which would be 100 metres or more in length"

The proposed Bray Sustainable Transport Bridge "road" development is neither a motorway or a busway and it consists of the construction of a 63m bridge. The road link will not involve construction of four or more lanes. Therefore, it is not a prescribed type of development for which a mandatory EIA is required.

Notwithstanding the mandatory thresholds, this Screening Report considers whether the Proposed Scheme will give rise to potential significant effects (sub-threshold development) as per the Roads Act 1993 as amended (by S.I. 279 of 2019), which is summarised below.

2.3.6 EIA Screening for road developments under the Roads Act, (1993) as amended

Sections 50(1)(b) to (f) set out the requirements for EIA Screening under the Roads Act, (1993), as amended. This legislation is discussed further below.

[3] Amended by SI 486/2019

Section 50(1)(b) states that where An Bord Pleanála considers that a proposed road development (other than development as listed in Section 50(1)(a)) consisting of the "*construction of a proposed public road or the improvement of an existing public road*" would be likely to have significant effects on the environment, it shall decide that it will be subject to EIA (i.e. it must carry out EIA Screening).

Section 50(1)(c) states that where a road authority considers that a proposed road development that it proposes (other than development as listed in Section 50(1)(a)) consisting of the "*construction of a proposed public road or the improvement of an existing public road*" would be likely to have significant effects on the environment (i.e. it must carry out EIA Screening), it shall inform An Bord Pleanála in writing prior to making an application.

Roads Act (1993), as amended

"50 (1) (b) If An Bord Pleanála considers that any road development proposed (other than development to which paragraph (a) applies) consisting of the construction of a proposed public road or the improvement of an existing public road would be likely to have significant effects on the environment it shall direct that the development be subject to an environmental impact assessment".

(c) Where a road authority or, as the case may be, the Authority considers that a road development that it proposes (other than development to which paragraph (a) applies) consisting of the construction of a proposed public road or the improvement of an existing public road would be likely to have significant effects on the environment, it shall inform An Bord Pleanála in writing prior to making any application to the Bord for an approval referred to in section 51(1) in respect of the development."

Further, Section 50(1)(d) states that where the construction of a proposed public road is located on a European site (or other important sites as listed in 50(1)(d)), the road authority proposing the development must make an EIA screening determination and it must also make its decision publicly available (Section 50(1)(f)).

Finally, Section 50(1)(e) states that An Bord Pleanála or the road authority shall take into account the relevant selection criteria specified in Annex III (of the EIA Directive) in making its EIA Screening determination.

Roads Act (1993), as amended

"50 (1) (d) In particular, where a proposed development (other than development to which paragraph (a) applies) consisting of the construction of a proposed public road or the improvement of an existing public road would be located on -

(i) a European Site within the meaning of Regulation 2 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011),

(ii) land established or recognised as a nature reserve within the meaning of section 15 or 16 of the Wildlife Act 1976 (No. 39 of 1976),

(iii) land designated as a refuge for fauna or flora under section 17 of the Wildlife Act 1976 (No. 39 of 1976), or

(iv) land designated a natural heritage area under section 18 of the Wildlife (Amendment) Act 2000,

the road authority or the Authority, as the case may be, proposing the development shall decide whether or not the proposed development would be likely to have significant effects on the environment.

(e) Where a decision is being made pursuant to this subsection on whether a road development that is proposed would or would not be likely to have significant effects on the environment, An Bord Pleanála, or the road authority or the Authority concerned (as the case may be), shall take into account the relevant selection criteria specified in Annex III.

(f) Where a road authority or the Authority, as the case may be, makes a decision under paragraph (d) it shall -

(i) make the decision available for inspection by members of the public, and

(ii) make an electronic version of the decision available on its website."

Given that the proposed Bray Sustainable Transport Bridge and road link development is interpreted under the legislation as the "construction of public road" it is considered that Wicklow County Council must make an EIA Screening determination (having regard to Annex III of the EIA Directive) as to whether it would be likely to have significant effects on the environment or not and it must make its decision publicly available. Wicklow County Council must also inform An Bord Pleanála of its decision (if it determines that an EIA is required) prior to making any application.

The following sections provide the information required as per the criteria set out in Annex III to enable Wicklow County Council to make an EIA Screening Determination as to whether an EIA is required for the proposed Bray Sustainable Transport Bridge and road link development. The characteristics and location of the proposed development are discussed in Section 3 and Section 4 respectively, and the type and characteristics of the potential effects are discussed in Section 5.

3 Characteristics of the Proposed Development

The first criterion included in Annex III of the EIA Directive (Refer to Section 2.3 above) relates to the characteristics of the proposed development:

The proposed development will include the construction of a new public transport bridge and road link, which will include cycle and pedestrian provision, over the River Dargle in Bray. It is anticipated that private vehicular use will be prohibited within the proposed development. The bridge has also been designed to be capable of accommodating infrastructure requirements for the future Luas Line

B2 extension to Bray Station, although this is not part of the current proposals.

Figure 1 and **Figure 2** provide an overview of the location of the proposed development and its indicative route.

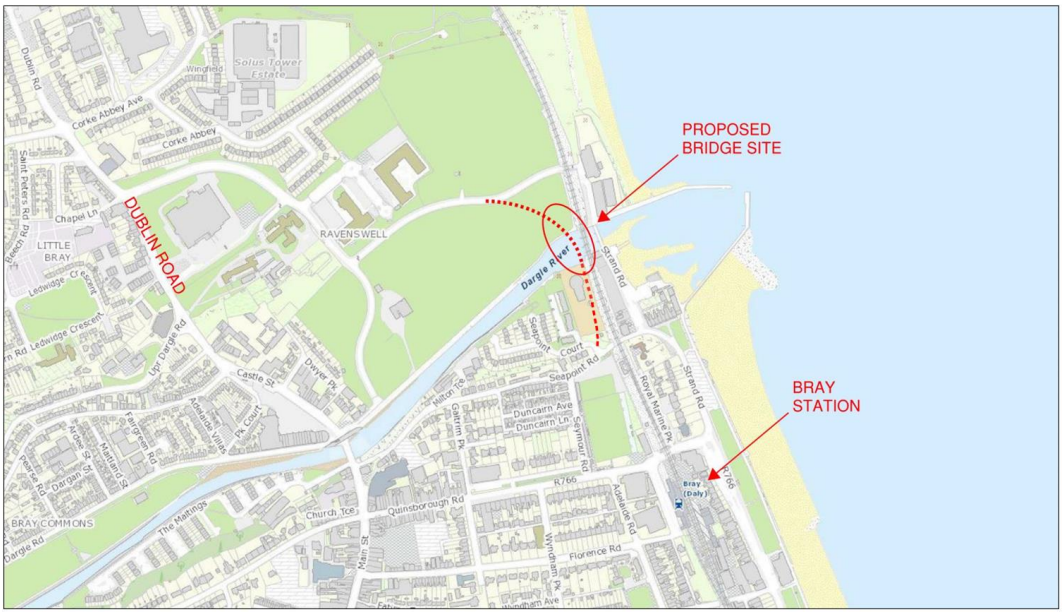


Figure 2: Indicative route of the proposed development | Not to Scale | Source: Open Street Maps

The total area extent for proposed development is approximately 0.6 hectares, which includes land north (4,000m^2) and south (2,000m^2) of the river. There will be no permanent footprint on the river itself.

Temporary land take will be required in order to facilitate temporary platforms within the waterway. This will comprise approximately 1,000m^2 on the northern side of the river bed, approximately 1,000m^2 on the southern side of the river bed and approximately 200m^2 for the laying of culverts on the river bed. The temporary platforms will be constructed by importing rock material. Further temporary land take of 7,500m^2 will be required within the former golf course lands to facilitate construction works areas. This temporary land take will be limited to current areas of hardstanding.

The proposed bridge will be a bowstring arch development which crosses the river with a width of approximately 15m and single span of 63m north to south.

The new road link will be approximately 225m length north of the river, and 175m south. Therefore, the entire length of new two-lane carriageway will be approximately 460m.

Figure 3 shows the indicative route of the proposed development in the context of existing land uses within and surrounding the application site.

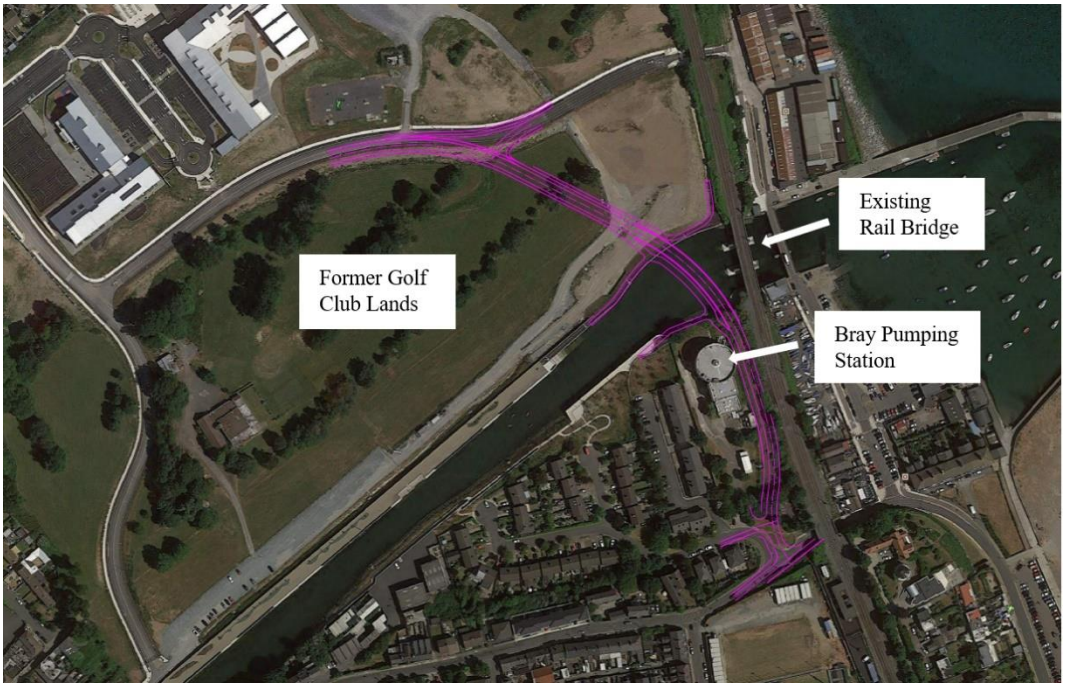


Figure 3: Indicative Route Through Site Surrounds | Not to Scale | Source: Bing Maps

Further detail on the layout provided in Drawing No. RDPTB-ARUP-ZZZ-ZZZ-SK-CB-1000 in **Appendix A.**

The arch itself will comprise of a fabricated steel plated box, potentially composite with a concrete infill, depending on the structural demands placed on the arch. The hangers will comprise of alloy steel cables, capable of supporting the structure's self-weight and imposed bridge loads.

Options for the superstructure would comprise either a steel and concrete composite deck or a fully post-tensioned concrete deck, depending on structural demand.

3.1 Construction

It is expected that construction of the proposed development will commence in Q1 2022, subject to planning approval. The total duration of all construction works is expected to be approximately 2 years.

Refer to **Appendix B** for an overview of the construction sequencing/methodology.

The proposed bridge will require temporary works within the waterway to allow for construction to proceed. Rock materials will be imported to infill northern and southern portions of the river bed, which will represent temporary platforms with a footprint of approximately 750m³ each. These will enable end span steel girders (a type of steel beam) to be installed on both north and south banks of the river. It is estimated that the quantity of rock infill material required will be in the region of 6,000m³. The existing quay wall on the southern bank will be broken out locally, and piling will be required to enable the installation of these girders. Temporary towers will be erected to support the end spans during construction. The central span steel girder will then be installed between the two end span steel girders. Once the bridge is constructed it is proposed that the rock material and temporary towers will be removed from the river bed.

Temporary concrete pipe culverts will be laid onto the river bed between the temporary platforms to facilitate access for machinery. Refer to **Appendix B** for an overview of the proposed construction sequencing/methodology. The detailed methodology will be agreed with Inlands Fisheries Ireland in accordance with their *Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters* (IFI, 2016).

The following construction materials will be required for the installation of the proposed bridge:

- Concrete;
- Steel;
- Cables; and
- Expansion joints and bearings.

Approval for the works will be also sought from the OPW in accordance with Section 50 of the Arterial Drainage Act 1945.

The construction of the link road will require removal of some trees and vegetation as well as temporary land take from areas of hardstanding within the former golf course lands, which will be required to accommodate site construction. Activities including the storage of materials and site works will be restricted to within these defined works boundaries. In addition, there will be temporary land take within the river bed. Temporary construction areas will be reinstated following construction.

Permanent land take of 6,000m^2 (0.6Ha) will be required for the permanent footprint of the northern and southern portion of the link road.

While some materials will be required in carrying out the proposed works, it is not considered that there will be a significant use of natural resources as part of the construction.

To ensure that traffic disturbance will not arise on local, national or regional roads, a Construction Traffic Management Plan will be prepared by the appointed Contractor, in consultation with the Local Roads Authority.

As the construction works are standard in nature and will involve normal routine methodologies it is predicted that the risk of accidents, having regard to substances or technologies used, will not result in significant environmental effects.

The employment of good construction management practices for the proposed development will serve to minimise the risk of pollution of soil, storm water run-off or groundwater and these will be implemented by the contractor for the duration of the construction works.

Works will take place within the river itself and adjacent to the river, which may give rise to sediment displacement. However, the volumes which will be displaced will be low.

Noise generated during the construction would be mainly from construction traffic and limited piling activities associated with erection of the bridge. Localised dust emissions will be generated during the construction activities.

3.2 Operation

The new road link and bridge, when operational, will facilitate the movement of pedestrians, cyclists and public transport across the River Dargle, and will link with the existing highway and cycle/pedestrian provision. The new infrastructure will be in close proximity to sensitive receptors such as residential units and a school complex. The long-term operation of the proposed development is intended to alleviate current traffic congestion within Bray and to encourage a move towards more sustainable transport patterns.

Noise and air emissions arising from the operation of the development are not considered to be significant given the prohibited use of it by private vehicles as well as its location in an already heavily urbanised environment. It is considered that the proposed development will contribute to better air quality in the town in the longer term.

4 Location of the Proposed Development

The second criterion included in Annex III of the EIA Directive relates to the location of the proposed development. The proposed development is broadly located in Bray Town Centre, between Ravenswell Road and Seapoint Road, and will cross the River Dargle. There is a newly constructed school complex to the immediate north, which has been constructed on former golf course lands. Further undeveloped golf course lands and a mix of residential and commercial uses lie to the west of the proposed development. The main Dublin-Bray railway line is located immediately east of the proposals, with Bray Harbour located further east, along with its road link to the town centre, and a mix of associated industrial and recreational uses. Bray railway station and the tourist area of Bray Promenade is located directly south.

The proposed development, in general, is located within a heavily urbanised area. The former golf course lands have been the subject of major development proposals for a number of years and are included in the Bray Municipal District Local Area Plan (2018) as a Specific Local Objective for mixed use development.

The proposed development site has been identified in a range of policy documents as a preferred location for the routing of the Luas Line B2 extension to Bray. The proposed BusConnects Bray to Dublin City Centre Core Bus Corridor is currently at public consultation stage, and if permitted, will commence approximately 500m southwest of the proposed development, at the junction of Ravenswell Road and Castle Street.

No acquisition of land will be required for the proposed development to proceed and no land ownership issues are envisaged.

The proposed development will be located on lands that are defined as a mixture of ‘Spoil and Bare Ground’, ‘Recolonising Bare Ground’ ‘Buildings and Artificial Surfaces’, ‘Scrub’, ‘Scattered Trees and Parkland’, ‘Amenity Grassland’, ‘Tidal River’ and ‘Sea Walls, Piers and Jetties’ according to Fossit habitat classifications.

The closest designated site to the proposed development is Bray Head, which is a Special Area of Conservation (SAC) and a proposed Natural Heritage Area (pNHA). It is located 1.6km southeast of the proposed development. The River Dargle is also a designated salmonid watercourse under S.I. No. 293/1988 – European Communities (Quality of Salmonid Waters) Regulations, 1988. Atlantic salmon is listed on Annex II of the EU Habitats Directive.

There are no important structures of archaeological and/or architectural significance within the proposed development. However, there are some features in the wider area (see **Section 5.3**), including a Martello tower and a number of buildings listed in the NIAH.

A Landscape Character Assessment (LCA) of the county has been prepared as part of the Wicklow County Development Plan 2016-2022 (CDP). In developing the LCA, a landscape sensitivity map was prepared for the County.

According to the CDP, urban areas such as the proposed development site are considered to have already been deemed suitable for development, thus landscape

or visual impact assessment is considered unnecessary. Protected views and prospects around Bray Harbour are set out in the Bray Municipal District Local Area Plan 2018. Any application for development in locations within the view/prospect will be required to provide an assessment of the view/prospect and an evaluation of how the development would change or interfere with that view/prospect.

5 Characteristics of Potential Impacts

The third criterion included in Annex III of the EIA Directive relates to the type and characteristics of potential impacts of the proposed development. In order to determine the potential impacts of the proposed development on the environment, having regard to the characteristics and location of the proposed development, the following aspects were assessed:

- Population and Human Health;
- Biodiversity and Water Quality;
- Archaeological, Architectural and Cultural Heritage;
- Water Quality;
- Landscape and Visual;
- Land, Soils and Geology;
- Air Quality and Climate;
- Noise and Vibration; and
- Land Use and Material Assets.

5.1 Population and Human Health

The nearest residence to the proposed bridge development is located at Seapoint Court, approximately 40m to its southwest. The nearest residence to the proposed link road is located on Seapoint Road, approximately 20m to its west.

Other sensitive land uses are located surrounding the proposed development area. A school complex (comprising a 480 pupil post primary school, Coláiste Ráithín and a 400 pupil primary school, St Philomena's) has recently been constructed approximately 200m northwest of the proposed bridge development, on the former golf course lands.

5.1.4 Construction

There is potential for disruption to nearby residents, road users and pedestrians resulting from construction vehicular movements during the proposed works, with associated noise and dust emissions.

There is also potential for indirect traffic impacts to occur in different locations during the construction works. However, a traffic management plan incorporating the use of a stop-go system will be implemented for the duration of the works to minimise impacts. It is not envisaged that full road closures will be required.

The pedestrian and cycle track on the northern bank of the River Dargle will be disrupted for the duration of the construction works. However, this disruption will be temporary only and the track will be fully repaired, reinstated and enhanced through improved linkages across the river, following the completion of the construction works.

The construction works on the southern bank of the River Dargle may result in local traffic restrictions.

However, access to local residences will be maintained at all times and the disruption to the ease of access will be temporary as it will be for the duration of the works only.

There will be some air (including dust), noise and vibration emissions during the construction phase that have the potential to adversely impact on population and human health. No significant effects on air quality are predicted during the construction phase, while it is considered that there will be minor negative effects due to noise and vibration during the construction phase. Refer to **Section 5.7** and **Section 5.8**, respectively.

5.1.5 Operation

Overall, it is considered that there will be no significant adverse effects on population and human health as a result of the proposed development. The proposed development will have a positive impact on the population of Bray, and visitors to the town, in that it will upgrade the existing transport links for the town, enhance accessibility, and encourage the use of sustainable transport modes.

5.2 Biodiversity

DixonBrosnan Environmental Consultants were commissioned by Arup to prepare an Ecological Impact Assessment Report (EcIA) in 2020. The EcIA is included in **Appendix C** of this report. A desktop study was undertaken to identify features of ecological value within and around the proposed development. A habitat and flora survey was also carried out on the 23rd January 2020. This included a bird count, survey for otters and other protected mammals and an invasive species survey.

5.2.4 Construction

The report concluded the following in relation to potential impacts during construction of the proposed development:

- The closest European designated ‘Natura 2000’ site is Bray Head Special Area of Conservation (SAC), located 1.6 km southeast of the proposed development site. There are a number of other SACs and Special Protection Areas (SPAs) surrounding the proposed development and these have been identified within the EcIA and the AA Screening Report. These Natura 2000 sites are located a considerable distance from the proposed development and given the limited scope of the development, the low risk of emissions and the dilution provided in the tidal section of the River Dargle, no potential impact on these Natura 2000 sites has been identified.
- Consultation of the NPWS online database identified a number of proposed National Heritage Areas (pNHAs) within 10km of the proposed development. However, these are not considered to be of relevance to the proposed development due to their distance from, and lack of connectivity with the proposed development and due to the nature of the proposed development.
- The terrestrial habitats on the site are not rare, threatened nor do they require any special protection under existing or pending legislation and are considered relatively common in the local landscape. The development will result in a minor net loss of common terrestrial habitats.

- There will be no permanent loss of habitat within the River Dargle and aquatic vegetation and macro-invertebrate communities will colonise the site following completion of works.
- With the exception of localised impacts and short-term impacts during construction, no significant impacts on fauna are envisaged.
- An estimated total of seventeen trees will be removed during the construction phase. These include Poplar, Sycamore, Whitebeam and Lodgepole pine. One semi mature Scots Pine on the south bank will be removed. Adjacent to Seapoint Road there are four semi-mature Norway Maple and Sycamore. The trees which will be removed are non-native, semi-mature trees which have been planted in an urban setting. They do not have a natural woodland structure and have a poorly developed ground and shrub layer. These trees have limited value for nesting and roosting habitat for birds due to their size. None of the trees to be removed have the structural elements (cracks, crevices etc) that would make them suitable as bat roosts.
- The non-native invasive species Winter Heliotrope (*Petasites fragrans*), and Butterfly Bush (*Buddleja davidii*) were recorded within the proposed development site, and will need to be managed through standard eradication/control methods. No signs of Japanese Knotweed were recorded within or near the proposed development site. However as the site survey took place outside the main growing season, a repeat survey for Japanese Knotweed should be carried out prior to construction. If Japanese Knotweed is identified at this stage, an Invasive Species Management Plan may need to be produced. It should be noted that findings of Japanese Knotweed have been recorded during previous invasive species surveys undertaken in January and October 2018 (within 40m of the proposed wastewater gravity main from Foildarraig).
- The loss of habitat will result in the loss of some feeding habitats for some mammals and terrestrial bird species, however these habitats do not provide critical resources for these species. It is also considered probable that these species will be displaced to the surrounding area or to alternative roosting sites.
- Harbour seal and a number of cetacean species are likely to occur in close proximity to the marine works area. There will be short-term disturbance during construction however there is no shortage of similar habitat in the surrounding area. Any species in the area will already be habituated to a level of disturbance due to the presence of marine traffic in the harbour.
- With the exception of localised impacts and short-term impacts during construction, no significant impacts on fauna are envisaged.
- A screening report for Appropriate Assessment prepared for the proposed development by Arup concluded that it is possible to rule out likely significant impacts on Natura 2000 sites. A Stage 2 Appropriate Assessment is therefore not considered necessary, but the competent authority, Wicklow County Council, will make the final determination in this regard.

Overall, it is considered that there will be no significant adverse effects on biodiversity as a result of the construction of the proposed development.

5.2.5 Operation

During operation there will be an increase in pedestrian, cyclist and public transport movement within the footprint of the development. Standard street lighting will also be provided.

The habitats here are common and the increased activity will be in line with pre-existing levels in the general area. There is a high level of disturbance in the immediate vicinity of the proposed development with two operational bridges located immediately upstream. Therefore resident and breeding birds and other fauna in the area are already subject to and tolerant to a comparable level of traffic. In the long-term the operational impact on biodiversity is predicted to be negligible.

5.3 Archaeological, Architectural and Cultural Heritage

A detailed Archaeological Screening Assessment has been undertaken by IAC Archaeology Ltd and is included as **Appendix C**. The proposed development is located in the townlands of Ravenswell, Bray Commons, and Bray, parishes of Oldconnaught and Bray, and barony of Rathdown, County Wicklow. The zone of notification for a section of the Pale boundary (DU026-124/WI004-005) is located approximately 90m to the north of the proposed development area and the zone of archaeological potential for the historic town of Bray (WI004-001) is situated approximately 395m to the west-southwest.

The proposed development site itself contains no recorded monuments listed in the Record of Monuments and Places (RMP), no national monuments and no buildings listed in the National Inventory of Architectural Heritage (NIAH).

There is a recorded monument, a holy well (DU026-069), located approximately 465m to the northwest. In addition, there are two archaeological sites within the 500m study area of the proposed development. These consist of a Martello tower (WI004-002), approximately 85m to south-southeast, and a redundant record (WI004-001002), approximately 360m to the southwest. Neither of sites are subject to statutory protection as they are not RMPs. The closest buildings listed in the NIAH are a row of buildings located approximately 125m to the south east of the proposed development, near Bray Harbour.

A review of the Excavations Bulletin (1970–2019) has shown that there have been three previous archaeological investigations within the proposed development, with a further ten within the study area. Details of those investigations, as well as the full desktop study and findings of field investigation are contained in **Appendix D**.

5.3.4 Construction

There are no predicted adverse impacts upon the known archaeological resource within the proposed development. However, there is potential for construction works for the northern portion of the link road to have an adverse impact on previously unrecorded archaeological remains within the previously undisturbed greenfield section (within the former golf club lands).

The construction of the bridge may have a negative adverse impact on any archaeological material which may survive along the river bed or banks. This could be caused by ground disturbances associated with the proposed development.

It is proposed that all topsoil stripping associated with the construction of the northern section of the proposed road, within the previously undisturbed greenfield area, be subject to archaeological monitoring.

It is also proposed that an underwater survey is carried out within the River and metal detector survey is carried out along the banks, given the significant number of artefacts which have been recovered from further upstream.

Full provision will be made available for the resolution of archaeological features, should that be deemed the most appropriate manner in which to proceed (following consultation with the Department of Culture Heritage and the Gaeltacht).

5.3.5 Operation

The operational effects of the proposed development on historical, cultural and archaeological heritage are considered to be negligible.

5.4 Water Quality

The proposed development will cross the River Dargle near Bray Harbour. The River Dargle is influenced by the tide at this location. The River Dargle flows into Bray Harbour approximately 350m to the east of the proposed development.

The River Dargle is a designated salmonid watercourse under S.I. No. 293/1988 – European Communities (Quality of Salmonid Waters) Regulations, 1988. Atlantic salmon is listed on Annex II of the EU Habitats Directive. No spawning potential for fish is present in proximity to the proposed development area. Fish using the area include salmon, lamprey moving upstream and downstream and European eel.

The most recent EPA biological monitoring results (2018) from the River Dargle indicate that water quality was good to moderate at all nearby monitoring stations relative to the proposed development. The transitional waters of the Dargle are eutrophic according to EPA data. Eutrophication results in artificially increased weed and algal growth in many rivers having an adverse effect on the aquatic fauna.

The aquifer beneath the site is classified according the Geological Survey of Ireland (GSI) as either a ‘Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones’ (on the northern bank of the River Dargle) or a ‘Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones’ (on the southern bank of the River Dargle). No groundwater wells or springs are located within the proposed development area. However, a number are located in the immediate vicinity – the closest groundwater well or spring is located approximately 40m to the west of the proposed development.

5.4.4 Construction

As outlined previously, temporary construction works will take place within the river bed. Minor emissions to water have potential to arise while these temporary works are taking place through the deposition of rock infill material. However, as the volume of sediment which will be displaced will be quite small, it is expected that there will be only be a minor release of sediments.

The river at this location is not extremely sensitive to sediment loading as it is located within a tidal area close to Bray Harbour which is subject to large diurnal tidal flows carrying substantial volumes of sediment. Disturbed sediment would disperse and drop to the seabed on the ebb and flow of the tide. As such any spillages would be quickly diluted. Therefore, it is not expected that there will be a significant adverse effect on water quality as a result of the construction of the proposed development.

The methodologies for the proposed construction works are standard and will be well managed. Therefore, the risk for accidental releases or spillages is very low.

Surface water discharges will be via connection to the existing drainage network.

Overall, it is considered that there will be no significant adverse impacts on water quality as a result of the construction of the proposed development.

5.4.5 Operation

The proposed development will be designed to standard highways requirements and will tie into the existing drainage network. The operational effects of the proposed development on water quality are considered to be negligible.

5.5 Landscape and Visual

A Landscape Character Assessment (LCA) of the county has been prepared as part of the Wicklow County Development Plan 2016-2022 (CDP). In developing the LCA, a landscape sensitivity map was prepared for the County. According to the CDP, urban areas such as the proposed development site are considered to have already been deemed suitable for development, thus a landscape or visual impact assessment is considered unnecessary.

Protected views and prospects around Bray Harbour are set out in the Bray Municipal District Local Area Plan 2018. Any application for development in locations within the view/prospect will be required to provide an assessment of the view/prospect and an evaluation of how the development would change or interfere with that view/prospect.

5.5.4 Construction

Minor adverse visual impacts on the surrounding environment may arise during the construction phase from the proposed works outlined in **Section 3.1**. The temporary impacts are predicted to arise as a result of the construction equipment and vehicles required to be on site during this stage and are not considered to be significant.

5.5.5 Operation

Following the completion of the construction works, the proposed bridge will have a permanent visual impact on the surrounding environment. A photomontage of the bridge upon completion is presented in **Figure 4**.

It is envisaged that there will be standard street lighting arrangements along the bridge and link road. This will be a minor visual impact and this will be in keeping with the surrounding urban landscape, including the current rail bridge and road bridge located to the east of the proposed development.

Overall, it is considered that there will be a minor adverse visual effect on the surrounding landscape of the area as a result of the proposed development.

Figure 4: Photomontage of Proposed Bridge

5.6 Land, Soils and Geology

The bedrock in the proposed development area is classified as ‘dark blue-grey slate, phyllite and schist’ from the Maulin Formation and ‘greywacke and quartzite’ from the Bray Formation according to the Geological Survey of Ireland (GSI) Groundwater Data Viewer.

The underlying soils are classified as a combination of ‘urban ground’ and ‘alluvium’ (on the northern bank of the River Dargle) according to the GSI Groundwater Data Viewer.

Excavations will take place for some elements of the construction works. Typical open cut excavation methodology will be used. No excavation works will take place within the River Dargle. Where excavation material may not be re-used within the proposed works the contractor will endeavour to send material for recovery or recycling so far as is reasonably practical. The contractor will ensure that any interim storage or waste management facilities for excavated material have the appropriate waste licences or waste facility permits in place. Where excavated material cannot be re-used/recycled the contractor will dispose of such material to appropriately licensed facilities.

5.6.4 Construction

There is not expected to be significant potential for land contamination arising from the proposed development. However, this will be confirmed by intrusive site investigation surveys prior to the commencement of the construction works.

5.6.5 Operation

Operational effects on land, soils and geology arising from the proposed development are predicted to be negligible.

5.7 Air Quality and Climate

5.7.1 Construction

During the construction phase of the proposed development, there is the potential for dust emissions and air pollutants to arise from the operation of site plant and machinery.

The potential for significant dust emissions will only arise in respect of excavations in dry weather and during such activities the levels of dust are likely to be small. Dust may be raised by wind from dry surfaces and stockpiles. The employment of control measures during construction will serve to minimise the risk of dust emissions. Examples of measures to be employed include the spraying of exposed earthworks during dry periods, the provision of wheel washes and sweeping of roads. A full list of measures will be proposed and implemented by the contractor in advance of the construction works.

Air emissions from the exhausts of construction plant, machinery and haulage trucks have potential to be elevated during construction but are not expected to be significant. Taking into consideration the routine construction methodologies (including dust minimisation) to be employed on site, the location of the proposed development in an urban setting, the separation distance between the proposed development and the nearest sensitive receptors, and the short term nature of the construction works, no significant effects on air quality are predicted during the construction of the proposed development at this stage.

5.7.2 Operation

The proposed use of the road link and bridge for public transport, including buses, taxis, and potentially the Luas in the future, will result in operational air quality effects. However, given the prohibited use of the road link and bridge by private vehicles as well as its location in an already heavily urbanised environment, the operational air quality effects will not be significant.

In terms of climate change, the proposed development, is seen as a generally positive measure, encouraging a modal shift from the private car, thereby relieving traffic congestion and encouraging more sustainable traffic patterns. It is considered that the proposed development will contribute to better air quality in the town in the longer term. The use of the road link and bridge for public transport, including buses, taxis, and potentially the Luas in the future, will have an imperceptible effect on the climate.

5.8 Noise and Vibration

5.8.1 Construction

There is potential for noise to be generated during the construction of the proposed development due to construction traffic and machinery operation. No works will take place outside of normal construction working hours (i.e. 07:00-19:00, Mondays – Fridays and 08:00-16:30 on Saturdays), ensuring no noise impacts outside of these times.

Noise emissions will be managed by the implementation of control measures. Examples of measures to be employed include the selection of quiet plant, not leaving plant idling and maintenance of plant to minimise noise generation. A full list of measures will be proposed and implemented by the contractor in advance of the construction works.

Monitoring will also be carried out at nearby sensitive receptors during the construction works to ensure that noise limits at these receptors are not being exceeded. The nearest residence to the proposed bridge development is located at Seapoint Court, approximately 40m to its southwest. The nearest residence to the proposed link road is located on Seapoint Road, approximately 20m to its west.

Transport Infrastructure Ireland`s (TII), (formerly the National Roads Authority) Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes, 2014 outlines construction noise limits that should be applied to developments such as this. These limits are outlined in **Table 3**.

Table 3: Maximum Permissible Noise Levels at the Façade of Nearby Dwellings during Construction (TII, 2014)

Days & Times	$L_{Aeq\ (1hr)}$ dB	$L_{pAmax,\ slow}$ dB
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 22:00hrs	60	65
Saturday 08:00 to 16:30hrs	65	75
Sundays and Bank Holidays 08:00 to 16:30hrs	60	65

No significant vibration impacts are envisaged during the construction phase. Construction plant with potential to cause vibration impacts are likely to be used such as excavators, lifting equipment and dumper trucks. However, no rock breaking will be required. There may be limited sheet piling activities associated with placing of the steel girders, but this will be minimised as far as possible.

Any potential vibration impacts during the construction phase will be managed by the implementation of control measures. As an example, it will be ensured that all materials are lowered rather than dropped from heights. A full list of measures will be proposed and implemented by the contractor in advance of the construction works.

The TII Guidelines recommend that in order to ensure that there is no potential for vibration damage during construction, vibration from construction activities should not exceed the values as set out in the TII guidance and detailed in **Table 4**.

Table 4: Maximum allowable vibration levels during construction phase

Allowable vibration velocity (Peak Particle Velocity) at the closest part of any sensitive property to the source of vibration, at a frequency of		
Less than 10Hz	10 to 50Hz	50 to 100Hz (and above)
8 mm/s	12.5 mm/s	20 mm/s

Overall, it is considered that there will be minor negative effects on noise and vibration as a result of the proposed development during the construction phase.

5.8.2 Operation

There is potential for noise and vibration effects arising during the operational phase of the proposed development. However, these effects will not be significant given the prohibited use of the road link and bridge by private vehicles as well as its location in an already heavily urbanised environment. Furthermore, the appropriate design of road surfaces will ensure that all potential effects are minimised.

5.9 Land Use and Material Assets

5.9.1 Construction and Operation

Land use will change within some areas of the proposed development.

Small areas of land will be permanently required to facilitate the construction of the proposed bridge. An area of semi-greenfield land adjacent to Bray pumping station will be removed to facilitate the construction of the proposed bridge. Approximately seventeen trees will need to be removed. The limited area of land take and the trees that are proposed for removal are not considered to represent high value resources.

The construction works will temporarily require additional areas of land for a construction compound and other ancillary works. The temporary works areas will all be selected to minimise impacts on the surrounding environment. Further, these areas will be required only for the construction stage and will be fully reinstated on completion of the works. The pedestrian and cycle track on the northern bank of the River Dargle will be fully repaired and reinstated following its use to facilitate construction activity. It is therefore considered that there will not be any significant impact on land use from the proposed development.

The topography within some of the proposed development areas will also change as a result of the proposed development, but these changes will be minor.

No acquisition of land will be required for the proposed development to proceed and no land ownership issues are envisaged.

During the construction phase, mobile generators will be used for all power supply needs.

There will be no utility and service diversions required as part of the proposed development, while there will also be no disruption to existing water supplies during the proposed works.

The River Dargle is tidal at the location of the proposed bridge. Flood levels have been established based on coinciding tidal and fluvial flood events, taking into account the effects of global warming. The maximum design flood level at the bridge site is approximately 3.65mOD. The proposed bridge will clear this level to ensure negligible impact on the flood defence works completed recently in 2017.

The flood defence works at the location of the proposed bridge site in 2017 comprised the re-alignment of the northern river bank wall and scour protection works around the existing rail bridge. The flood defence works completed in 2017 will not be altered by the proposed development. Approval for the works will be sought from the OPW in accordance with Section 50 of the Arterial Drainage Act 1945.

Overall, it is considered that there will be no significant negative effects on land use and material assets during the construction or operational phases as a result of the proposed development.

5.10 Major Accidents and Disasters

5.10.1 Construction

The risk of any major accidents and/or disasters during the construction phase will be managed in accordance with relevant health and safety legislation. A Project Supervisor for the Construction Stage will be appointed to manage safety issues during construction.

The construction works are standard in nature and well understood. Normal good construction health and safety practice and the standard construction control measures proposed will ensure that the risk of major accidents and/or disasters will be low.

5.10.2 Operation

The risk of any major accidents and/or disasters during the operational phase will be managed in accordance with relevant health and safety legislation.

Normal good operational health and safety practice in relation to the use of the road link and bridge for public transport, including buses, taxis, and potentially the Luas in the future, will ensure that the risk of major accidents and/or disasters will be low.

5.11 Interaction Between the Above Factors and Cumulative Effects

The interaction of the above factors has been taken into account in this screening assessment.

The Wicklow County Council online planning records for the area were consulted in March 2020. There are no other major proposed projects in the vicinity of the proposed development with which the proposed development will interact and which could result in significant in-combination or cumulative effects.

The design chosen is that which is deemed to have the least environmental impact, taking into account all site location factors, sensitivities and constraints. Significant impacts from the proposed development are not predicted. Therefore, in-combination effects with other developments are not expected to arise.

6 Screening Checklist

The potential significant environmental effects associated with the proposed development have been outlined in previous sections of this report.

The EC Guidance on EIA Screening (EC, 2017) also provides a checklist to help users decide whether EIA is required based on the characteristics of a project and its environment. This screening checklist is included in **Table 5**.

Table 5: Screening Checklist to determine if EIA is required based on the characteristics of a project and its environment

Brief Project Description	Yes/No	Is this likely to result in a significant impact Yes/No - Why
1. Will construction, operation or decommissioning of the project involve actions which will cause physical changes in the locality (topography, land use, changes in waterbodies, etc.)?	Yes	No. Land use will change within some areas of the proposed development. Small areas of land will be permanently required to facilitate the construction of the proposed bridge. The construction works will temporarily require additional areas of land for a construction compound and other ancillary works. The temporary works areas will all be selected to minimise impacts on the surrounding environment. Further, these areas will be required only for the construction stage and will be fully reinstated on completion of the works. The pedestrian and cycle track on the northern bank of the River Dargle will be fully repaired, reinstated and the wider network enhanced. It is therefore considered that there will not be any significant impact on land use from the proposed development. The topography within some of the proposed development areas will also change as a result of the proposed development, but these changes will be minor.
2. Will construction or operation of the project use natural resources such as land, water, materials or energy, especially any resources which are non-renewable or in short supply?	Yes	No. An area of semi-greenfield land adjacent to Bray pumping station will be removed to facilitate the construction of the proposed bridge. Approximately seventeen trees will need to be removed. The limited area of land take and the trees that are proposed for removal are not considered to represent high value resources. Construction materials will include concrete, steel, cables and expansion joints and bearings. It is not considered that there will be a significant use of these resources as part of the proposed works.

Brief Project Description	Yes/No	Is this likely to result in a significant impact Yes/No - Why
		During the construction phase, mobile generators will be used for all power supply needs. However, the power supply required will be minimal.
3. Will the project involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?	Yes	No. The types of standard construction materials that will be used will not be harmful to human health or the environment. The contractor will ensure that the proposed works are carried out in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013). It is envisaged that the risk of accidents, having regard to substances or technologies used is very low and therefore will not result in significant environmental impacts.
4. Will the project produce solid wastes during construction or operation or decommissioning?	Yes	No. Inert construction and demolition waste generated will be removed from the site areas and disposed of at a suitable licensed facility. The production of waste will be managed in accordance with the relevant waste legislation. Small quantities of domestic waste will also be produced during the proposed works. This will be managed in accordance with waste legislation.
5. Will the project release pollutants or any hazardous, toxic or noxious substances to air or lead to exceeding Ambient Air Quality standards in Directives 2008/50/EC and 2004/107/EC?	Yes	No. During the construction phase, the potential for significant dust emissions will only arise in respect of excavations in dry weather and during such activities the levels of dust are likely to be small. Dust may be raised by wind from dry surfaces and stockpiles. The employment of control measures during construction will serve to minimise the risk of dust emissions. Examples of measures to be employed include the spraying of exposed earthworks during dry periods, the provision of wheel washes and sweeping of roads. A full list of measures will be proposed and implemented by the contractor in advance of the construction works. Air emissions from the exhausts of construction plant, machinery and haulage trucks have potential to be elevated during construction but are not expected to be significant.

Brief Project Description	Yes/No	Is this likely to result in a significant impact Yes/No - Why
		During the operational phase, the proposals are anticipated to enhance air quality and climate in the wider area through relieving traffic congestion and encouraging more sustainable traffic patterns. No air quality standards are expected to be exceeded.
6. Will the project cause noise and vibration or release of light, heat energy or electromagnetic radiation?	Yes	No. Noise will be generated during the construction of the proposed development due to construction traffic and machinery activities. However, such activities will take place during day time hours and will managed by the implementation of control measures. Noise emissions will be managed by the implementation of control measures during construction. A full list of measures will be proposed and implemented by the contractor in advance of the construction works. Monitoring will also be carried out at nearby sensitive receptors during the construction works to ensure that noise limits at these receptors are not being exceeded. No significant vibration impacts are envisaged during the construction phase. Some plant with potential to cause vibration are likely to be used, such as excavators, lifting equipment and dumper trucks. However, no rock breaking will be required. Piling activities will be kept to a minimum. Any potential vibration impacts during the construction phase will be managed by the implementation of control measures. A full list of measures will be proposed and implemented by the contractor in advance of the construction works. There is potential for noise and vibration effects arising during the operational phase of the proposed development. However, these effects will not be significant given the prohibited use of the road link and bridge by private vehicles as well as its location in an already heavily urbanised environment. Furthermore, the appropriate design of road surfaces will ensure that all potential effects are minimised.
7. Will the project lead to risks of contamination of land or water from releases of pollutants onto the ground or into surface waters, groundwater, coastal wasters or the sea?	Yes	No. Construction works will take place within the river itself and adjacent to the river. Temporary platforms will be constructed on both sides of the river bed. Minor emissions to

Brief Project Description	Yes/No	Is this likely to result in a significant impact Yes/No - Why
		water have potential to arise while these temporary platforms are being constructed. However, as the volume of materials which will be displaced will be limited, it is expected that there will be only be a minor release of sediments. The river at this location is not extremely sensitive to sediment loading as it is located within a tidal area close to Bray Harbour which is subject to large diurnal tidal flows carrying substantial volumes of sediment. Disturbed sediment would disperse and drop to the seabed on the ebb and flow of the tide. As such any spillages would be quickly diluted. Therefore, it is not expected that there will be a significant effect on water quality as a result of the construction of the proposed development. The methodologies for the proposed construction works are well understood and the risk for accidental releases or spillages is very low. Surface water discharges during the construction phase will be via connection to the existing drainage network. Overall, it is considered that there will be no significant adverse impacts on water quality as a result of the construction of the proposed development. The proposed development will be designed to standard highways requirements and will tie into the existing drainage network. The operational effects of the proposed development on water quality are considered to be negligible.
8. Will there be any risk of accidents during construction or operation of the project which could affect human health or the environment?	Yes	No. The risk of any major accidents during the construction phase will be managed in accordance with relevant health and safety legislation. A Project Supervisor for the Construction Stage will be appointed to manage safety issues during construction. The construction works are standard in nature and well understood. Normal good construction health and safety practice and the standard construction control measures proposed will ensure that the risk of major accidents will be low. The risk of any major accidents during the operational phase will be managed in accordance with relevant health and safety legislation. Normal good operational health and safety practice in relation to the use of the road link

Brief Project Description	Yes/No	Is this likely to result in a significant impact Yes/No - Why
		and bridge for public transport, including buses, taxis, and potentially the Luas in the future, will ensure that the risk of major accidents and/or disasters will be low.
9. Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?	Yes	No. The proposed development is expected to have a positive impact on the population of Bray, and visitors to the town, in that it will upgrade the existing transport links for the town.
10. Are there any other factors which should be considered such as consequential development which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality?	No	No. The Wicklow County Council online planning records for the area were consulted in March 2020. There are no other major proposals in the vicinity of the application site that will interact and which could result in in-combination or cumulative effects.
11. Is the project located within or close to any areas which are protected under international, EU, or national or local legislation for their ecological, landscape, cultural or other value, which could be affected by the project?	Yes	No. The closest European designated 'Natura 2000' site is Bray Head Special Area of Conservation (SAC), located 1.6 km southeast of the proposed development site. There are a number of other SACs and Special Protection Areas (SPAs) surrounding the proposed development. These Natura 2000 sites are located a considerable distance from the proposed development and given the limited scope of the development, the low risk of emissions and the dilution provided in the tidal section of the River Dargle, no potential impact on these Natura 2000 sites has been identified. Consultation of the NPWS online database identified a number of proposed National Heritage Areas (pNHAs) within 10km of the proposed development. However, these are not considered to be of relevance to the proposed development due to their distance from, and lack of connectivity with the proposed development and due to the nature of the proposed development. A screening report for Appropriate Assessment prepared for the proposed development by Arup concluded that it is possible to rule out likely significant impacts on Natura 2000 sites. A Stage 2 Appropriate Assessment is therefore not considered necessary, but the competent authority, Wicklow County Council, will make the final determination in this regard.

Brief Project Description	Yes/No	Is this likely to result in a significant impact Yes/No - Why
		The proposed development site contains no recorded monuments listed in the Record of Monuments and Places (RMP), no national monuments and no buildings listed in the National Inventory of Architectural Heritage (NIAH). A Landscape Character Assessment (LCA) of the county has been prepared as part of the Wicklow County Development Plan 2016-2022 (CDP). In developing the LCA, a landscape sensitivity map was prepared for the County. According to the CDP, urban areas such as the proposed development site are considered to have already been deemed suitable for development, thus a landscape or visual impact assessment is considered unnecessary.
12. Are there any other areas on or around the location which are important or sensitive for reasons of their ecology e.g. wetlands, watercourses or other waterbodies, the coastal zone, mountains, forests or woodlands, which could be affected by the project?	Yes	No. The proposed development will cross the River Dargle near Bray Harbour. The River Dargle is a designated salmonid watercourse under S.I. No. 293/1988 – European Communities (Quality of Salmonid Waters) Regulations, 1988. Atlantic salmon is listed on Annex II of the EU Habitats Directive. No spawning potential for fish is present in proximity to the proposed development area. Fish using the area include salmon, lamprey moving upstream and downstream and European eel. Temporary construction works will take place within the river bed. Minor emissions to water have potential to arise while these temporary works are taking place through the deposition of rock infill material. However, as the volume of sediment which will be displaced will be quite small, it is expected that there will be only be a minor release of sediments. The river at this location is not extremely sensitive to sediment loading as it is located within a tidal area close to Bray Harbour which is subject to large diurnal tidal flows carrying substantial volumes of sediment. Disturbed sediment would disperse and drop to the seabed on the ebb and flow of the tide. As such any spillages would be quickly diluted. Therefore, it is not expected that there will be a significant adverse effect on water quality as a result of the construction of the proposed development. The methodologies for the proposed construction works are standard and will be well managed. Therefore, the risk for

Brief Project Description	Yes/No	Is this likely to result in a significant impact Yes/No - Why
		accidental releases or spillages is also very low. The proposed development will be designed to standard highways requirements and will tie into the existing drainage network. The operational effects of the proposed development on water quality are considered to be negligible.
13. Are there any areas on or around the location which are used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected by the project?	Yes	No. There will be no permanent loss of habitat within the River Dargle and aquatic vegetation and macro-invertebrate communities will colonise the site following completion of works. An estimated total of seventeen trees will be removed during the construction phase. The trees which will be removed are non-native, semi-mature trees which have been planted in an urban setting. They do not have a natural woodland structure and have a poorly developed ground and shrub layer. These trees have limited value for nesting and roosting habitat for birds due to their size. None of the trees to be removed have the structural elements (cracks, crevices etc) that would make them suitable as bat roosts. The loss of habitat will result in the loss of some feeding habitats for some mammals and terrestrial bird species, however these habitats do not provide critical resources for these species. It is also considered probable that these species will be displaced to the surrounding area or to alternative roosting sites. Harbour seal and a number of cetacean species are likely to occur in close proximity to the marine works area. There will be short-term disturbance during construction however there is no shortage of similar habitat in the surrounding area. Any species in the area will already be habituated to a level of disturbance due to the presence of marine traffic in the harbour. With the exception of localised impacts and short-term impacts during construction, no significant impacts on fauna are envisaged. There is a high level of disturbance in the immediate vicinity of the proposed development with two operational bridges located immediately upstream. Therefore resident and breeding birds and other fauna in the area are already subject to and tolerant to a comparable level of traffic. In the long-term

Brief Project Description	Yes/No	Is this likely to result in a significant impact Yes/No - Why
		the operational impact on biodiversity is therefore predicted to be negligible.
14. Are there any inland, coastal, marine or underground waters (or features of the marine environment) on or around the location that could be affected by the project?	Yes	No. The primary water features located near the proposed development are the River Dargle and Bray Harbour. Construction works will take place within the river itself and adjacent to the river. Temporary platforms will be constructed on both sides of the river bed. Minor emissions to water have the potential to arise while these temporary platforms are being constructed. However, as the volume of materials which will be displaced will be limited, it is expected that there will be only be a minor release of sediments. The river at this location is not extremely sensitive to sediment loading as it is located within a tidal area close to Bray Harbour which is subject to large diurnal tidal flows carrying substantial volumes of sediment. Disturbed sediment would disperse and drop to the seabed on the ebb and flow of the tide. As such any spillages would be quickly diluted. Therefore, it is not expected that there will be a significant effect on water quality as a result of the construction of the proposed development. The methodologies for the proposed construction works are well understood and the risk for accidental releases or spillages is very low. Surface water discharges will be via connection to the existing drainage network. There will be no significant impacts on water quality, hydrology or hydrogeology as a result of the proposed works.
15. Are there any areas or features of high landscape or scenic value on or around the location which could be affected by the project?	Yes	No. The proposed development will not result in any significant impacts on the landscape character around Bray.
16. Are there any routes or facilities on or around the location which are used by the public for access to recreation or other facilities, which could be affected by the project?	Yes	No. A traffic management plan will be implemented for the duration of the construction works in order to minimise any disruption to traffic flow on the road network

Brief Project Description	Yes/No	Is this likely to result in a significant impact Yes/No - Why
		at and surrounding the proposed development areas.
17. Are there any transport routes on or around the location which are susceptible to congestion or which cause environmental problems, which could be affected by the project?	No	No. The proposed development is anticipated to ease traffic congestion in the wider area.
18. Is the project in a location where it is likely to be highly visible to many people?	Yes	No. Minor adverse visual impacts on the surrounding environment have the potential to arise during the construction phase of the works. However, these impacts will be temporary only. The proposed construction works are unlikely to be visible from the Martello Tower, a national monument of cultural significance in Bray, approximately 85m to the south east of the proposed development. Following the completion of the construction works, the proposed bridge will have a permanent visual impact on the surrounding environment. This will be a minor visual impact and will be in keeping with the surrounding urban landscape, including the current rail bridge and road bridge located to the east of the proposed development. The proposed bridge, following construction, will is unlikely to be visible from the Martello Tower, a national monument of cultural significance in Bray, approximately 85m to the south east of the proposed development. There will be no significant adverse visual impacts on the surrounding landscape of the area as a result of the proposed development during either the construction phase or the operational phase.
19. Are there any areas or features of historic or cultural importance on or around the location which could be affected by the project?	Yes	No. The proposed development site contains no recorded monuments listed in the Record of Monuments and Places (RMP), no national monuments and no buildings listed in the National Inventory of Architectural Heritage (NIAH). However, there are a number of recorded monuments, national monuments and buildings listed in the NIAH evident within

Brief Project Description	Yes/No	Is this likely to result in a significant impact Yes/No - Why
		the adjacent landscape. The closest national monument is the Martello Tower (Reg. No. WI004-002) in Bray, approximately 85m to the south east of the proposed development. The closest buildings listed in the NIAH are a row of buildings located approximately 125m to the south east of the proposed development, nearby Bray Harbour. The high distribution of historical, cultural and archaeological heritage nearby the proposed works suggests that it is possible that the areas where construction works are planned contain some previously unrecorded sub surface archaeological features and deposits. Consultation with the Department of Culture Heritage and the Gaeltacht is proposed to agree a programme of archaeological monitoring and underwater survey.
20. Is the project located in a previously undeveloped area where there will be loss of greenfield land?	Yes	No. An area of semi-greenfield land adjacent to Bray pumping station will be removed to facilitate the construction of the proposed bridge. Approximately seventeen trees will need to be removed. The limited area of land take and the trees that are proposed for removal are not considered to represent high value resources. The construction works will temporarily require additional areas of land for a construction compound and other ancillary works. The temporary works areas will all be selected to minimise impacts on the surrounding environment. Further, these areas will be required only for the construction stage and will be fully reinstated on completion of the works. The pedestrian and cycle track on the northern bank of the River Dargle will be fully repaired and reinstated. The wider pedestrian and cycle network will be enhanced as a result of the proposed development.
21. Are there existing land uses on or around the location e.g. homes, gardens, other private property, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, mining or quarrying which could be affected by the project?	Yes	No. There will be minor inconvenience caused to some properties during the construction phase but this will be managed through the implementation of specific control measures and a traffic management plan.

Brief Project Description	Yes/No	Is this likely to result in a significant impact Yes/No - Why
22. Are there any plans for future land uses on or around the location which could be affected by the project?	Yes	Yes – significant positive impact. Proposed long term mixed use development of the former golf club lands and proposed infrastructure projects in the area such as Luas and BusConnects would benefit from the infrastructure provided by the proposed development.
23. Are there any areas on or around the location which are densely populated or built-up, which could be affected by the project?	Yes	No. Bray Town, which is a built-up area, is located near the proposed development (Bray Main Street is located approximately 500m to the south west of the proposed development site). To ensure that traffic nuisance will not arise in Bray Town or on other nearby national or regional roads, a Construction Traffic Management Plan will be prepared by the appointed Contractor, in consultation with the Local Roads Authority. The traffic management plan will incorporate the use of a stop-go system, which will be implemented for the duration of the works to minimise any disruption to traffic flow.
24. Are there any areas on or around the location which are occupied by sensitive land uses e.g. hospitals, schools, places of worship, community facilities, which could be affected by the project?	Yes	No. Sensitive land uses are located near the proposed development area, such as the recently built school complex to the north of the site. Direct access routes to the above sensitive land uses will not be directly impacted by the proposed construction works. A traffic management plan incorporating the use of a stop-go system will be implemented for the duration of the works to minimise any disruption to traffic flow nearby these areas.
25. Are there any areas on or around the location which contain important, high quality or scarce resources e.g. groundwater, surface waters, forestry, agriculture, fisheries, tourism, minerals, which could be affected by the project?	Yes	No. The River Dargle and Bray Harbour are used for fisheries. Impacts from the proposed development on water quality could therefore have a potential knock on impact on fisheries in this area. Site surveys revealed no evidence of spawning within the river in this location. Construction works will take place within the river itself and adjacent to the river. Temporary platforms will be constructed on both sides of the river bed. Minor emissions to water have potential to arise while these temporary platforms are being constructed. However, as the volume of materials which

Brief Project Description	Yes/No	Is this likely to result in a significant impact Yes/No - Why
		will be displaced will be limited, it is expected that there will be only be a minor release of sediments. The river at this location is not extremely sensitive to sediment loading as it is located within a tidal area close to Bray Harbour which is subject to large diurnal tidal flows carrying substantial volumes of sediment. Disturbed sediment would disperse and drop to the seabed on the ebb and flow of the tide. As such any spillages would be quickly diluted. Therefore, it is not expected that there will be a significant adverse effect on water quality as a result of the construction of the proposed development.
26. Are there any areas on or around the location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?	No	No.
27. Is the project location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the project to present environmental problems?	No	No. The River Dargle is tidal at the location of the proposed bridge. Flood levels have been established based on coinciding tidal and fluvial flood events, taking into account the effects of global warming. The maximum design flood level at the bridge site is approximately 3.65mOD. The proposed bridge will clear this level to ensure negligible impact on the flood defence works completed recently in 2017. The flood defence works at the location of the proposed bridge site in 2017 comprised the re-alignment of the northern river bank wall and scour protection works around the existing rail bridge. The new flood defence wall to the north was constructed to a level of approximately 4.3mOD, with the existing wall to the south surveyed at approximately 5.9mOD. The flood defence works completed in 2017 will not be altered by the proposed development.

7 Conclusions

Arup has prepared this EIA Screening Report to determine whether an EIA is required for the proposed development.

The information provided in this report provides details on the characteristics of the proposed development, its location and its likely significant effects (if any) on the environment. It also provides the relevant details as required for Environmental Impact Assessment under Section 50 of the Roads Act 2007 (Number 34 of 2007), as amended.

Based on the information provided in this report, it is the opinion of Arup that there is no real likelihood of significant effects on the environment arising from the proposed development and that an EIA is not required.

Wicklow County Council, as the competent authority, will make the EIA screening determination.

8 References

Department of Housing, Planning, Community and Local Government (DoHPCLG) (2018) *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (August 2018). Dublin, Ireland.

DoHPCLG, 2017. *Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems*. Dublin, Ireland.

DoHPCLG, 2017. *Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on the Administrative Provisions in Advance of Transposition*. Dublin, Ireland.

Department of the Environment, Heritage and Local Government (DoEHLG), 2003. *Environmental Impact Assessment (EIA) Guidance for Consent Authorities regarding Sub-threshold Development*. Dublin, Ireland.

European Commission (EC), 2017. *Environmental Impact Assessment of Projects – Guidance on Screening*. Office for Official Publications of the EC, Luxembourg.

EC, 2015. *Interpretation of definitions of project categories of annex I and II of the EIA Directive*.

European Communities (Environmental Impact Assessment) (Amendment) Regulations (S.I. No. 93 of 1999).

Environmental Protection Agency (2017) *Revised Guidelines on the Information to be contained in Environmental Impact Statements (Draft August 2017)*.

EPA, 2015. *Draft Advice Notes for preparing Environmental Impact Statements.*

EPA, 2003. *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*. Johnstown Castle Estate, Wexford, Ireland.

EPA, 2002. *Guidelines on the Information to be contained in Environmental Impact Statements*. Johnstown Castle Estate, Wexford, Ireland.

Inland Fisheries Ireland (IFI), 2016. *Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.*

Roads Act 2007 (Number 34 of 2007), as amended.

Transport Infrastructure Ireland, 2014. *Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes.*

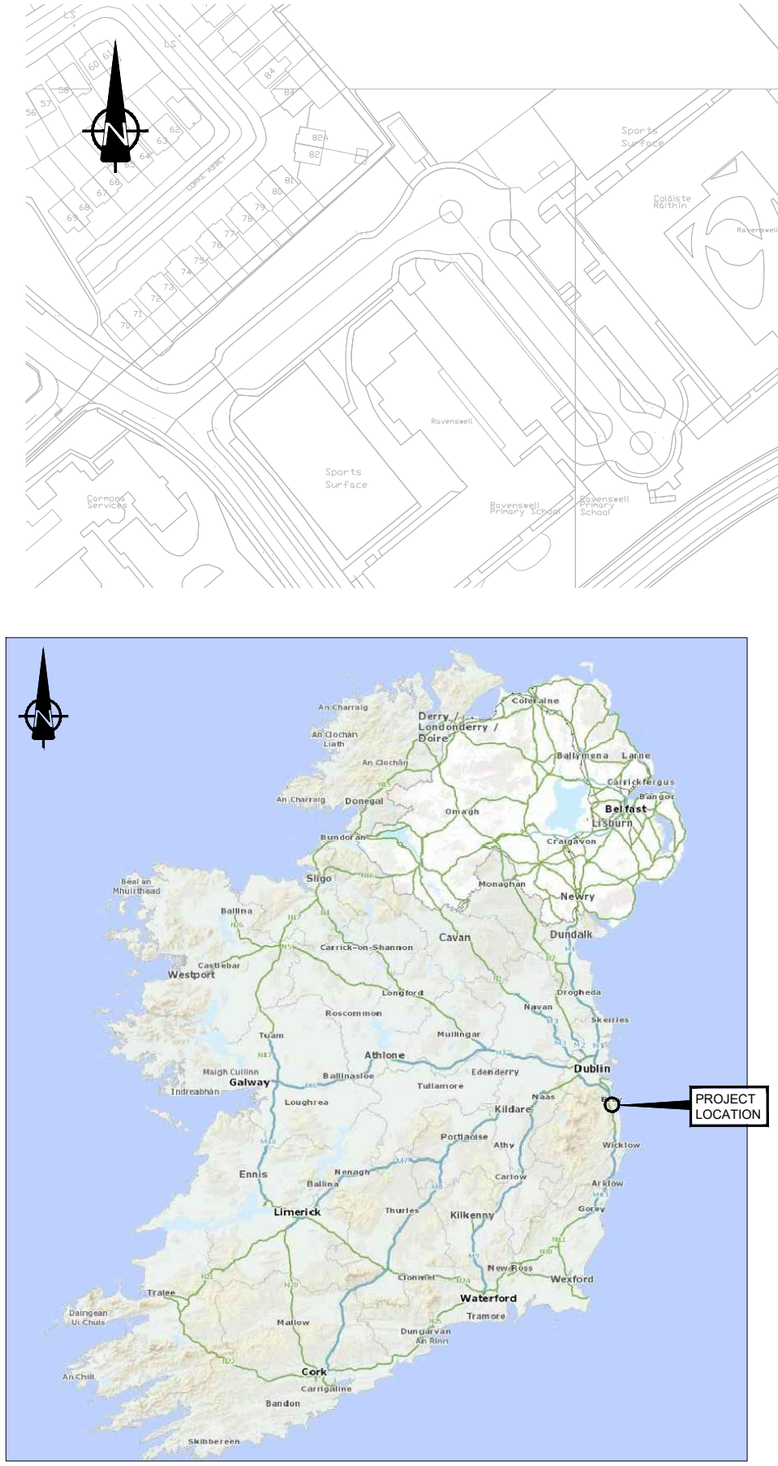
Appendix A

Plan Drawing of Proposed Development

DRAFT

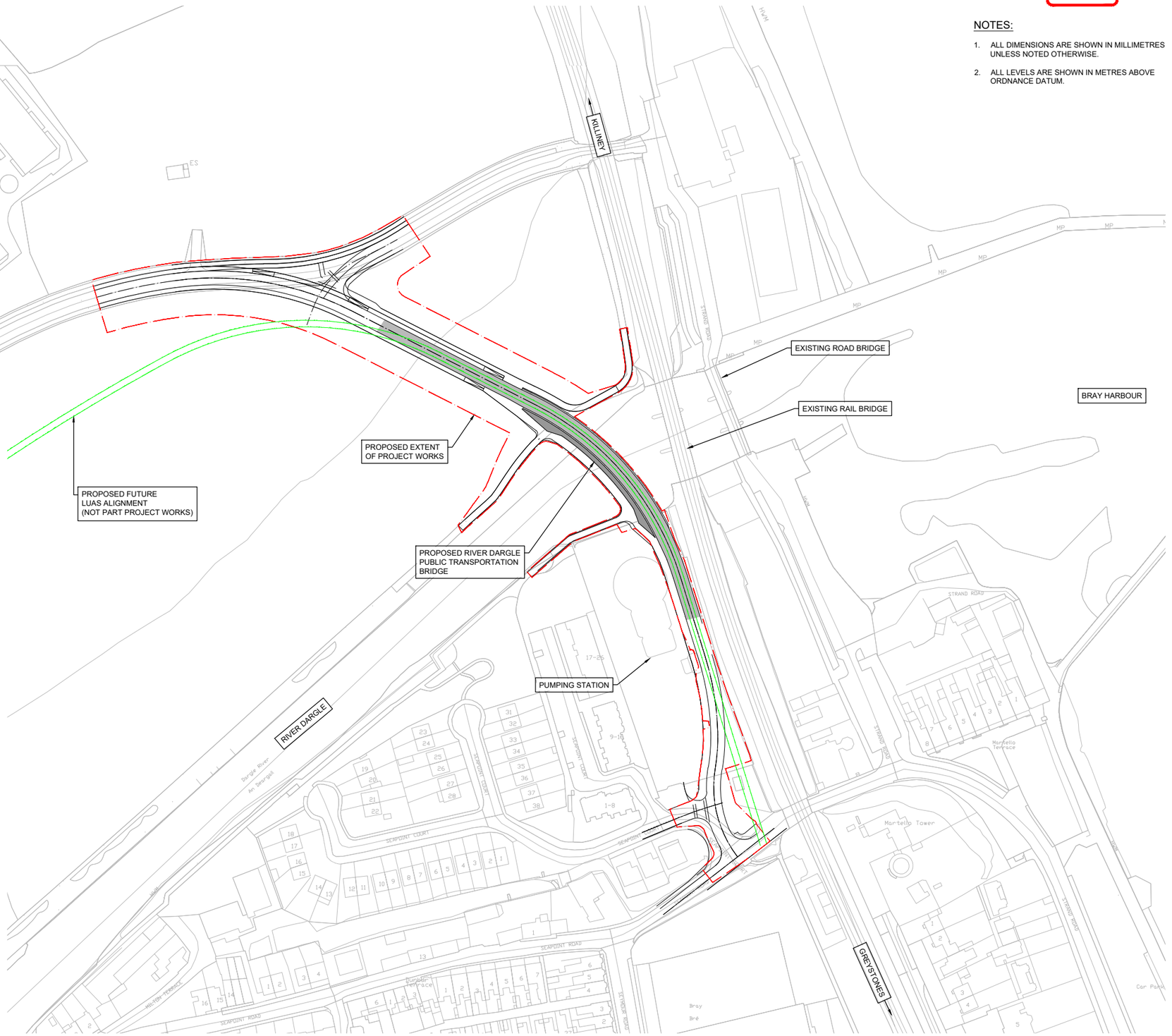
NOTES:

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE SHOWN IN METRES ABOVE ORDNANCE DATUM.



MAP OF IRELAND

SCALE N.T.S



PLAN ON PROPOSED BRIDGE LOCATION

SCALE 1:1000

WICKLOW
ENDLESS OPPORTUNITIES

Rialtas na hÉireann Government of Ireland

Tionscadal Éireann Project Ireland 2040

General Notes

(i) This is a confidential document and must not be copied,used, or its content divulged without prior written consent.

(ii) All Levels refer to Ordnance Survey Datum, Malin Head.

(iii) DO NOT SCALE, use figured dimensions only, if in doubt ask.

(iv) Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg etc) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. The Designer will not accept any responsibility for any errors from the use of these files, either by human error by the recipient, listing of the un-dimensioned measurements, compatibility with the recipients software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

No.	Date	Chk'd	Amendment / Issue	App
P01	01/05/20	PD CG	ISSUED FOR REVIEW AND COMMENT	MS

ARUP
50 Ringsend Road
Dublin 4
D04 T6X0
Ireland
T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Drawn:	PD
Checked:	CG
Approved:	MS
Date:	20.03.20
Scale:	AS SHOWN @ A1
Status:	S3
Job No.	268095

Project: RIVER DARGLE PUBLIC TRANSPORTATION BRIDGE

Title: BRIDGE SITE LOCATION PLAN

Drg. No. RDPTB-ARUP-ZZZ-ZZZ-SK-CB-1000 Rev. P01

c:\local drive\dargle river bridge\s4-02 drawings\s4-02-13 sketches\rdptb-arup-zzz-zzz-sk-cb-1000.dwg
philip.dunwoody 27/04/2020 16:49:34

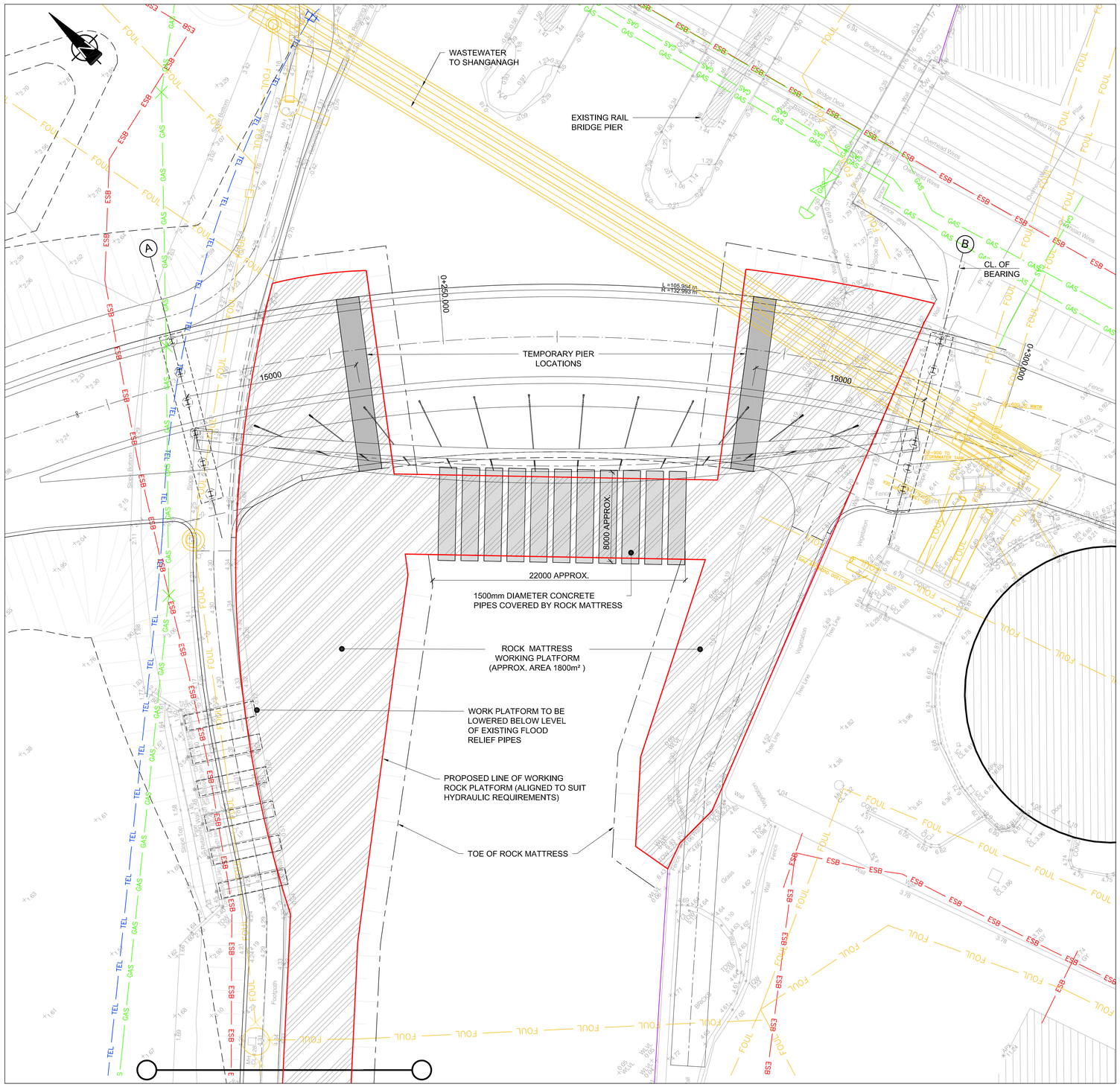
Appendix B

Construction Sequence Drawings

DRAFT

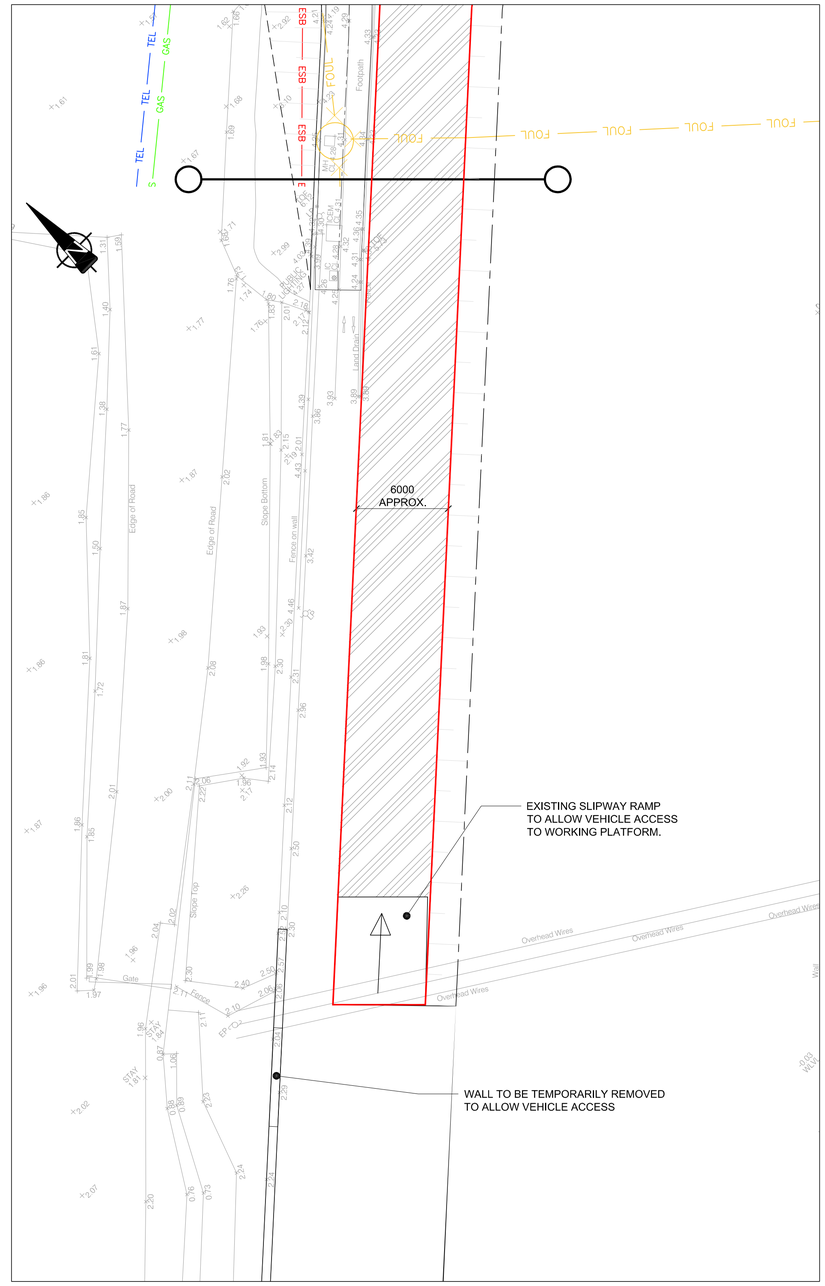
NOTES:

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE SHOWN IN METRES ABOVE ORDNANCE DATUM.
3. ESTIMATED CLEARANCE TO ESB LINES APPROX 8M TO BE CONFIRMED.



PLAN ON PROPOSED CONSTRUCTION SEQUENCE LAYOUT

SCALE 1:200



PLAN ON PROPOSED CONSTRUCTION SEQUENCE LAYOUT - CONTINUED

SCALE 1:200

WICKLOW
ENDLESS OPPORTUNITIES

Rialtas na hÉireann Government of Ireland

Tionscadal Éireann Project Ireland 2040

General Notes

(i) This is a confidential document and must not be copied,used, or its content divulged without prior written consent.

(ii) All Levels refer to Ordnance Survey Datum, Malin Head.

(iii) DO NOT SCALE, use figured dimensions only, if in doubt ask.

(iv) Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg etc) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. The Designer will not accept any responsibility for any errors from the use of these files, either by human error by the recipient, listing of the un-dimensioned measurements, compatibility with the recipients software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

No.	Date	Drn. Chk.	Amendment / Issue	App

ARUP
50 Ringsend Road
Dublin 4
D04 T6X0
Ireland
T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Drawn:	PD
Checked:	AR
Approved:	MS
Date:	14.04.20
Scale:	AS SHOWN @ A1
Status:	
Job No.	268095

Project: RIVER DARGLE PUBLIC TRANSPORTATION BRIDGE

Title: BRIDGE CONSTRUCTION SEQUENCE SHEET 1

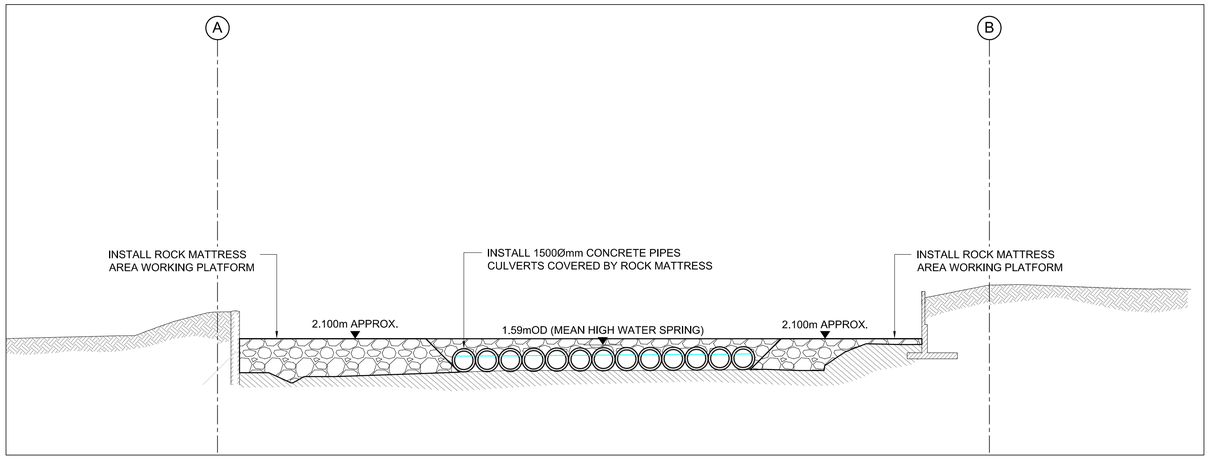
Drg. No. RDPTB-ARUP-ZZZ-ZZZ-SK-CB-1010 Rev.

c:\local drive\dargle river bridge\4-02 drawings\4-02-13 sketches\rdptb-arup-zzz-zzz-sk-cb-1010.dwg
philip.dunwoody 17/04/2020 12:35:53

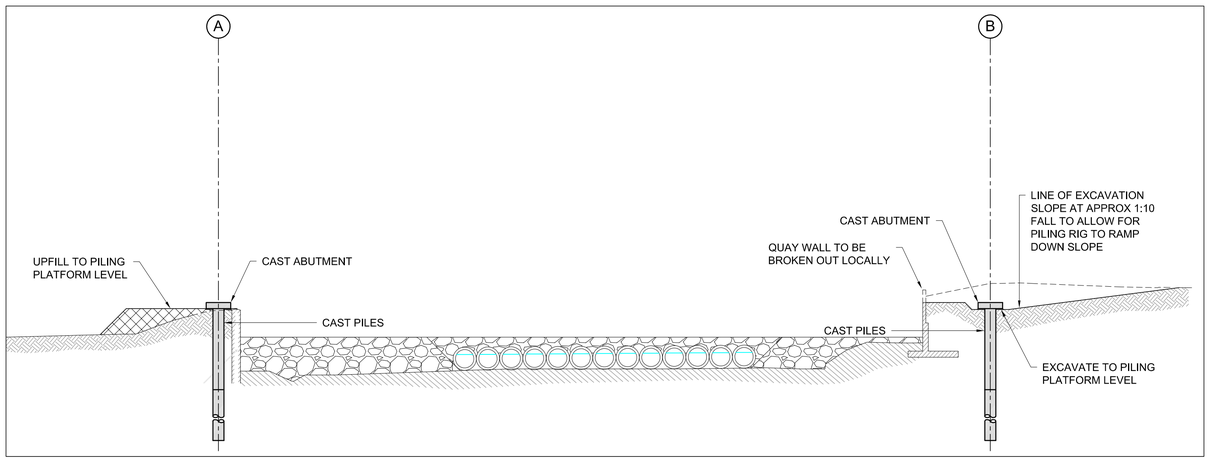
DRAFT

NOTES:

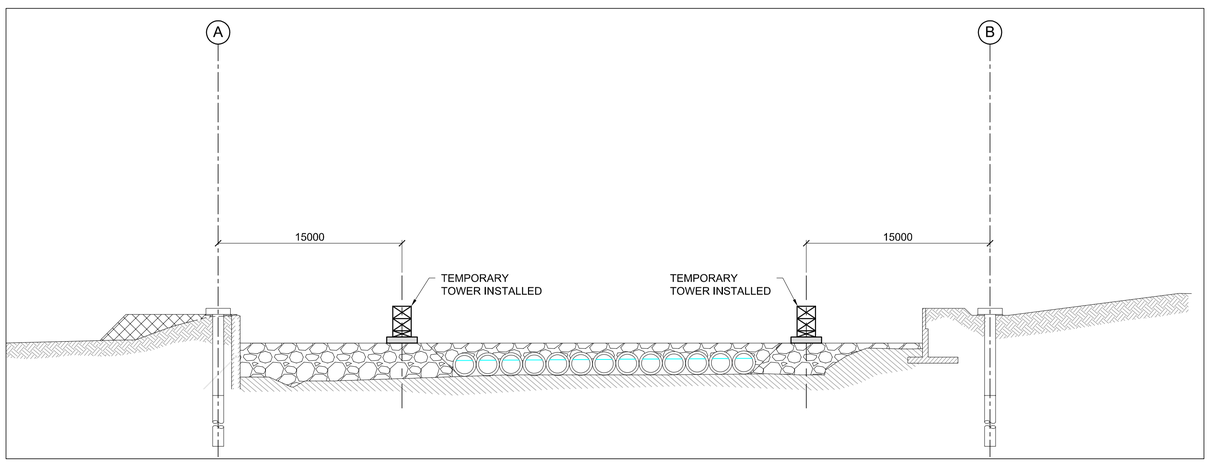
1. ALL DIMENSIONS ARE SHOWN IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE SHOWN IN METRES ABOVE ORDNANCE DATUM.



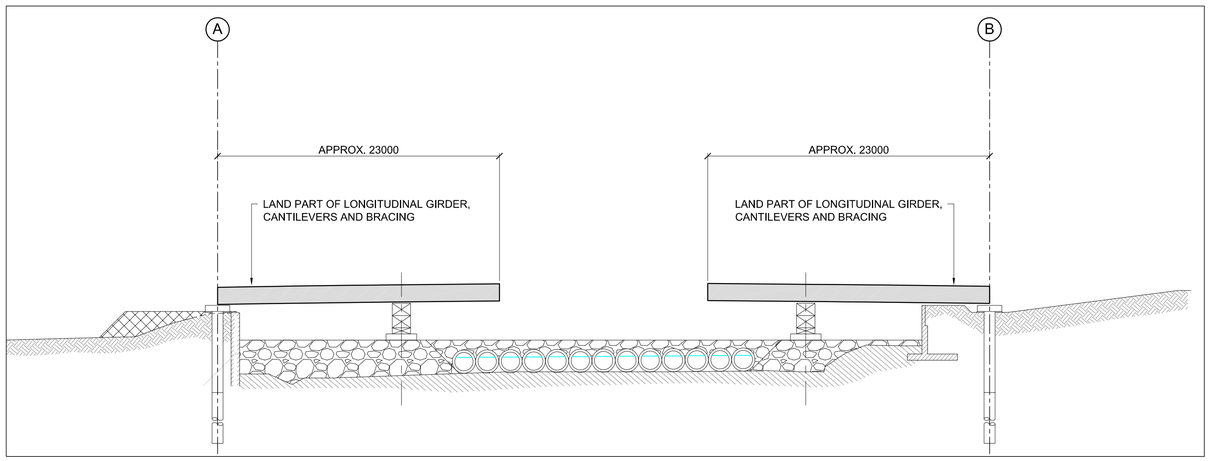
STAGE 1: INSTALL ROCK MATTRESS WORKING PLATFORMS AND PIPE CULVERTS



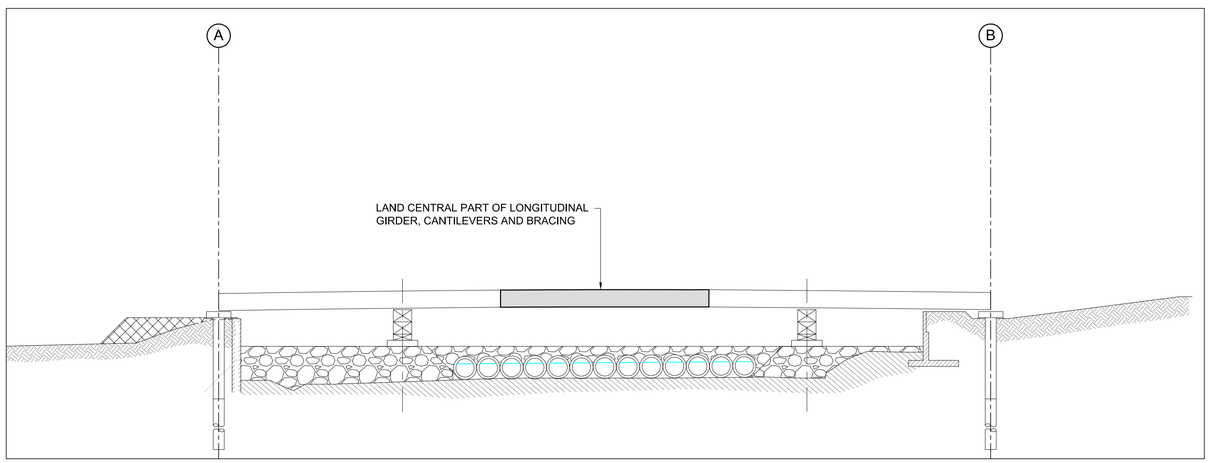
STAGE 2: EXCAVATION AND UPFILL TO FORMATION LEVEL, BREAK OUT QUAY WALL LOCALLY AND CAST PILES AND ABUTMENTS



STAGE 3: INSTALL TEMPORARY TOWERS



STAGE 4: INSTALL END SEGMENTS OF LONGITUDINAL GIRDER, CANTILEVERS AND BRACING



STAGE 5: INSTALL CENTRAL SEGMENT OF LONG. GIRDER, CANTILEVERS & BRACING

WICKLOW
ENDLESS OPPORTUNITIES

Rialtas na hÉireann Government of Ireland

Tionscadal Éireann Project Ireland 2040

General Notes

(i) This is a confidential document and must not be copied,used, or its content divulged without prior written consent.

(ii) All Levels refer to Ordnance Survey Datum, Malin Head.

(iii) DO NOT SCALE, use figured dimensions only, if in doubt ask.

(iv) Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg etc) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. The Designer will not accept any responsibility for any errors from the use of these files, either by human error by the recipient, listing of the un-dimensioned measurements, compatibility with the recipients software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

No.	Date	Drn. Chk.	Amendment / Issue	App

ARUP
50 Ringsend Road
Dublin 4
D04 T6X0
Ireland
T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Drawn:	PD
Checked:	AR
Approved:	MS
Date:	14.04.20
Scale:	AS SHOWN @ A1
Status:	
Job No.	268095

Project: RIVER DARGLE PUBLIC TRANSPORTATION BRIDGE

Title: BRIDGE CONSTRUCTION SEQUENCE SHEET 2

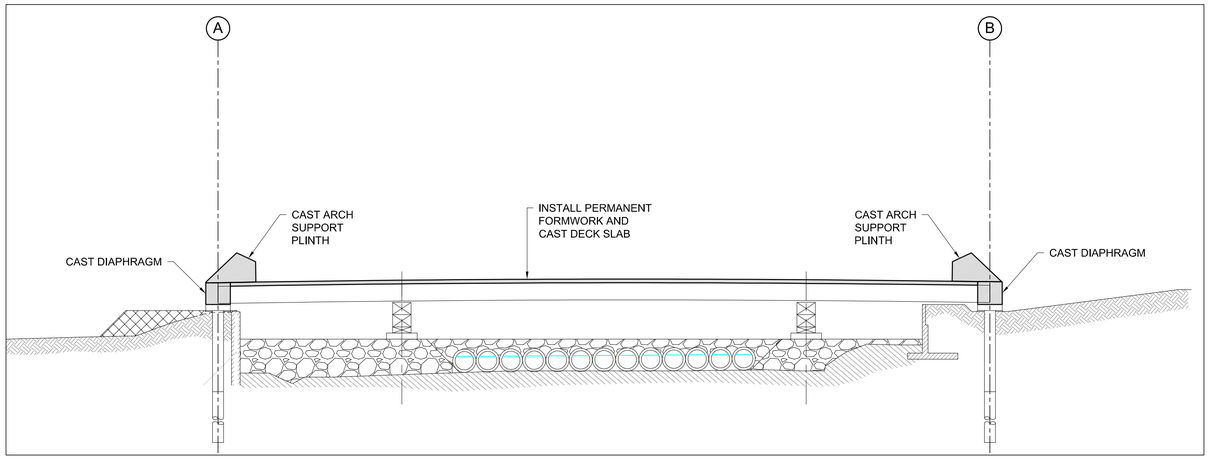
Drg. No. RDPTB-ARUP-ZZZ-ZZZ-SK-CB-1011 | Rev.

c:\local drive\dargle river bridge\4-02-13 sketches\rdptb-arup-zzz-zzz-sk-cb-1011&1012.dwg
philip.dunwoody 15/04/2020 11:54:31

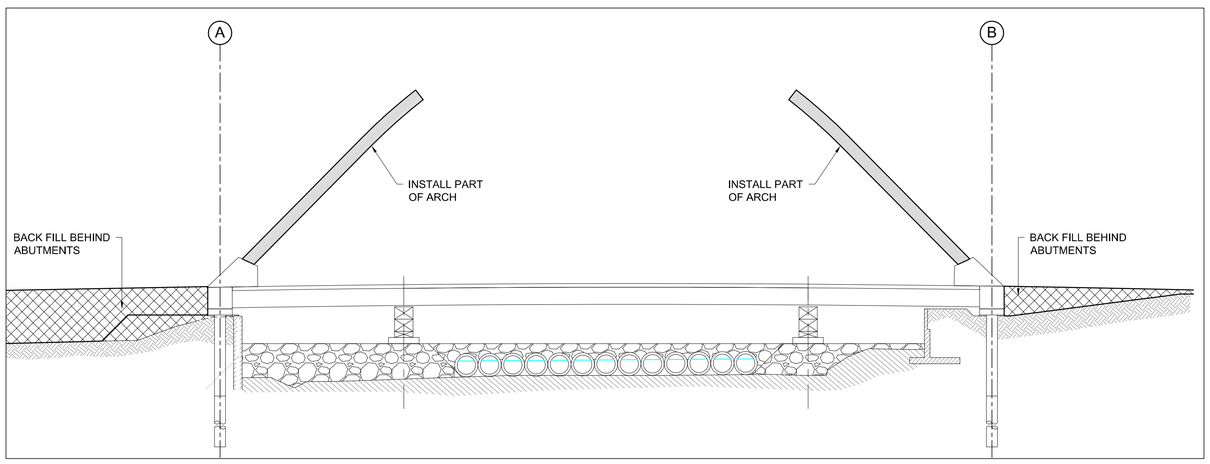
DRAFT

NOTES:

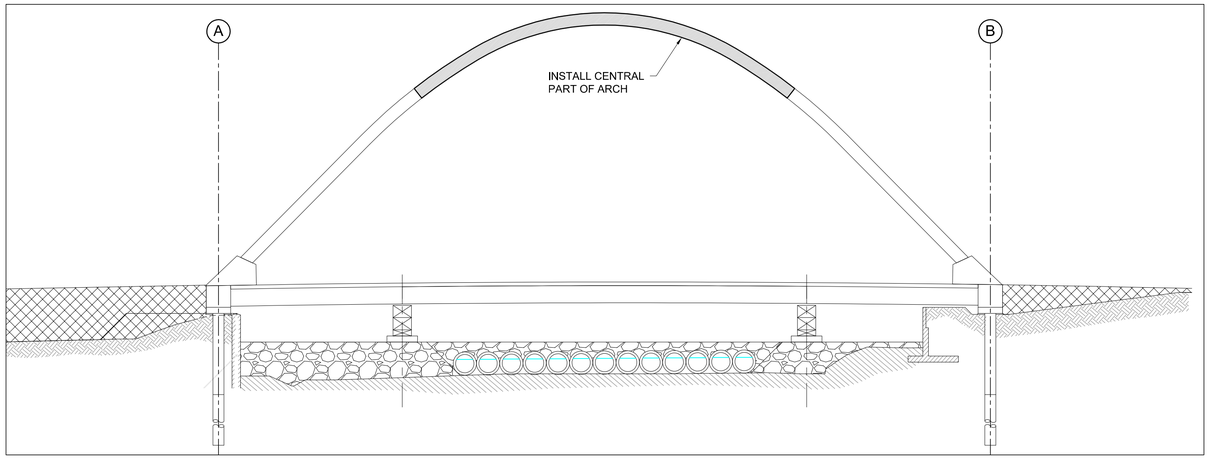
1. ALL DIMENSIONS ARE SHOWN IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE SHOWN IN METRES ABOVE ORDNANCE DATUM.



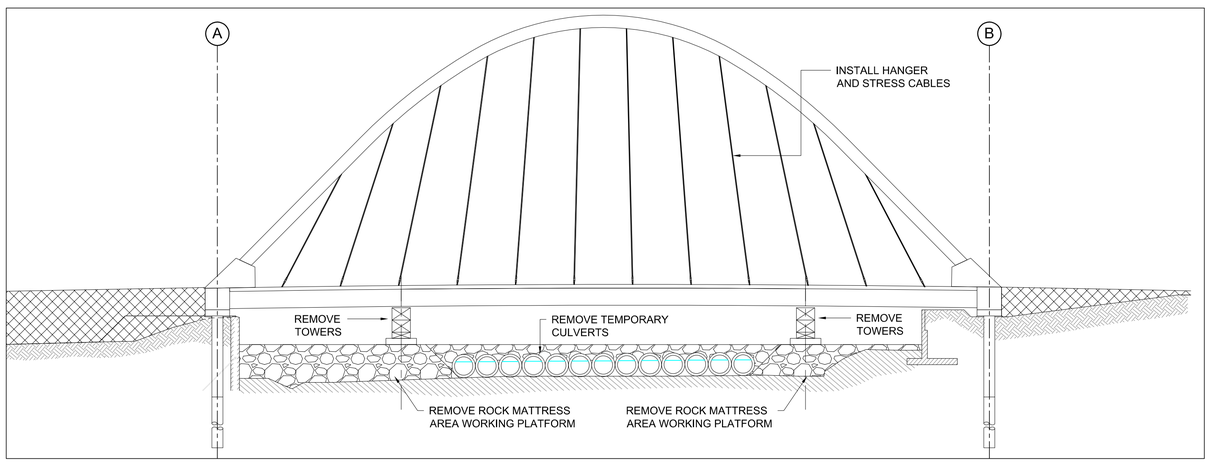
STAGE 6: INSTALL PERMANENT FORKMWORK AND CAST DIAPHRAGMS, DECK AND ARCH SUPPORT PLINTHS



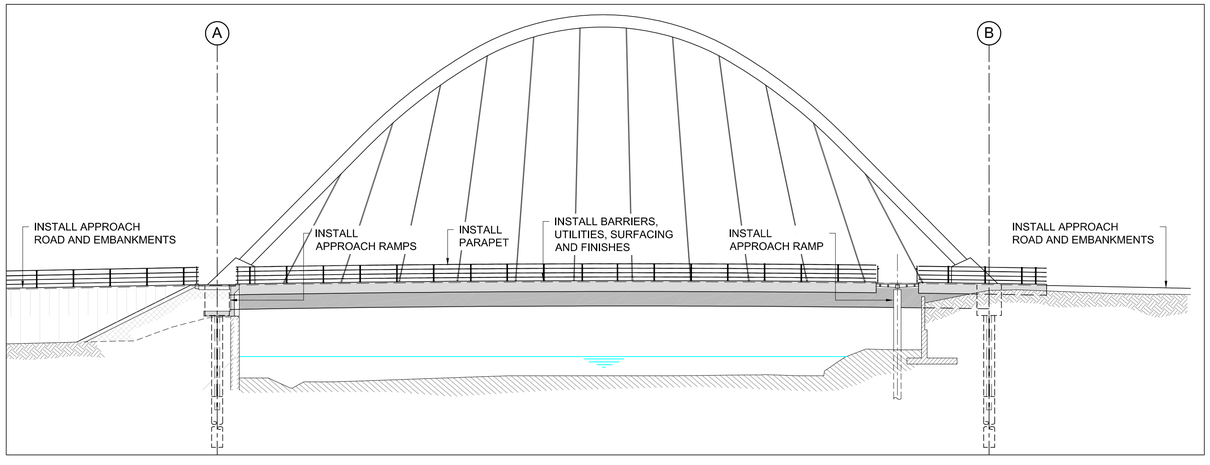
STAGE 7: BACKFILL BEHIND ABUTMENTS AND INSTALL END SEGMENTS OF ARCH



STAGE 8: INSTALL CENTRAL SEGMENT OF ARCH



STAGE 9: INSTALL HANGERS, STRESS CABLES AND REMOVE TEMPORARY TOWERS, CULVERTS AND MATTRESS AREA WORKING PLATFORM



STAGE 10: INSTALL PARAPETS, BARRIERS, UTILITIES, SURFACING, FINISHES, APPROACH RAMPS AND APPROACH ROAD AND EMBANKMENTS

WICKLOW
ENDLESS OPPORTUNITIES

Rialtas na hÉireann Government of Ireland

Tionscadal Éireann Project Ireland 2040

General Notes

(i) This is a confidential document and must not be copied,used, or its content divulged without prior written consent.

(ii) All Levels refer to Ordnance Survey Datum, Malin Head.

(iii) DO NOT SCALE, use figured dimensions only, if in doubt ask.

(iv) Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg etc) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. The Designer will not accept any responsibility for any errors from the use of these files, either by human error by the recipient, listing of the un-dimensioned measurements, compatibility with the recipients software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

No.	Date	Drn.	Chk.	Amendment / Issue	App

ARUP
50 Ringsend Road
Dublin 4
D04 T6X0
Ireland
T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Drawn:	PD
Checked:	AR
Approved:	MS
Date:	14.04.20
Scale:	AS SHOWN @ A1
Status:	
Job No.	268095

Project: RIVER DARGLE PUBLIC TRANSPORTATION BRIDGE

Title: BRIDGE CONSTRUCTION SEQUENCE SHEET 3

Drg. No. RDPTB-ARUP-ZZZ-ZZZ-SK-CB-1012 | Rev.

c:\local drive\dargle river bridge\4-02 drawings\4-02-13 sketches\rdptb-arup-zzz-zzz-sk-cb-1011&1012.dwg
philip.dunwoody 15/04/2020 11:54:31

Appendix C

Ecological Impact Assessment

Ecological Impact Assessment (EcIA)

Proposed Bray Sustainable Transport Bridge, Bray, Co. Wicklow

April 2020

Prepared by

DixonBrosnan

dixonbrosnan.com

DixonBrosnan

dixonbrosnan.com

Project	**Ecological Impact Assessment** **Bray Sustainable Transport Bridge, Bray, Co. Wicklow**
Client	**Arup**

Project ref	Report no	Client ref	
202011	202011	-	

DixonBrosnan Lios Ri Na hAoine, 1 Redemption Road, Cork.
Tel 086 851 1437| carl@dixonbrosnan.com | www.dixonbrosnan.com

Date	Rev	Status	Prepared by	
29/02/2020	1	First Draft	Carl Dixon MSc	
18/03/2020	2	Second Draft	Mark Donnelly BSc	
29/04/2020	0	Final Draft	Sorcha Sheehy PhD	

Table of Contents

1. Introduction

Wicklow County Council proposes to build a public transportation bridge over the River Dargle, with an associated road link, in Bray, County Wicklow. The bridge is to cater for public transportation, cyclists and pedestrians, as well as the future Luas Line B2 extension to Bray Station.

DixonBrosnan Environmental Consultants have assessed the potential impacts from the proposed public transportation bridge and all associated site works, on the River Dargle at Bray, on terrestrial and aquatic flora and fauna. This report describes and evaluates the habitats with their representative flora and fauna and addresses the potential ecological impacts of the development on the ecology of the site and the surrounding area.

2. Methodology

2.1 Introduction

This appraisal is based on surveys of the proposed works area and a review of desktop data. Although not part of an environmental impact assessment this report follows the structure and protocols detailed in *Advice notes for preparing Environmental Impact Statements* (EPA Draft, 2015) and *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (EPA, May 2017).

2.2 Desktop Review

A desktop study was carried out to identify features of ecological value occurring within the proposed development site and those occurring in close proximity to it. A desktop review also allows the key ecological issues to be identified early in the appraisal process and facilitates the planning of surveys. Sources of information utilised for this report include the following:

- National Parks & Wildlife Service (NPWS) - www.npws.ie
- Environmental Protection Agency (EPA) – www.epa.ie
- National Biodiversity Data Centre – www.biodiversityireland.ie
- Wicklow Biodiversity Action Plan 2010-2015 (Wicklow County Council, 2010);
- Bat Conservation Ireland – http://www.batconservationireland.org
- Birdwatch Ireland - http://www.birdwatchireland.ie/
- British Trust for Ornithology (BTO)-www.BTO.ie
- European Communities (Quality of Salmonid Waters) Regulations 1998, S.I. No. 293/1998
- *Best Practice Guidance for Habitat Survey and Mapping* (Heritage Council, 2011)
- *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority, 2009).

The appraisal of impacts follows the protocols outlined in guidelines for *Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority, 2009) and *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal*, *2nd edition* (CIEEM 2016). Further detail on potential impacts of the proposed development are addressed in the *Environmental Impact Screening Report* (Arup 2020), submitted with this application.

2.3 Survey Overview

The likelihood of additional ecological impacts occurring, which have not been identified in this report, is considered remote. A habitat and flora survey was carried out on the 23rd January 2020. A bird count, survey for otters and other protected mammals and an invasive species survey were also conducted during this site visit.

Whilst it is acknowledged that surveys took place outside the growing season, the habitats noted on site are common and the presence of rare flora is considered improbable. This report was prepared by Carl Dixon MSc (Ecological Monitoring), Mark Donnolly BSc (Forestry) and Sorcha Sheehy PhD (Ecology/Ornithology).

3. Proposed development

3.1 Overview

The Bray Sustainable Transport Bridge and link road will cross the River Dargle close to the existing railway bridge, providing a pedestrian, cycleway and public transport link between Dublin Road and Bray DART station. Refer to **Figure 1** and **Figure 2**.

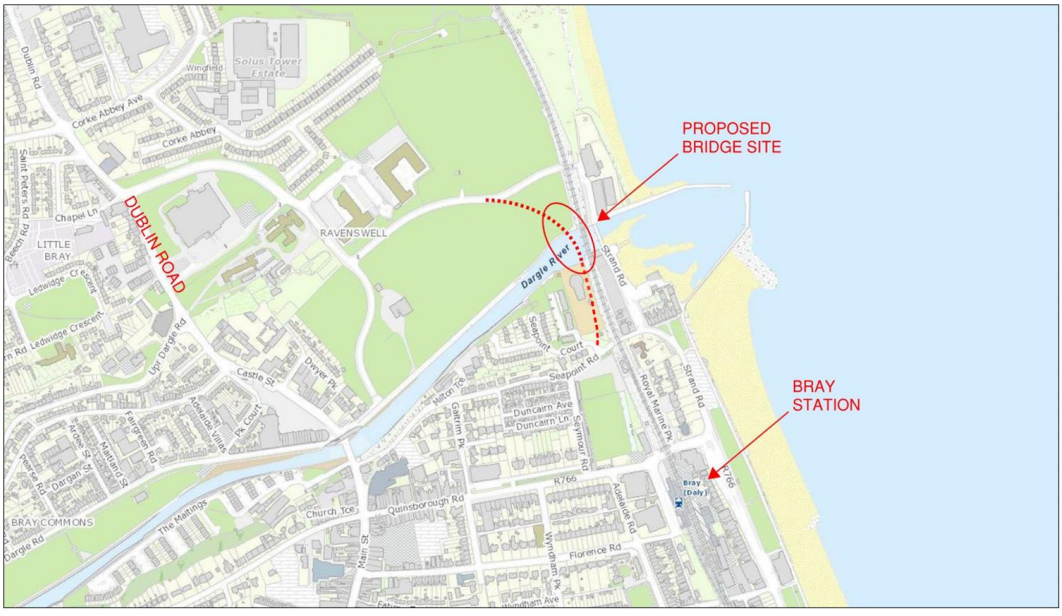


Figure 1. Site Location

The Former Golf Club Lands lie to the north and consists of a semi-greenfield site, with a pedestrian and cycle track running adjacent to the river bank wall. A network of below ground services also run approximately parallel to the river bank wall at this location.

Bray Pumping Station is located to the south, which forms a constrained corridor with the railway line. The existing rail bridge is located directly downstream (east) of the proposed bridge, with an existing road bridge adjacent to that. The River Dargle is approximately 57 m wide at the location of the proposed crossing. The river is tidal in this region and discharges into Bray Harbour to the east.

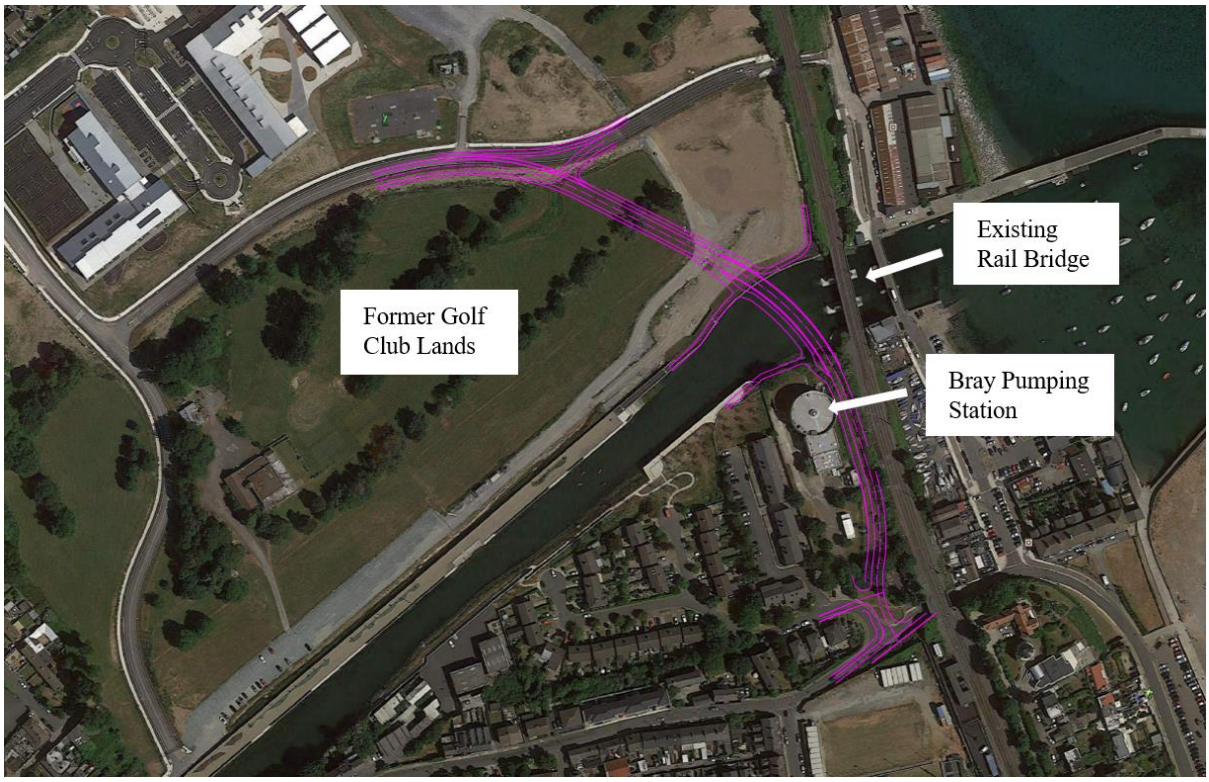


Figure 2. Proposed Bridge Site

The proposed bridge will carry the public transportation route over the River Dargle and align the carriageway to pass through the narrow corridor of land to the south between the existing railway line embankment and Bray Pumping Station. The total area for the proposed development is approximately 0.6 hectares. The proposed bridge will be a bowstring arch bridge which crosses the river with a single span of 63 m. The proposed bridge is illustrated in **Figure 3**, with further detail on the layout provided in **Appendix A**.

Figure 3. Proposed Bow String Arch Bridge

The arch itself will comprise of a fabricated steel plated box, potentially composite with a concrete infill depending on the structural demands placed on the arch. The hangers will comprise of alloy steel cables, capable of supporting the structure self-weight and imposed bridge loads. Options for the superstructure would comprise either a steel and concrete composite deck or a fully post-tensioned concrete deck, depending on structural demand.

3.2 Construction

It is expected that construction of the proposed development will commence in Q1 2022, subject to approval. The total duration of all construction works is expected to be approximately 2 years.

The proposed bridge will require temporary works within the waterway to allow for construction to proceed. Rock materials will be imported to infill northern and southern portions of the river bed and concrete pipe culverts will be laid onto the river bed. It is estimated that the quantity of rock infill material required will be in the region of 6,000m^3. These will represent temporary platforms to enable end span steel girders (a type of steel beam) to be installed. The existing quay wall on the southern bank will be broken out locally, and piling will be required to enable the installation of these girders. Temporary towers will be erected to support the end spans during construction. The central span steel girder will then be installed between the two end span steel girders. Once the bridge is constructed it is proposed that the rock material and temporary towers will be removed from the river bed. Refer to **Appendix A** for an overview of the construction sequencing/methodology.

3.3 Emissions

The type of construction works proposed involve standard routine construction methodologies and are not complex in nature and are well understood. Therefore, significant environmental emissions are not predicted. However, minor emissions to environmental media are likely to

occur, and these are detailed below. These will be localised and minor emissions which will be of short duration.

3.3.1 Emissions to Water

As outlined above, construction works will take place within the river itself and adjacent to the river. Temporary platforms will be constructed on both banks of the river. Minor emissions to water will arise while these temporary platforms are being constructed.

However, as the volume of sediment which will be displaced will be quite small, it is expected that there will be only be a minor release of sediments. The river at this location is not extremely sensitive to sediment loading as it is located within a tidal area close to Bray Harbour which is subject to large diurnal tidal flows carrying substantial volumes of sediment. Disturbed sediment would disperse and drop to the seabed on the ebb and flow of the tide. As such any sediment in the water column will be subject to a high level of dilution Therefore, it is not expected that there will be a significant effect on water quality as a result of the construction of the proposed development.

Similarly, the impact from any minor spillages of hydrocarbons from machinery, if they were to inadvertently occur, would have a negligible impact in the context of the available dilutions. The risk of accidental releases or spillages is very low from this standard type of construction work.

3.3.2 Emissions to Ground

There is potential for minor pollution of soils during construction from polluting substances such as hydrocarbons, but the construction footprint is relatively small and constrained and any minor pollution would be confined to the immediate area of the works.

3.3.3 Emissions to Air

Noise generated during the construction would arise primarily from construction traffic and activities associated with the bridge construction. Noise emissions will be temporary and short-term. Aquatic fauna such as fish, seals, cetaceans and birds etc. are already accustomed to a certain level of disturbance along the river channel at this location due to the existing traffic noise, construction and urban nature of the surrounding area.

The main source of noise emissions during the works in the River Dargle will be during the sheet piling required for the bridge construction. It is expected that there may be some temporary short-term disturbance on mobile species, such as fish and birds, during the sheet piling installation and that these species may move away from the source of the noise for the duration of the works. It is noted that the sheet piling will only be carried out during daylight hours.

Minor dust emissions will also be generated during the construction work but again, these would be temporary and short-term.

3.3.4 Use of Natural Resources

The proposed works area required for the proposed development is relatively small. Permanent land take for road construction = 6000 m^2 (approximately 2000m^2 of amenity grassland and 4000 m^2 of spoil and bare ground/recolonising bare ground habitat) and an additional temporary land take for construction = 7500 m^2 (spoil and bare ground/recolonising bare ground habitat).

The temporary land impact area within the river bed will be 1500 m^2. A number of trees will be removed on the northern and southern side of the river (approximately 10 northern side & 7 southern side).

Construction materials will include concrete, steel, cables and expansion joints and bearings. It is not considered that there will be a significant use of these resources as part of the proposed works.

3.4 Production of Waste, Pollution and Nuisances

To ensure that traffic nuisance will not arise on either the national or regional roads, a Construction Traffic Management Plan will be prepared by the appointed Contractor, in consultation with the Local Roads Authority.

Construction activities including the storage of materials and works will be restricted to within the defined works boundaries.

The employment of control measures for the proposed development will serve to minimise the risk of pollution of soil, storm water run-off or groundwater. These measures will be implemented by the contractor in advance of the construction works.

3.5 Operation

Following the completion of the construction works, a public transportation bridge will be in place across the River Dargle close to the existing railway bridge, providing a pedestrian, cycleway and public transport link between Dublin Road and Bray DART station. It is envisaged that the bridge and road link will be frequented as per typical edge of town centre patterns. The development is anticipated to ease congestion within Bray Town Centre, providing a link between the northern part of the town and the town centre/ rail station. The actual bus network through here is yet to be determined, but there is a new school complex to the north of the application site and plans for further mixed-use development in the short to medium term. The BusConnects Bray to Dublin Core Bus Corridor is also proposed in close proximity to the site. The proposals do not include provision for private vehicular traffic. The proposals will include standard street lighting.

There will be no emissions from the proposed development during the operational phase.

4. Designated Conservation Areas

Special Areas of Conservation (SACs) and candidate SACs are protected under the Habitats Directive 92/43/EEC and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Special Protection Areas (SPAs) are protected under the Birds Directive 2009/147/EC and European Communities (Birds and Natural Habitats) Regulations 2011, as amended. Collectively, these sites are referred to as Natura 2000 or European sites. Natural Heritage Areas (NHAs/pNHAs) are national designations under the Wildlife Act 1976, as amended. A Natural Heritage Area (NHA) is designated for its wildlife value and receives statutory protection. A list of proposed NHAs (pNHAs) was published on a non-statutory basis in 1995, but these have not since been statutorily proposed or designated. Consultation with the NPWS is still required if any development is likely to impact on a pNHA.

The proposed development area does not form part of any Natural Heritage Area (NHA), Special Protection Area (SPA), Special Area of Conservation (SAC) or candidate Special Area of Conservation (cSAC), Nature Reserve, or National Park.

4.1 European Sites SACs & SPAs

The closest Natura 2000 site is Bray Head SAC located 1.7 km south of the proposed development site. Designated sites, along with their distance from the proposed development site, are listed in **Table 1** and are shown in **Figure 5.**

These Natura 2000 sites are located a considerable distance from the proposed development and given the limited scope of the development, the low risk of emissions and the dilution provided in the tidal section of the River Dargle no potential impact on these Natura 2000 sites has been identified.

Table 1. Designated areas and their location relative to the proposed work site.

Site	Code	Distance from the proposed works at its closest point.
Special Area of Conservation (SAC)		
Bray Head	000714	1.7 km S
Ballyman Glen	000713	2.6 km NW
Rockabill to Dalkey Island	003000	4.4 km NE
Knocksink Woods	000725	4.7 km NW
Glen of the Downs	000719	7.3 km SSW
Wicklow Mountains	002122	7.9 km W
South Dublin Bay	000210	10.3 km NNW
The Murrough Wetlands	002249	11.1 km SSE
Carriggower Bog	000716	11.7 km SW

Site	Code	Distance from the proposed works at its closest point.
Special Protection Area (SPA)		
Dalkey Islands	004172	6.8 km NNW
Wicklow Mountains	004040	8.4 km W
South Dublin Bay and River Tolka Estuary	004024	10.2 km NW
The Murrough	004186	12.1 km SSE

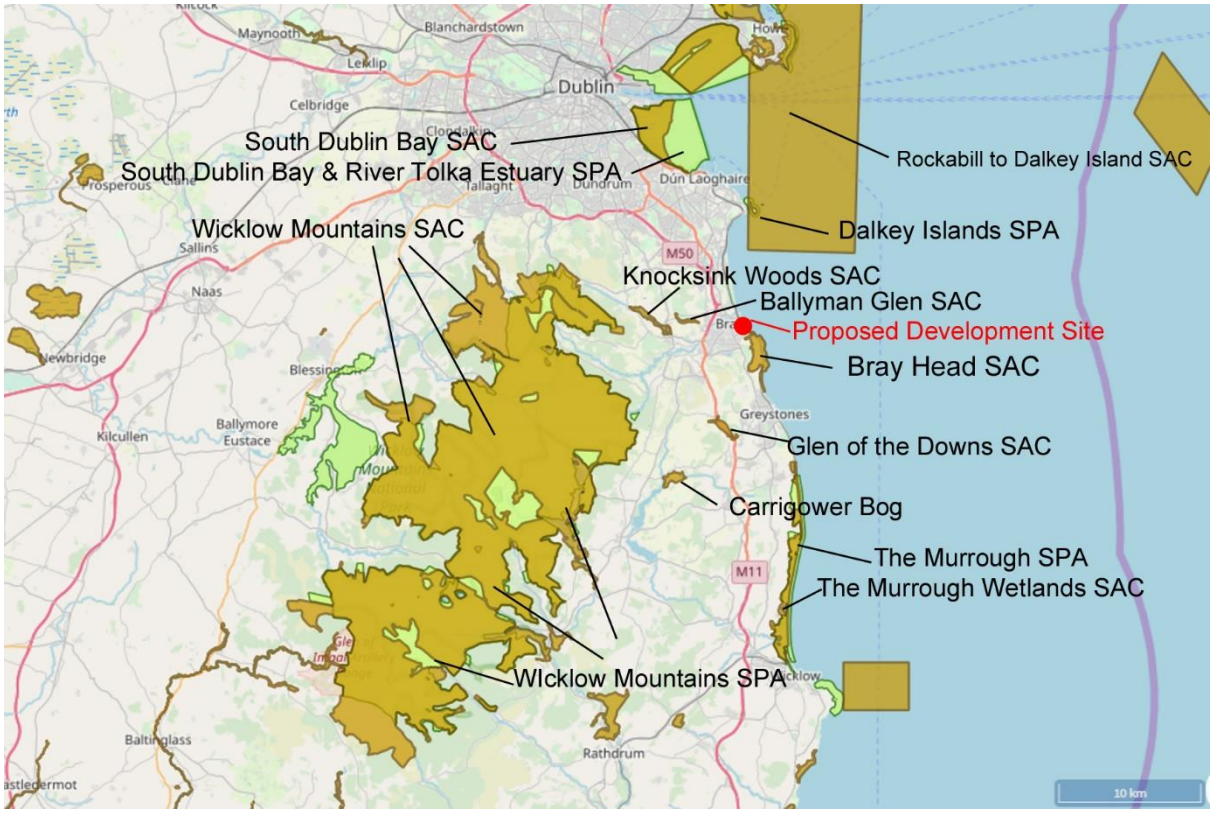


Figure 5. Proposed development site in relation to surrounding Natura 2000 sites

An Appropriate Assessment Screening was carried out for the proposed development by Arup and submitted with this application (*River Dargle Public Transportation Bridge Report for Screening for Appropriate Assessment* Arup 2020). This report concluded the following:

> *"The aims of this report were as follows:*
>
> - *Provide information on and assess the potential for the proposed development to significantly impact on Natura 2000 Sites (also known as European sites).*
> - *Determine whether the proposed development is directly connected with, or necessary*
> - *to the conservation management of any Natura 2000 sites.*

- *Determine whether the proposed development, alone or in combination with other*
- *projects, is likely to have significant effects on Natura 2000 sites in view of their*
- *conservation objectives.*

It has been objectively concluded by Arup that:

- *There is no potential for the proposed development to significantly impact on Natura 2000 Sites.*
- *The proposed development is not directly connected with, or necessary to the conservation management of any Natura 2000 sites.*
- *The proposed development, alone or in combination with other projects, is not likely to have significant effects on Natura 2000 sites in view of their conservation objectives.*

It has been determined by Arup that it is possible to rule out likely significant impacts on any Natura 2000 sites. It is the view of Arup that it is not necessary to undertake any further stage of the Appropriate Assessment process."

4.2 Nationally Protected Sites - NHAs/pNHAs

Consultation of the NPWS online database identified two NHAs and seven pNHAs within 15km of the proposed development. These are listed in **Table 2** and their distances from the site of the proposed development are also provided. No direct source-pathway-receptor link of significance between the area of the proposed development and any Natura 2000 site, NHA or pNHA has been identified.

None of the NHA and pNHA sites below listed are considered to be of relevance to the proposed development due to their distance from, and lack of connectivity with the proposed development and due to the nature of the proposed development.

Table 2. NHAs and pNHAs within 15km of the Proposed Development

pNHAs	Site Code	Distance from closest section of proposed development (km)
Bray Head	000714	1.6 km south-southeast
Dargle River Valley	001754	3.5 km southwest
Ballyman Glen	000713	2.6 km west southwest
Knocksink Woods	000725	5.0 km southwest
Powerscourt Woodland	001768	3.5 km southwest
Great Sugar Loaf	001769	4.9 km southwest

pNHAs	Site Code	Distance from closest section of proposed development (km)
Ballybetag Bog	001202	6.3 km northwest
Dingle Glen	001207	5.9 km northwest
Loughlinstown Wood	001211	4.1 km north northwest
Glen of the Downs	000719	7.9 km south southwest
Carrigower Bog	000716	11.7 km south southwest
The Murrough	000730	10.0 km south
Dalkey Coastal Zone & Killiney Hill	001206	6.5 km north northwest
Fitzsimons wood	001753	11.3km northwest
Vartry Reservoir	001771	13.3 km southwest
South Dublin Bay	000210	11.8 km north northwest

4.3 Salmonid Waters

The River Dargle main channel is a designated salmonid river in accordance with EU Directive 78/659 (SI No 293 of 1988) and as such receives protection under S.I. No. 293/1988: European Communities (Quality of Salmonid Waters) Regulations, 1988. The River Dargle and its tributaries support resident Brown Trout, a nationally significant population of Sea Trout (both *Salmo trutta*) in addition to a significant and biologically valuable population of Atlantic salmon (*Salmo salar*), listed under Annex II and V of the EU Habitats Directive).

5. Habitats

Surveys were carried out on the 23rd of January 2020. The terrestrial and aquatic habitats within or adjacent to the proposed development site were classified using the classification scheme outlined in the Heritage council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and cross referenced with Annex I Habitats where required. Although the survey took place outside the growing season no rare species were noted, nor are they expected to occur given that the terrestrial habitats within the study area are common, low value habitats.

The habitats to be impacted by the proposed development are described below in **Table 2** and illustrated in **Figure 6**. The ecological value of habitats is defined by the classification scheme outlined in the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (National Roads Authority, 2009) which is included in **Appendix B.**

Table 2. Habitats present and their relative value.

Habitat	Comments	Ecological value (NRA guidelines)
Recolonising Bare Ground (ED3)	An area of sparsely vegetated ground on the north of proposed development which was previously disturbed during construction of adjacent roads and paths. Ruderal, weed species including Plantation (*Plantago* sp), Willow – herbs (*Epilobium* sp.) red fescue (*Festuca rubra*), dandylion (*Taxodium* sp) dominate the floral community. There is an area of taller, perennial species dominated by creeping thistle (*Cirsium nigra*). The invasive species, winter heliotrope (*Petasites fragrens*) and Buddleia (*Buddleja davidii*) were both recorded. This area is of limited local value to wildlife and peripheral areas are being colonised by gorse (*Ulex europeaus*) grass species (*Fectuca* sp.) and clover (*Trifolium repens*) which was probably sown relatively recently.	Local Importance (Lower value)
Spoil and bare ground ED2	This includes the spoil associated with the construction of trackways north and south of the river. South of the river the proposed construction corridor has recently been cleared leaving bare substrate. It will quickly regenerate as deep rooted perennial and colonising ruderal species become re-established. There are several sites where winter heliotrope is re-establishing itself. The proposed construction corridor south of the River Dargle is bordered by scrub to the east and the Bray water Pumping station, building and artificial surfaces, to the west.	Local importance (Lower value)
Buildings and artificial surfaces BL3	A building on the construction route adjacent to Seapoint Road is included within the study area. It services the gas pipeline which run beneath the proposed development site. The adjacent Pumping Station is also included. Vegetation is sparse and these areas are obviously highly modified.	Local importance (lower value)

Habitat	Comments	Ecological value (NRA guidelines)
Scrub WS1	Alongside the proposed development area, south of the River Dargle, dense scrub is dominant. Species include Bramble (*Rubus fruticosus* agg), Elder (*Sambucas nigra*), Buddleia (*Buddleja davidii*) and Sycamore (*Acer pseudoplatanus*) with Ivy (*Hedera helix*) in the field layer. The dense growth is of local importance for birds.	Local importance (higher value)
Scattered trees and parkland WD5	Where the proposed route passes through the former golf course there are mature and semi-mature trees. A total of 10 trees comprising Poplar (*Populus* sp.) Sycamore (*Acer pseudoplatanus*), Whitebeam (*Sorbus aria*) and Lodgepole pine (*Pinus contorta*) were recorded. There is one semi mature Scots Pine (*Pinus Sylvestris*) adjacent to the River Dargle – south bank, it will need to be removed. Adjacent to Seapoint Road there are four semi mature Norway maple (*Acer plotanoides*) and sycamore (*Acer pseudoplatanoides*). These are non-native species which will need to be removed.	Local importance (higher value)
Amenity Grassland GA2	This is the former golf club on the north bank. It retains the characteristics of an intensively managed, highly modified grassland which is species poor. Species noted include dandylion (*Taxodium* spp), daisy (*Bellis perennis*) and Clovers (*Trifolium* spp). Overall, this is a highly modified habitat with limited value for local wildlife.	Local importance (Lower value)
Tidal river CW2/ Sea Walls, Piers and Jetties (CC1).	The Lower section of the River Dargle as it discharges into Bray Harbour experiences regular fluctuations in salinity, turbidity and in the rate and direction of water flow. It has been canalised with vertical concrete banks. There is no maritime/ terrestrial vegetation and therefore this is classified as Sea Walls, Piers and Jetties (CC1).	County importance

Habitat	Comments	Ecological value (NRA guidelines)
	The river bed is medium to fine gravel sand with imported boulders on the south bank which have been colonised by Bladder Wrack (*Fucus vesiculosus*). This estuary is of importance from an ecological viewpoint but passes through a highly modified landscape with very little associated vegetation or natural morphological features. However is utilised as a feeding and roosting area for birds.	

An area of spoil and bare ground (ED2) adjacent to Bray pumping station on the southern bank of the River Dargle will be permanently removed to facilitate the construction of the proposed bridge (approximately 2,000 m^2). On the northern bank of the Dargle a small section of recolonising bare ground (ED3) (approximately 2,000 m^2) will be permanently removed (**Photograph 1**). Within the former golf club site, also on the northern bank, a small area of the amenity grassland (approximately 2,000 m^2) will be permanently removed to facilitate the new link road (**Photograph 4**). A further 7,500 m^2 of land on the northern side of the river will be used for the temporary works area, mainly within an area of recolonising bare ground (ED3). However this will be reinstated following completion of the development.

The proposed bridge will require temporary works within tidal river habitat (CW2) within the River Dargle (**Photograph 3**). Details of construction are to be agreed, but in-river works will involve rock importation, with rocks likely to be infilled on a footprint of 1,500m^2 (750 m^2 on both the north and south riverbanks). These would be removed following construction. Sheet piling may be additionally required. There will be no permanent loss of habitat within the River Dargle and aquatic vegetation and macro-invertebrate communities will colonise the site following completion of works.

Where the proposed works area passes through the former golf course there are mature and semi mature trees (**Photograph 4**). An estimated total of seventeen trees will be removed during the construction phase. These include Poplar, Sycamore, Whitebeam and Lodgepole pine. One semi mature Scots Pine on the south bank will be removed. Adjacent to Seapoint Road there are four semi-mature Norway Maple and Sycamore. The trees which will be removed are non-native, semi-mature trees which have been planted in an urban setting. They do not have a natural woodland structure and have a poorly developed ground and shrub layer. These trees have limited value for nesting and roosting habitat for birds due to their size. None of the trees to be removed have the structural elements (cracks, crevices etc) that would make them suitable as bat roosts.

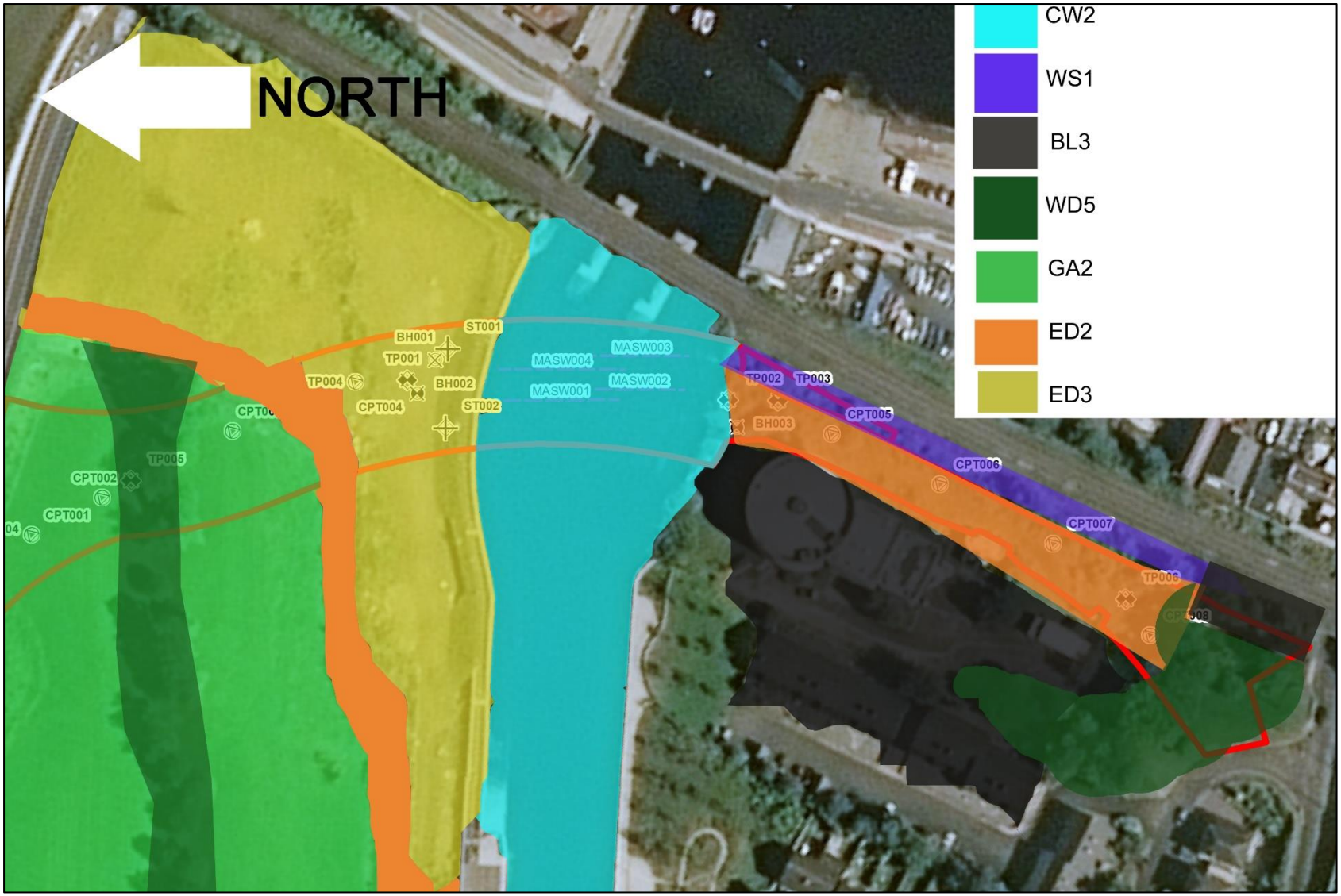


Figure 6. Habitat map of study area

Photograph 1. Recolonising bare ground looking south to proposed bridge. Photographs 2. Proposed development corridor looking south. Photograph 3. River Dargle. Photograph 4. Trees on former golf club to be removed.

6. Flora

The site of the proposed development lies within Ordnance Survey National Grid 10km square O21. The National Parks and Wildlife Service (NPWS) rare plant database notes the presence of three protected plant species within grid square O21; Beck Pocket-moss (*Fissidens rufulus*). These species are protected by the Flora Protection Order 2015 (S.I. No. 356 of 2015). This species was not recorded within study area during site survey.

The National Biodiversity Data Centre (NBDC) online database provides data on the distribution of mammals, birds, and invertebrates within the 10 km grid squares. Some 420 flowering plants are listed by the NBDC as present in the grid square O21. None of these species are designated as threatened. No rare species were recorded during the site survey.

7. Fauna

7.1 Otter

Otters, along with their breeding and resting places are protected under the provisions of the Wildlife Act 1976, as amended by the Wildlife (Amendment) Act, 2000. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Direct which is transposed into Irish law in the European Communities (Natural Habitats) Regulations (S.I 94 of 1997), as amended. Otters are also listed as requiring strict protection in Appendix II of the Berne Convention on the Conservation of European Wildlife and Natural Habitats and are included in the Convention on International Trade of Endangered species (CITES).

Although rare in parts of Europe they are widely distributed in the Irish countryside in both marine and freshwater habitats. Otters are solitary and nocturnal and as such are rarely seen. Thus, surveys for otters rely on detecting signs of their presence. These include spraints (faeces), anal gland secretions, paths, slides, footprints and remains of prey items. Spraints are of particular value as they are used as territorial markers and are often found on prominent locations such as grass tussocks, stream junctions and under bridges. In addition, they are relatively straightforward to identify.

Otters occasionally dig out their own burrows but generally they make use of existing cavities as resting placing or for breeding sites. Suitable locations include eroded riverbanks, under trees along rivers, under fallen trees, within rock piles or in dry drainage pipes or culverts etc. If ground conditions are suitable the holt may consist of a complex tunnel and chamber system. Otters often lie out above ground especially within reed beds where depressions in the vegetation called “couches” are formed. Generally, holts or resting areas can be located by detecting signs such as spraints or tracks.

In contrast natal holts which are used by breeding females can be extremely difficult to locate. They are often located a considerable distance from any aquatic habitats and otters may also use habitats adjoining small streams with minimal or no fish populations. In addition, natal holts are usually carefully hidden and without obvious sprainting sites. Otters do not have a well-defined breeding season.

It is noted that Otters are largely nocturnal, particularly in areas subject to high levels of disturbance as evidenced by the presence of Otters in the centre of Cork and Limerick City. Thus, otters are able to adapt to increased noise and activity levels; however, breeding holts are generally located in areas where disturbance is lower.

Otter undoubtedly frequent the River Dargle. The National Biodiversity Data Centre (NBDC) online database for the grid square O21 has 12 records of Otter, the most recent record from September 2017. However, no signs of otter were recorded during the site survey. An inspection of the only accessible suitable sites, the imported rock and railway bridge pier on the south bank, revealed no evidence, (spraints/footprints) of otter and no potential couches or holts were recorded. Although otter are likely to forage within this section of the tidal river no suitable sites for holts or couches were recorded.

7.2 Bats

In Ireland, nine species of bat are currently known to be resident with the residency of the tenth recorded species yet to be proven. These are classified into two Families: the Rhinolophidae (Horseshoe bats) and the Vespertilionidae (Common bats). The lesser horseshoe bat *Rhinolophus hipposideros* is the only representative of the former Family in Ireland. All the other Irish bat species are of the latter Family and these include three pipistrelle species: common *Pipistrellus pipistrellus*, soprano *P. pygmaeus* and Nathusius' *P. nathusii*, four *Myotids*: Natterer's *Myotis nattereri*, Daubenton's *M. daubentonii*, whiskered *M. mystacinus*, Brandt's *M. brandtii*, brown long-eared *Plecotus auritus* and Leisler's *Nyctalus leisleri* bats.

The review of existing bat records within a 10 km radius (O21) of the study site (sourced from BC Ireland's National Bat Records Database) showed that the following Irish bat species have been recorded locally, **Table 3**.

Table 3. Bat Species recorded in O21 (BC Ireland)

Common name	Scientific name
Lesser Noctule	*Nyctalus leisleri*
Pipistrelle	*Pipistrellus pipistrellus sensu lato*
Soprano Pipistrelle	*Pipistrellus pygmaeus*
Daubenton's Bat	*Myotis daubentoniid*
Natterer's Bat	*Myotis nattereri*
Brown Long-eared Bat	*Plecotus auratus*

All bat species are protected under the Wildlife Acts (1976 & 2000) which make it an offence to wilfully interfere with or destroy the breeding or resting place of all species; however, the Acts permit limited exemptions for certain kinds of development. All species of bats in Ireland are listed in Schedule 5 of the 1976 Act and are therefore subject to the provisions of Section 23 which make it an offence to:

- Intentionally kill, injure or take a bat
- Possess or control any live or dead specimen or anything derived from a bat
- Wilfully interfere with any structure or place used for breeding or resting by a bat
- Wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose.

In addition to domestic legislation bats are also protected under the EU Habitats Directive (92/43/EEC) with all bat species listed in Annex IV of the Directive. The Irish government is

also a signatory to the 1979 Bonn convention (Convention on the conservation of migratory species of wild animals) and the 1982 Bern convention (The convention on the conservation of European wildlife and natural habitats), and has a commitment to the 1991 Eurobats agreement (Agreement on the conservation of bats in Europe).

Evidence of bat activity associated with potential roost sites includes bat droppings, urine staining, feeding remains and dead/alive bats. Indicators that potential roost locations and access points are likely to be inactive include the presence of cobwebs and general detritus within the apertures. Potential roost features associated with trees include cracks, crevices, loose bark, woodpecker holes and splits. Evidence indicating bat presence, includes dark stains running below holes or cracks, bat droppings, odours, or scratch marks.

Bats roosting in the locality probably use the site for feeding. However the trees on the site are predominantly semi-mature and there is no suitable roosting habitat within the proposed development site. None of the trees to be removed have the structural elements (cracks, crevices etc) that would make them suitable as bat roosts. There are no other suitable roosting locations for bats within the proposed development area.

7.3 Other terrestrial mammals

Nineteen other species of terrestrial mammal have been recorded within a 10 km radius of the proposed development site. Seven of which are protected under the Irish Wildlife Act; namely Badger, Pygmy Shrew, Red Squirrel, Pine Marten, Red Deer and Hedgehog.

7.3.1 Badger (*Meles meles*) and their setts are protected under the provisions of the Wildlife Act 1976, as amended, and it is an offence to intentionally, knowingly or unknowingly kill or injure a protected species, or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. Badgers are known to occur within the wider landscape (NBDC), however no signs of Badger, were recorded during the site surveys.

7.3.2 Pygmy Shrew (*Sorex minutus*) is common throughout mainland Ireland and has a preference for habitats such as hedgerows and grasslands; they have also been found utilizing stone walls. Due to the habitats present within the proposed site it is possible that Pygmy Shrew is present.

7.3.3 Red Squirrel (*Sciurus vulgaris*) also listed on Appendix III of the Berne Convention can be found throughout Ireland. Due to the habitats recorded within the proposed development area it is unlikely that Red Squirrel is present.

7.3.4 Pine Marten (*Martes martes*) is protected in Ireland by both national and international legislation. Under the Irish Wildlife Acts it is an offence, except under licence, to capture or kill a pine marten, or to destroy or disturb its resting places. The European Union's Habitats & Species Directive further obliges Ireland to maintain the favourable conservation status of the Pine Marten throughout its range. Due to the habitats recorded within the proposed development area it is unlikely that Pine Marten is present.

7.3.5 Red Deer (*Cervus elaphus*) are protected under the Wildlife Act although they are listed as a quarry species and can be hunted under license at certain times of the year except for the Kerry herd which is completely protected. Due to the habitats recorded within the proposed development area it is unlikely that Red Deer is present.

7.3.6 Hedgehog (*Erinaceus europaeus*) is protected under the Wildlife Act and is also listed on Appendix III of the Berne Convention can be found throughout Ireland, with male hedgehogs having an annual range of around 56 hectares. Due to the habitats recorded within the site, hedgehog could occur within the proposed development site.

7.3.7 Irish Hare (*Lepus timidus hibernicus*) is one of three lagomorphs found on the Island of Ireland and the only native lagomorph. It is listed on Appendix III of the Berne Convention, Annex V(a) of the EC Habitats Directive (92/43/EEC) and as an internationally important species in the Irish Red Data Book.

The Irish hare is adaptable and lives in a wide variety of habitats. It typically reaches its highest densities on farmland, particularly where there is a mix of grassland and arable fields along with hedgerows and other cover. No signs of Hare were recorded although this species is likely to occur.

7.3.8 Irish Stoat (*Mustela erminea hibernica*) is one of the species protected under regulations (Protection of Wild Animals) in 1980 which enabled Ireland to comply with the provisions of the Bern Convention of European Wildlife and Natural Habitats, which was ratified by Ireland in April 1982. Irish stoats occur in most habitats with sufficient cover, including urban areas. It is likely that stoat will occur although habitats are suboptimal.

7.3.9 Red Fox *Vulpes vulpes* has no legal status in Ireland. Accurate statistics not available, but breeding population estimated at between 150,000 to 200,000 (Hayden & Harrington, 2000 with no evidence of a decline. Foxes are highly adaptive mammals that can inhabit any type of land area, they are traditionally associated with woodland and open countryside but can be found from lowlands up to mountainous areas, along the coast, in farmland and more recently in urban areas.

7.4 Marine mammals In Ireland, there are two groups of mammals that almost exclusively inhabit the marine environment, namely cetaceans and seals. In Ireland, the 1992 EC Habitats Directive as transposed by the EC (Natural Habitats) Regulations requires that both seal species and all cetaceans occurring in Ireland are maintained at favourable conservation status. Under Article 12 of the Directive, all cetaceans should receive strict protection within the Exclusive Economic Zone. Under the Wildlife Amendment) Act 1976 as amended, all cetaceans and seals are protected species listed on the 5th Schedule. The National Biodiversity Data Centre (NBDC) databases for grid square O21 lists the following species as present (**Table 4**).

Table 4. NBDC marine mammal species.

Marine Mammal Species	Latin Name	EU Designation/Legal Protection
Grey Seal	*Halichoerus grypus*	Protected Species: EU Habitats Directive Annex II & V. Protected Species: Wildlife Acts
Common Seal	*Phoca vitulina*	Protected Species: EU Habitats Directive Annex II & V. Protected Species: Wildlife Acts
Bottle-nosed Dolphin	*Tursiops truncatus*	Protected Species: EU Habitats Directive Annex II & IV. Protected Species: Wildlife Acts
Common Porpoise	*Phocoena phocoena*	Protected Species: EU Habitats Directive Annex II & IV. Protected Species: Wildlife Acts
Risso's Dolphin	*Grampus griseus*	Protected Species: EU Habitats Directive Annex II & IV. Protected Species: Wildlife Acts

Grey Seals are strictly protected in the Republic of Ireland under the Wildlife Act, 1976 and the Wildlife (Amendment) Act, 2000. They are also listed under Annex II of the European Union's EC Habitats Directive (92/43/EEC) as species of Community Interest, whose conservation requires the designation of Special Areas of Conservation (SACs). There are no Grey Seal SAC's within a 15 km radius of the proposed development site.

Grey seals generally select more remote haul-out locations on rocky skerries, uninhabited islands, isolated mainland beaches and in sea-caves (Kiely *et al.* 2000). Pups are born with a white coat that they shed before they can take to the water, usually after about six weeks. The mother stays with the pups whilst they remain on the shore. The seals shed their fur during the spring months and remain ashore for the majority of this time.

Grey Seal has been recorded on 35 occasions by the NBDC, with the most recent sighting in May 2018. Common Seals are less common with only two NBDC records in the grid square O21.

Grey Seal and, to a lesser extent, Common Seal (Protected Species: EU Habitats Directive Annex II & Annex V & Protected Species: Wildlife Acts) would be expected to occur in the

coastal waters around Bray Harbour and are likely to travel up the River Dargle to the area around the proposed bridge.

Fifty-six sightings of Bottlenose Dolphin have been recorded and 98 of Common Porpoise within O21. A single record is listed for O21 for Risso's Dolphin from a stranding in 2003. These cetacean species could potentially occur sporadically in the marine waters around Bray Harbour downstream of the proposed development site, but there is no valuable habitat for these species within the proposed development site.

7.5 Reptiles and Amphibians

According to records held by the NBDC, four reptile and amphibian species have been recorded in O21; Common Frog (*Rana temporaria),* Smooth Newt *(Lissotriton vulgaris)* Common Lizard (*Zootoca vivipara*) and Leathery Turtle (*Dermochelys coriacea)*. Common Frog is listed in Annex V of the EU Habitats Directive and is protected under the Wildlife Acts. Smooth Newt, Common Lizard and Leathery Turtle are also listed under the Wildlife Act.

Common Frog and Smooth Newt were not recorded during the site visit and are unlikely to occur within the proposed development site. Although Common Lizard can occur in a wide range of habitats, no value habitat for this species will be affected.

Leathery Turtles (*Dermochelys coriacea*) are also protected under EU Habitats Directive Annex IV and Wildlife Act but are also listed as a threatened Species under the OSPAR Convention. There are no recent records of this species within O21, with the most recent sighting dating back to 1960 (NBDC).

7.6 Fish

The River Dargle is a designated salmonid watercourse under S.I. No. 293/1988 – European Communities (Quality of Salmonid Waters) Regulations, 1988. Atlantic salmon is listed on Annex II of the EU Habitats Directive.

The River Dargle is one of Ireland's best sea trout rivers and also gets a small run of salmon (grilse). Inland Fisheries Ireland recorded four fish at seven sites surveyed on the Dargle River Catchment in 2018 (Matson *et al.* 2018). Brown trout was the most abundant species captured and ranged in length from 5.6 to 21.8 cm. Salmon were recorded at three out of seven sites surveyed. Four age classes for both brown trout and salmon 0+, 1+, 2+ and 3+ were present. European eel was recorded at one site. Stone loach were also present. All sites were assigned a fish ecological status of Good.

The NBDC records 21 species of Actinopterygii fish within O21 including the Annex IV species under the EU Habitats Directive Common Sturgeon. There are no recent records for Common Sturgeon with the most recent sighting dating back to 1966. Basking Shark, classified as a threated species by the OSPAR convention as well as Lesser Spotted Dogfish, Smooth Hound have also been recorded here.

No spawning potential for fish is present in proximity to proposed development area. However a number of fish species are likely to migrate through the site including Salmon, Lamprey and

European Eel. A number of estuarine species including mullet, bass and flounder are likely to occur within the estuarine section of the River Dargle.

7.7 Other species listed by NBDC as present within grid square O21

Table 6 below lists other species recorded within grid square O21, along with any species considered under threat and provided with legal protection.

Table 6. Other species listed by NBDC as present within grid square O21

Species Group	Named species
Invasive Mammals	Fallow Dear, Brown Rat, Feral Goat, House Mouse, Sika Dear, Wild Boar, Wood Mouse.
Alga	54 species recorded. None protected.
Mollusc	100 species recorded. Field Slug, Lesser Bulin, Moss Chrysalis Snail, Plated Snail, Smooth Ramshorn, Common Whorl Snail, Prickly Snail, Silky Snail, Striated Whorl Snail, Dog Whelk, Ash-black Slug, Brown Snail, Ear Pond Snail, English Chrysalis Snail, Heath Snail, Lake Orb Mussel, Marsh Whorl Snail, Moss Bladder Snail, Plaited Door Snail, Point Snail, Smooth Grass Snail, Tree Snail are threatened
Beetle (Coleoptera)	87 species recorded. *Hydraena flavipes, Prionocyphon serricornis* *Oreodytes davisii* threatened
Centipede	7 species recorded. None protected
Crustacean	10 species recorded. Not protected.
Fungus	513 species recorded. None protected.
Moths	503 species recorded. None protected.
Butterflies	28 butterflies. Marsh Fritillary Protected Species: EU Habitats Directive Annex II, Endangered Species; Small Blue, Wall. Threatened Species; Gatekeeper, Grayling, Small Heath, Wood White, Dark Green Fritillar.
Dragonfly (Odonata)	15 dragonfly species recorded. None protected.
Annelids	7 species recorded. None protected.
Hymenopteran	70 species recorded. None protected 32 species threatened

Species Group	Named species
Flea (Siphonaptera)	86 species recorded. None protected. 32 species threatened
Earwig (Dermaptera)	2 species recorded. Not protected.
Orthopteran	6 species recorded. None protected.
True bugs (Hemiptera)	9 species recorded. None protected.
True flies (Diptera)	102 species recorded. None protected.
Millipede	11 species recorded. None protected.
Louse (Phthiraptera)	1 species recorded. None protected
Harvestman (Opiliones)	10 species recorded. None protected.
Horsetail	6 species recorded. None protected.
Slime mould	128 species recorded. Not protected.
Ferns	13 species recorded. None protected
Conifers	15 species recorded. None protected
Lichen	104 species recorded. None protected
Liverwort	66 species recorded. None protected
Moss	189 species. 2 Protected Large White-moss *(Leucobryum glaucum*) Annex 4 Habitats Directive Beck Pocket-moss (*Fissidens rufulus*) Flora Protection Order.
Tunicate (Urochordata)	3 species recorded. Not protected.

7.8 Birds

The National Biodiversity Centre online data base lists 180 species of bird recorded within grid square O21. Of these 180 species 18 are listed under Annex I of the Birds Directive, namely Great Northern Diver, Little Egret, Little Gull, Peregrine Falcon, Golden Plover, Arctic Tern, Kingfisher, Common Tern, Corncrake, Dunlin, Nightjar, Hen Harrier, Mediterranean Gull, Merlin, Red-throated Diver, Sandwich Tern, Short-eared Owl and Whooper Swan.

An additional 12 species are Red Listed Birds of Conservation Concern in Ireland; Grey Partridge, Red Grouse, Common Scoter, Curlew, Lapwing, Barn Owl, Black-headed Gull, Common Quail, Redshank, Herring Gull, Twite and Yellowhammer.

A bird survey was carried out in conjunction with habitat survey in January 2020. During the survey, all birds seen or heard within the development site were recorded. The majority of birds utilising the proposed works areas are common in the local landscape.

Birds species listed in Annex I of the Birds Directive are considered a conservation priority. Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BOCCI). These are bird species suffering declines in population size. BirdWatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into Red and Amber lists. Red List bird species are of high conservation concern and the Amber List species are of medium conservation. Green listed species are regularly occurring bird species whose conservation status is currently considered favourable. Birds species listed in Annex I of the Birds Directive (2009/147/EC) are considered a conservation priority. Species recorded within the proposed works area are shown in **Table 7**.

Table 7. Bird Species recorded during January 2020 site visit

Species		**Birds Directive Annex**			**BOCCI***	
		I	**II**	**III**	**Red List**	**Amber List**
Anas platyrhynchos	Mallard		X	X		
Erithacus rubecula	Robin					X
Larus ridibundus	Black-headed Gull				X	
Larus canus	Common Gull					X
Chloris chloris	Greenfinch					X
Turdus merula	Blackbird					
Carduelis carduelis	Goldfinch					

Species		Birds Directive Annex			BOCCI*	
		I	II	III	Red List	Amber List
Troglodytes troglodytes	Wren					
Ardea cinerea	Grey Heron					
Corvus frugilegus	Rook					
Corvus monedula	Jackdaw					
Pica pica	Magpie					
Columba palumbus	Woodpigeon		X	X		
Fringilla coelebs	Chaffinch					
Corvus cornix	Hooded Crow					
Tachybaptas ruficollis	Little Grebe					X
Parus caeruleus	Blue Tit					
Motacilla alba yarrellii	Pied Wagtail					
Columba livia f. domestica	Feral Pigeon					

Symbol	Description
I	**Annex 1**: species and sub-species are particularly threatened. Member States must designate Special Protection Areas (SPAs) for their survival and all migratory bird species.
II	**Annex 2**: bird species can be hunted. However, the hunting periods are limited and hunting is forbidden when birds are at their most vulnerable: during their return migration to nesting areas, reproduction and the raising of their chicks.
III	**Annex 3**: overall, activities that directly threaten birds, such as their deliberate killing, capture or trade, or the destruction of their nests, are banned. With certain restrictions, Member States can allow some of these activities for species listed here.

*Colhoun & Cummins (2019) Birds of Conservation Concern in Ireland. *Irish Birds* **9**; 523-544

Overall, most of the proposed development site is of local value for bird species that utilise terrestrial and estuarine habits are relatively common in the Irish countryside. There are no terrestrial features or habitats of particular value, which would differentiate the proposed development site from large areas of similar habitat in the surrounding countryside. No Annex

I species were recorded during the site survey. There may be a short-term impact on feeding patterns during construction, but the long-term impact is predicted to be negligible.

7.9 Bray Harbour I-WeBS Data

Bray Harbour has been counted as part of the Irish Wetland Bird Survey (I-WeBS) between winter of 2006/2007 and 2012/2013. I-WeBS involves monthly counts between September and March each winter. This data is summarised in **Table 8**. The Bray Harbour sub-site includes the parts of the River Dargle, including the proposed development site, and the shoreline habitats to the north and south of the mouth of the river (**Figure 7**). No species was recorded in internationally or nationally important numbers. Gulls, including Black-headed Gull and Herring Gull, were the most commonly recorded species. Mallard, Mute Swan and Turnstone were also common. Other waterbirds such as Cormorant, Shag and Moorhen were recorded in low numbers. No wading bird species are recorded reflecting the lack of mudflat/sandflat habitat at the site.

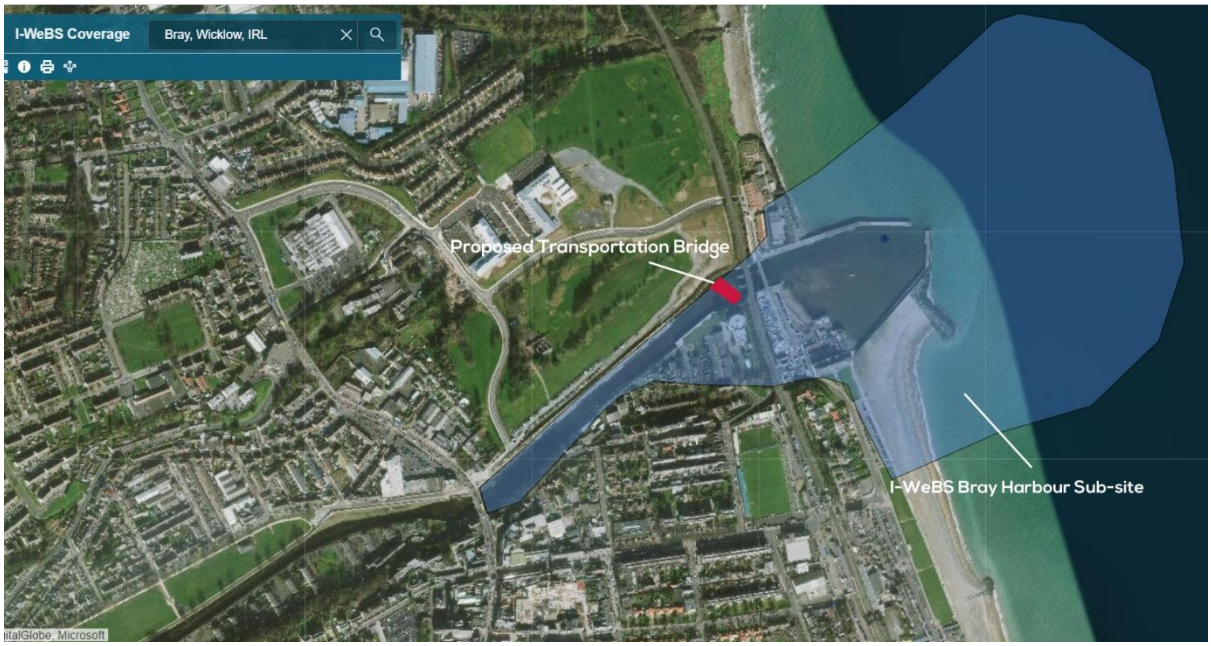


Figure 7. Location of I-WeBS Bray Harbour Sub-site (blue shading)

Table 8. I-WeBS data summary for Bray Harbour 2006-2013

Species Name	1% national	1% international	2006/2007	2007/2008	2008/2009	2009/2010	2010/20
Black-headed Gull		20000.00	525	512	505	320	655
Herring Gull		10200.00	49	95	152	153	181
Unidentified gull							240
Mallard	290.00	20000.00	95	103	85	63	71
Mute Swan	90.00		146	129	95	100	98
Turnstone	95.00	1400.00	74	48	68	102	58
Mediterranean Gull		770.00				1	4
Feral/hybrid Goose			8	9	8	6	5
Common Gull		16400.00	25	27	28	19	18
Great Black-backed Gull		4200.00	2	1	2	3	2
Cormorant	120.00	1200.00	2	3	4	2	2
Light-bellied Brent Goose	360.00	400.00					2
Shag		2000.00	1				
Moorhen		20000.00	3	4	1	3	4
Lesser Black-backed Gull		5500.00			2		1
Common Tern							
Muscovy Duck							1
Grey Heron	25.00	2700.00	2	1	1	2	1
Oystercatcher	690.00	8200.00	22		3	1	4
Glaucous Gull		2200.00					
Sandwich Tern			2			2	
Little Gull		1100.00		1			

8. Invasive Species

Non-native plants are defined as those plants which have been introduced outside of their native range by humans and their activities, either purposefully or accidentally. Invasive non-native species are so-called as they typically display one or more of the following characteristics or features: (1) prolific reproduction through seed dispersal and/or re-growth from plant fragments; (2) rapid growth patterns; and, (3) resistance to standard weed control methods.

Where a non-native species displays invasive qualities, and is not managed it can potentially: (1) out compete native vegetation, affecting plant community structure and habitat for wildlife; (2) cause damage to infrastructure including road carriageways, footpaths, walls and foundations; and, (3) have an adverse effect on landscape quality.

There is a statutory obligation under S.I. 477 of 2011 of the European Communities (Birds and Natural Habitats) Regulations 2011 to address invasive species in Ireland. With relation to this particular project the high-risk invasive species Japanese knotweed (*Fallopia japonica*) is of particular concern. This species is listed under the *3rd Schedule: Part 1 – Plants; Non-native species subject to restrictions under Regulations 49 & 50*. Regulation 49 deals with the '*Prohibition on introduction and dispersal*' while Regulation 50 deals with the '*Prohibition on dealing with and keeping certain species*'. Regulation 50 has yet to be brought into Irish law. Regulation 74 is a transitional provision in relation to Regulation 49 and 50. The Wildlife (Amendment) Act 2000 states that anyone who plants or otherwise causes to grow in a wild state in any place in the State any species of (exotic) flora, or the flowers, roots, seeds or spores of (exotic) flora shall be guilty of an offence.

No signs of Japanese Knotweed were recorded within or near the proposed development site. However as the site survey took place outside the main growing season, a repeat survey for Japanese Knotweed should be carried out prior to construction.

The NBDC lists a number of both aquatic and terrestrial high impact invasive species which have been recorded within grid square O21 (**Table 9**).

Table 9. NBDC list of high impact invasive species.

Common Name	Latin Name
Japanese Knotweed	*Fallopia japonica*
Cherry Laurel	*Prunus laurocerasus*
Brown Rat	*Rattus norvegicus*
Fallow Deer	*Dama dama*
Canada Goose	*Branta canadensis*

Common Name	Latin Name
House Mouse	*Mus musculus*
Wireweed	*Sargassum muticum*
Eastern Grey Squirrel	*Sciurus carolinensis*
New Zealand Flatworm	*Arthurdendyus triangulatus*
Giant Hogweed	*Heracleum mantegazzianum*
Rhododendron	*Rhododendron ponticum*
American Mink	*Mustela vison*
Sika Deer	*Cervus nippon*
Wild Boar	*Sus scrofa*

The non-native invasive species Winter Heliotrope (*Petasites fragrans*), and Butterfly Bush (*Buddleja davidii*) were recorded within and in close proximity to the proposed development area. Winter Heliotrope was recorded on both sides of the river along the proposed works area. Buddleia was recorded within Recolonising base ground (ED3) and Spoil and Bare Ground (ED2).

These species are classified as Amber Threat species by Invasive Species Ireland which under the right ecological conditions and may have an impact native species or habitats. Winter Heliotrope and Butterfly Bush are also included in the NRA *Guidelines on the Management of Noxious Weeds and Non-native Species on National Roads* (NRA, 2010) as these species have been shown to have an adverse impact on landscape quality, native biodiversity or infrastructure; and are likely to be encountered during road schemes.

9. Water Quality

9.1 EPA Biological Monitoring

Water quality is a key supporting element for aquatic habitats and species within the River Dargle. The Environmental Protection Agency carries out a biological assessment of most river channels in the country on a regular basis. The assessments are used to derive Q values, indicators of the biological quality of the water. The biological health of a watercourse provides an indication of long-term water quality. The EPA Q value scheme is summarised in **Table 10**. The relationship between the Q-rating system and the Water Framework Directive classification as defined by the Surface Waters Regulations 2009 (S.I. 272 of 2009) is shown in **Table 11**.

Table 10. EPA Biotic Index Scheme

Q value	Water quality	Pollution	Condition
5	Good	Unpolluted	Satisfactory
4	Fair	Unpolluted	Satisfactory
3	Doubtful	Moderately polluted	Unsatisfactory
2	Poor	Seriously polluted	Unsatisfactory
1	Bad	Seriously polluted	Unsatisfactory

Source: EPA

The Q Value system which is used by the Environmental Protection Agency describes the relationship between water quality and the macro-invertebrate community in numerical terms. The presence of pollution causes changes in flora and fauna of rivers. Well documented changes occur in the macro-invertebrate community in the presence of organic pollution: sensitive species are progressively replaced by more tolerant forms as pollution increases. Q5 waters have a high diversity of macro-invertebrates and good water quality, while Q1 have little or no macro-invertebrate diversity and unsatisfactory water quality.

The intermediate ratings Q1-2, Q2-3, Q3-4 and Q4-5 are used to denote transitional conditions, while ratings within parenthesis indicate borderline values. Great importance is attached to the EPA biotic indices, and consequently it is these data that are generally used to form the basis of water quality management plans for river catchments. EPA biological monitoring data for the monitoring locations near the proposed development site are shown in **Table 11** and **Figure 8**.

Table 11. Correlation Between the WFD Classification and Q Values

Ecological status WFD	Q Values
High	Q5, Q4-5
Good	Q4
Moderate	Q3-4
Poor	Q3, Q2-3
Bad	Q2, Q1

Figure 8. Location of EPA Water Quality Monitoring Stations and Transitional Waters

Table 12. Q-Values and Locations

Q-Value location	Distance from development	Q-Value Score	Water Framework Directive Status
River Dargle			
Peoples Park u/s Swan Rv Confluence	1.2km u/s	Q4 (2012)	Good
Peoples Park d/s Swan Rv Confluence	1.3 km u/s	Q4 (2015)	Good
1km u/s Bray Bridge	1.9 km u/s	Q3-4 (2018)	Moderate
Br. u/s Glencullen River	3.3 km u/s	Q4 (2018)	Good
River Glencullen			
Just u/s Dargle River Confl.	3.4 km u/s	Q4 (2018)	Good

The most recent biological monitoring results (2018) from the River Dargle indicate that water quality was good to moderate at all nearby monitoring stations relative to the proposed works area.

The EPA have defined the area immediately downstream of the proposed development site as 'Transitional Waters'. The trophic status of these waters is assessed using the EPA's Trophic Status Assessment Scheme (TSAS) which captures the cause-effect relationship of the eutrophication process and considers the following: Enrichment of waters by nutrients (dissolved inorganic nitrogen and phosphorus), Accelerated algal growth (phytoplankton and opportunistic macroalgae), Undesirable disturbance (oxygen content). Trophic status assessments are based on the analysis of data collected over a period of 3 years, and each water body assessed is categorised as eutrophic, potentially eutrophic, intermediate or unpolluted with respect to nutrient enrichment.

Results indicate that the water quality within the transitional waters of the Dargle Estuary are Eutrophic (**Figure 7**). Eutrophication results in artificially increased weed and algal growth in many rivers having an adverse effect on the aquatic fauna.

9.2 Water Framework Directive River Basin Management Plan for Ireland 2018 – 2021 (2nd Cycle)

The Water Framework Directive (WFD) sets out the environmental objectives which are required to be met through the process of river basin planning and implementation of those plans. Specific objectives are set out for surface water, groundwater and protected areas. The challenges that must be overcome in order to achieve those objectives are very significant. Therefore, a key purpose of the River Basin Management Plan (RBMP) is to set out priorities and ensure that implementation is guided by these priorities.

The second-cycle RBMP aims to build on the progress made during the first cycle. Key measures during the first cycle included the licensing of urban waste-water discharges (with an associated investment in urban waste-water treatment) and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations). The former measure has resulted in significant progress in terms both of compliance levels and of the impact of urban wastewater on water quality. The latter provides a considerable environmental baseline which all Irish farmers must achieve and has resulted in improving trends in the level of nitrates and phosphates in rivers and groundwater. It is acknowledged, however, that sufficient progress has not been made in developing and implementing supporting measures during the first cycle.

Overall, RBMP assesses the quality of water in Ireland and presents detailed scientific characterisation of our water bodies. The characterisation process also takes into account wider water quality considerations, such as the special water-quality requirements of protected areas. The characterisation process identifies those water bodies that are *At Risk* of not meeting the objectives of the WFD, and the process also identifies the significant pressures causing this risk. Based on an assessment of risk and pressures, a programme of measures has been developed to address the identified pressures and work towards achieving the

required objectives for water quality and protected areas. Data relating to the watercourses within the study area is provided in **Table 13**. The relevant waterbodies are shown below on **Figure 9**.

Table 13. Water Framework Directive Data – Relevant data

Catchment: HA 10 Ovoca-Vartry – 2nd Cycle
This catchment includes the area drained by the Rivers Avoca and Vartry and by all streams entering tidal water between Sorrento Point, Co. Dublin and Kilmichael Point, Co. Wexford, draining a total area of 1,247km². The largest urban centre in the catchment is Bray. The other main urban centres in this catchment are Dun Laoghaire-Rathdown, Arklow, Wicklow Town, Rathnew, Newtown Mount Kennedy, Greystones, Delgany and Kilcoole. The total population of the catchment is approximately 179,100 with a population density of 144 people per km². The higher areas of the Wicklow Mountains are underlain by granite bedrock while metamorphic slates and quartzites underly the eastern coastal part of the catchment.
Sub-catchment: Dargle_SC_10
Six out of eleven river water bodies within this subcatchment are AT RISK: Dargle_010 due to failing to meet its High Ecological Status objective; Carrickmines Stream_010 and Kilmacanoge_010 due to Moderate biological status (driven by invertebrate status); Dargle_030 due to Poor biological status (driven by invertebrate status as fish status was Good); Kill of the Grange Stream_010 due to Poor biological status (invertebrate status) and elevated phosphate and ammonia. Glencullen_010 is failing to meet its High Ecological Status (HES) objective. Urban diffuse is likely to be the significant pressure within Carrickmines Stream_010, Kilmacanoge_010 and Kill of the Grange Stream_010. Combined sewer overflows and urban waste water treatment were also identified as significant pressures within Kilmacanoge_010 and Kill of the Grange Stream_010, respectively. Hydromorphological issues related to the modification of the river channel was evident due to culverts within Kill of the Grange Stream_010 and flood protection within Dargle_030. Hydromorphological status (Good) within the downstream station of Dargle_010 resulted in the water body being downgraded to Good ecological status - siltation is an issue as a result of excessive bank erosion (bank protection upstream of the monitoring site). There is a natural barrier on the Dargle_010 which is driving fish status. Urban waste water (Enniskerry) is a significant pressure on Dargle_030.

Waterbody	Status	Risk	Date to meet Objective
Dargle_010	Good	At risk	2027
Dargle_020	Good	Not at risk	Unassigned
Dargle_030	Poor	At risk	2027
Dargle_040	Good	Not at risk	Unassigned
Dargle Estuary	Review	Under review	2027

Figure 9. WFD sites

10. Evaluation of Potential Impacts

During construction, potential impacts could arise from increased noise and disturbance and from the spread of the invasive species. There will be a minor loss of areas of terrestrial and tidal river habitats (**see section 3.3.4**). Increased traffic and noise associated with the construction works could potentially increase levels of disturbance which could result in the disturbance/displacement of birds and mammals such as otter. Increased dust levels during

construction could have localised impacts on local vegetation and habitats. Minor spills of hydrocarbons during construction or increases in silt levels in surface water run-off could impact on groundwater or surface water quality with resultant impacts on aquatic ecology.

During operation there will be an increase in traffic, from private vehicles and pedestrian activity within the footprint of the development. Street lighting will also be provided on the bridge and new road and the bridge will accommodate existing bus traffic. Buses will be diverted from the existing main road to the newly constructed bridge and link road and there will be no increase in bus traffic as a result of the proposed development.

10.1 'Do Nothing' Impact

Most of the habitats to be affected have been significantly modified from the natural state by human activity. If the site were to be left unmanaged, a general pattern of succession would be expected to occur e.g. grassland to scrub to eventually woodland. However, non-native species like Winter Heliotrope and Butterfly Bush would likely spread if active control measures are not implemented.

In the absence of development, it is expected that the areas which are currently managed as part of a landscaping system such as amenity grassland would remain under the same management regime.

10.2 Magnitude, Probability and Significance of Impacts

When describing changes/activities and impacts on ecosystem structure and function, the important elements to consider include magnitude, duration and probability of occurrence (IEEM, 2016 and 2018).

Magnitude refers to the 'size' or 'amount' of an impact, determined on a quantitative basis if possible. Duration refers to the time for which the impact is expected to last prior to recovery or replacement of the resource or feature. This should be defined in relation to ecological characteristics (for example species' lifecycles) rather than human timeframes. Appropriate criteria for the assessment of magnitude and duration for this project are provided in **Tables 14 & 15** below.

Table 14. Criteria for Determining the Magnitude of Ecological Impacts

Magnitude	Examples
Very High	e.g. The proposal (either on its own or with other proposals) will result in – The total loss of or very major alteration to key elements/features of the baseline conditions such that post-development/character/composition/attributes will be fundamentally changed and may be lost from the site altogether.
High	e.g. The proposal (either on its own or with other proposals) will result in – Major alterations to key elements/features of the baseline (predevelopment)

Magnitude	Examples
	conditions such that post-development/character/composition/attributes will be fundamentally changed.
Medium	e.g. The proposal (either on its own or with other proposal) will result in – The loss of or alteration to one or more key elements/features of the baseline conditions such that post-development/character/composition/attributes of baseline would be partially changed.
Low	e.g. The proposal (either on its own or with other proposals) will result in – A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of baseline conditions would be similar to predevelopment circumstances/patterns.
Negligible	e.g. The proposal (either on its own or with other proposals) will result in – A very slight change from baseline condition. Change barely distinguished approximating to the “no change” situation.

Table 15. Criteria for assessment of duration

Duration	Criteria
Permanent	Effects continuing beyond one human generation (c.25 years) are expected. There is likely to be a substantial improvement after this period, whereby these would be described as "very long-term effects."
Temporary	Long term-(15-25 years) Medium (5-15 years) Short term (0-5 years)

10.3 Probability of occurrence

It is important to consider the likelihood that a change/activity will occur as predicted and also the degree of confidence in the assessment of the impact on ecological structure and function. The following scale (IEEM, 2006) is often utilised in ecological assessment:

- Certain/near-Certain: probability estimated at 95% chance or higher.
- Probable: probability estimated above 50% but below 95%.
- Unlikely: probability estimated above 5% but less than 50%.

- Extremely Unlikely: probability estimated at less than 5%.

10.4 Significance of impacts

Based on the above and the value of habitats and species a matrix of significance can be used to determine specific impacts. This matrix is shown below in **Table 16**.

Table 16. Impact Significance Matrix

Impact Significance		Ecological Value				
		Very High	**High**	**Medium**	**Low**	**Negligible**
Magnitude	Very High	Major	Major	Major	Moderate	Minor
	High	Major	Major	Moderate	Minor	Negligible
	Medium	Major	Moderate	Minor	Minor	Negligible
	Low	Moderate	Minor	Minor	Negligible	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible

11. Potential Impacts on Habitats

Impacts on terrestrial habitats are generally restricted to direct removal of habitats and possible impacts from the spread of invasive species. For this project, there will be a net loss of low value habitats and the loss of a small number of trees. Therefore, the long-term impact will be permanent and minor.

Construction works within a tidal section of the Dargle River will lead to short-term, minor to moderate loss of tidal river habitat. However, no permanent loss of habitat will occur and aquatic algae and macroinvertebrate populations are predicted to recolonise the affected areas post-construction. Shading from the new bridge could potentially limit populations and diversity of aquatic species compared to adjacent unshaded, habitats however in the context of a tidal river this is considered a permanent, negligible impact.

Overall, the habitats to be affected are common and no Annex I habitats or rare or uncommon habitats or floral species will be directly affected. Based on the criteria outlined by the IEEM, as described above, the predicted impacts are detailed in **Table 17.**

Table 17. Impacts on Habitats

Habitat	Ecological value (NRA guidelines)	Predicted Impact
Buildings and artificial surfaces (BL3)	Local importance (Lower value)	Permanent, negligible impact
Amenity grassland (improved) (GA2)	Local importance (Lower value)	Permanent, minor impact
Recolonising bare ground (ED3)	Local importance (Lower value)	Permanent, negligible impact
Spoil and bare ground (ED2)	Local importance (Lower value)	Permanent, negligible impact
Scrub (WS1)	Local importance (Higher value)	Permanent, minor impact
Scattered Trees and parkland (WD5)	Local importance (Higher value)	Permanent, minor impact
Tidal River (CW2)	County Importance	Short-term minor to moderate impact during construction, permanent minor impact.

11.1. Non-native invasive species

Following best practice guidance any Amber Listed species found on site e.g. Winter Heliotrope and Buddleia, can be readily managed through standard eradication/control methods. On the basis of their invasive qualities, the ecological value and types of habitats recorded during the walkover survey and their Amber Listing by Invasive Species Ireland, these species are will not result in a significant effect.

If not eradicated, however, these species are likely to further invade adjacent semi-natural habitats and disturbed ground and cause long-term landscape maintenance issues relative to the proposed development with associated costs. For this reason, these species should be treated post construction using standard herbicides. Use of herbicides must take into account sensitive aquatic habitats and receptors and follow manufacturers recommendations.

12. Potential Impacts on Fauna

12.1 Protected Terrestrial Mammals

The habitats on the site are not rare, threatened nor do they require any special protection under existing or pending legislation and are considered relatively common in the local landscape. There will be no significant loss of habitat for protected terrestrial mammals within the proposed development area.

Whilst increased noise and disturbance is predicted to occur during construction, the impact on terrestrial fauna is predicted to be minor to moderate in the short-term and negligible in the long term.

12.2 Impacts on fish

12.4 Impacts on fish

No spawning habitat for fish is present in proximity to proposed development area. However a number of fish species are likely to migrate through the site including Salmon, Sea Trout, Lamprey species and European Eel. A number of estuarine species including mullet, bass and flounder are likely to occur within the estuarine section of the River Dargle within the proposed works area.

The effects of noise on fish species include, in order of increasing severity: behavioural change, auditory tissue damage, which can be temporary, i.e. temporary threshold shift (TTS), or permanent, i.e. permanent threshold shift (PTS), non-auditory tissue damage and death. There will be no pile driving during the proposed works although sheet piling may be used. This may cause increased noise and vibration but given the temporary nature of the works this is not likely to cause significant disturbance to fish.

Both upstream and downstream migration of lamprey and salmonids are almost entirely nocturnal, the vast majority of individuals will be migrating through the works area outside of the hours in which sheet piling works will be taking place and, therefore, will not be affected by noise and vibration from the construction works. Underwater noise levels will increase due to the proposed works but will be restricted to daylight hours and is expected to have a minor short-term impact on migratory fish movement and fish feeding ecology.

Inappropriate lighting design also has the potential to affect the migration or activity pattern of migratory fishes. Given that the proposed development is located within an existing urban area and that lighting design will be similar to existing lighting within the area, the impact of lighting the new bridge will be negligible.

Temporary instream works will generate increased levels of silt due to re-suspension of estuarine sediments, however the creation of temporary work platforms will not generate sufficient levels of silt or turbidity to impact on fish species will not create a barrier to migration. Any minor spills of hydrocarbons, were they to occur, will not have a significant effect in the context of the available dilution in a tidal environment.

12.2 Impacts on Otter

Levels of noise from sheet-piling and other construction works, under water noise, vibration and lighting will increase during the construction period, Potential vibration causing items of plant are likely to be used such as excavators, lifting equipment and dumper trucks. However, no rock breaking will be required. Sheet piling could potentially be used during the construction phase.

Artificial lighting may be used during the construction phase and for security purposes once construction is completed. Similarly, inappropriate lighting of the bridge/roadway during operation also has the potential to deter nocturnal species, such as otter, from moving past the site. Given that the proposed development is located within an existing urban area and that lighting design will be similar to existing lighting within the area, the impact of lighting the new bridge will be permanent and negligible.

Although no signs of otter were recorded along the tidal sections of the River Dargle within the proposed development site, aquatic habitats within the proposed development area could potentially provide suitable feeding habitat for this species. It is noted that the development is limited in scale and within an existing built-up area. Otters are largely nocturnal and readily habitualise to increased noise and disturbance in urban habitats, as evidenced by their continued present in major Irish cities. Whilst there may be a short-term temporary impact on feeding patterns, the long-term impact is predicted to be minor to negligible.

During operation there will be an increase in vehicle and pedestrian/bike traffic. While this may have minor impacts within the footprint of the development and proximate areas, the habitats here are common and otter will habituate to the increased activity which will be in line with pre-existing levels in this area. In the long-term the impact from noise and disturbance is predicted to be negligible.

12.3 Birds

Potentially increased noise, vibration, lighting and disturbance associated with the site works could cause disturbance/displacement of birds. If of sufficient severity, there could be impacts on reproductive success. It is noted that the bird survey for this project and background !-Webs data do not indicate that the works area and/or the wider harbour is of very high value for more specialised bird species such as waders which are more susceptible to such impacts.

The potential effects and impacts of disturbance have been widely recognised in wildlife conservation legislation, as has the need to develop conservation measures for birds whilst taking human activities into account. Article 4.4 of the Bird's Directive (79/409/EEC) requires member states to "*take appropriate steps to avoid… any disturbances affecting the birds, in so far as these would be significant having regard to the objectives of this Article*". This specifically relates to conservation measures concerning Annex I species.

Theoretically disturbance of bird species could potentially occur during the construction phase of the project. However, predicting potential impacts on birds from disturbance can be problematic. Optimal foraging theory is a useful basis from which to understand likely effects

of disturbance on feeding. Many studies have shown that birds concentrate where feeding is best. If birds are forced temporarily or permanently to leave these places, then there is an increased risk that their foraging ability will suffer. However, the severity of this type of situation and the way is which birds respond; vary in a very complex way. The multiplicity of variables underlying the observed interactions between birds and people makes it difficult to assess the cause and implications of a particular instance of disturbance. The magnitude of disturbance to birds may arise from synergistic effects of more than one activity.

Noise levels of 70dB and above are regularly cited within the literature as being the threshold beyond which disturbance to estuarine bird species can be predicted to occur (Cutts *et al.* 2013). However, the greatest levels of disturbance response typically occur when the difference between ambient noise levels and peak noise levels is greatest, and when combined with visual human presence (Cutts *et al*. 2013).

Burger (1981), in a study of a coastal bay, found that birds were present 42% of the time when people were present, but birds were present 72% of the time when people were absent. Human activities such as jogging or grass mowing, which involved rapid movement or close proximity to roosting birds, usually caused them to flush (fly away). Slow-walking birdwatchers and clammers did not usually cause birds to flush. Gulls and terns were least affected and usually returned to where they had been; ducks usually flushed and flew to the centre of the pond; and herons, egrets and shorebirds were most disturbed and flushed to distant marshes.

Pedestrian activity, with or without dogs, can be particularly disruptive to birds. Research has shown that walkers (without dogs) can induce anti-predator responses in birds including vigilance and early flight, which may lead to a cascade of related responses that negatively affect birds (Blumstein & Daniel 2005). Off-lead dog walking can also disturb some species of breeding shorebirds from their nests (Lord et al. 2001). Banks and Bryant (2007) found that dog walking in woodland leads to a 35% reduction in bird diversity and 41% reduction in abundance,

The magnitude and predictability of impacts as a result of disturbance ranges between species, seasons, weather, source and duration of disturbance, degree of previous exposure of the individuals to disturbance and the occurrence of additional disturbances. Most disturbances to wetland birds result in an interruption to normal activity and the displacement of birds over variable distances, often into sub-optimal habitats. This can be critical during severe winters and can lead to a reduction in the carrying capacities of important wintering wetland sites. However, in general studies show that most bird species have the ability to habituate to regular and continual sources of noise and visual disturbances providing there is no large 'startling' component.

The construction works will take place within an area already subject elevated levels of anthropomorphic noise and disturbance. In the context of the relatively low value of terrestrial and tidal river habitat for birds within and in proximity to the proposed development area, the short-term nature of construction impacts and the ability of birds to habituate to increased levels of noise in an urban environment, the impact during construction is predicted to be

short-term and minor. Whilst there may be minor impacts on feeding behaviour during the construction period the long-term effect is predicted to be negligible.

Increased noise and activity from bus and Luas traffic as well as pedestrian and bike traffic has the potential to disturb birds during operation. However, given that two operational bridges are located immediately upstream of the proposed public transportation bridge, it is safe to assume that resident and breeding birds in the area are already subject to and tolerant to a comparable level of traffic.

The terrestrial and aquatic bird species recorded within the proposed development site during the site survey are typical of the types of habitat noted on site and are generally common. No Annex I species were recorded during the site visit. Black-headed Gull, which is a red-listed species, was recorded. However, there will be no permanent loss of habitat for this species. The semi-natural habitats which will be affected have the potential to provide suitable nesting and feeding resources for common bird species. Overall, the loss of habitat for breeding birds within the development site is considered a minor, permanent impact.

The habitats within the development area are utilised by birds for feeding. Some displacement of feeding birds may occur during construction due to increased noise and disturbance. Disturbance can cause sensitive species to deviate from their normal, preferred behaviour, resulting in stress and increased energy expenditure. During construction where will be a short-term, minor impact.

During the operational phase, the levels of activity will stabilise and birds in the surrounding landscape will be expected to habituate to any increased noise and disturbance. The impact on terrestrial birds in habitats adjoining the proposed development site is therefore predicted to be permanent and negligible during operation.

12.3 Potential impacts on marine mammals

Hearing is the most important sense for most marine mammal, in particular cetaceans, and the ability to hear well is vital in all key aspects of their lives including finding food, navigating and social interactions. Any reduction in hearing ability, whether by physical damage or masking by other sound, may seriously compromise the viability of individuals and, therefore, populations. Whilst at an extreme level noise can lead to cetacean mortality from barotrauma, sub-lethal effects may also have a significant impact. Sub-lethal effects could include threshold shift or complete hearing loss, which would seriously compromise the viability of individuals or entire populations. Displacement of cetaceans from important feeding, migration or reproductive sites could also lead to a change in population dynamics (DoEHLG, 2007).

Marine mammal sensory systems are adapted to life in the water or, in the case of seals, both in water and on land. Grey Seal and Common Seal are listed on Annex II of the Habitats Directive, and both are known to occur in the coastal waters around Bray and could potentially move into the transitional waters of the River Dargle/Although there is nothing to indicate that the area in the immediate vicinity to the proposed development site is of particular value for seals, it may be within the feeding range for seal populations that forage within this general

area. There will be short-term disturbance during site works, however, there is no shortage of similar habitat in the surrounding area. Given the short-term nature of the proposed works and that the proposed development area is unlikely to important feeding area for this species any are predicted to be short-term and minor.

Potential vibration causing items of plant are likely to be used such as excavators, lifting equipment and dumper trucks. However, no rock breaking will be required. Sheet piling could potentially be used during the construction phase. Should this be the case, piling activities will be limited as far as possible and will only be undertaken in daytime. A number of cetacean species have been recorded within the overall coastal waters around Bray, however they are unlikely to be found in the River Dargle at the proposed development site. Impacts on cetaceans during site works are predicted to be minor to negligible.

12.4 Impacts on other fauna

Mammal species which are protected under the Irish Wildlife Act 1976, as amended, such as Pygmy Shrew and Hedgehog could potentially occur within the proposed development site, although no signs of these species were recorded. No signs of amphibians or reptiles were recorded. The proposed development area is only likely to support common invertebrate species. Although the habitats to be directly affected may form part of the territories of various mammal species, they do not provide critical resources and direct impacts on these habitats will be localised and temporary. Noise and disturbance during construction will be temporary and will have a minor impact.

Given that the habitats which will be affected are relatively common in the surrounding landscape and the limited scale of the proposed development any impact on these species will be minor to negligible.

13. Potential impacts on water quality and aquatic ecology

Potential impacts on aquatic habitats which can arise from this type of development include increased silt levels from surface water run-off, substrate modification and sedimentation of the water column and inadvertent spillages of hydrocarbons and/or other chemical substances during construction which could introduce toxic chemicals into the aquatic environment via direct means or surface water run-off. The duration and extent of the impact however is hard to predict as it is influenced by many abiotic factors such as dilution, particle size, water turbulence and currents.

Some hydrocarbons exhibit an affinity for sediments and thus become entrapped in deposits from which they are only released by vigorous erosion or turbulence. Oil products may contain various highly toxic substances, such as benzene, toluene, naphthenic acids and xylene which are to some extent soluble in water; these penetrate into the fish and can have a direct toxic effect. The lighter oil fractions (including kerosene, petrol, benzene, toluene and xylene) are much more toxic to fish than the heavy fractions (heavy paraffins and tars). In the case of

turbulent waters, the oil becomes dispersed as droplets into the water. In such cases, the gills of fish can become mechanically contaminated and their respiratory capacity reduced. However, any such spills, in the unlikely event of their occurrence, would be minor in the context of the available dilution in the River Dargle and Bray Harbour.

Hydrocarbon contamination, if severe, could potentially impact on water quality and thus could impact on aquatic species e.g. Otter, seals and waterbirds. A number of fish species are known to occur in the River Dargle including Sea Trout, Brown Trout and Atlantic Salmon Significant impacts on fish stocks could negatively impact piscivorous species due to a reduction in prey availability.

High levels of silt can also impact on fish species. If of sufficient severity, adult fish could be affected by increased silt levels as gills may become damaged by exposure to elevated suspended solids levels. If of sufficient severity, aquatic invertebrates may be smothered by excessive deposits of silt from suspended solids. In areas of stony substrate, silt deposits may result in a change in the macro-invertebrate species composition, favouring less diverse assemblages and impacting on sensitive species. Cement can also affect fish, plant life and macroinvertebrates by altering pH levels of the water.

Placing permanent features such as bridges in aquatic settings may adversely impact water quality mainly by causing increases in suspended solids concentrations, reducing dissolved oxygen levels or changing pH. Stormwater runoff from constructed surfaces also poses a threat to water quality from its associated nonpoint source pollutant load.

It is noted that due to the dilution provided in the aquatic environment and naturally fluctuating levels of silt within the River Dargle/Dargle Estuary, impacts are only likely to arise from extremely severe levels of siltation. The risk of significant silt levels being generated is very low given the limited scope of the proposed development. Environmental Protection measures, specified in **section 15**, will ensure that no significant changes in water quality will occur during construction, particularly in relation to concrete or other construction materials.

Construction works will take place within the river itself and adjacent to the river. Temporary platforms will be constructed on both banks of the river. Minor emissions to water will arise while these temporary platforms are being constructed. However, as the volume of sediment which will be displaced will be quite small, it is expected that there will be only be a minor release of sediments. The river at this location is not extremely sensitive to sediment loading as it is located within a tidal area close to Bray Harbour which is subject to large diurnal tidal flows carrying substantial volumes of sediment. Disturbed sediment would disperse and drop to the seabed on the ebb and flow of the tide.

Minor spills of hydrocarbons during construction could impact on surface water quality with resultant impacts on aquatic ecology. As such any spillages would be quickly diluted. Environmental Protection measures, specified in **section 15**, will ensure that no significant changes in water quality will occur during construction, particularly in relation to concrete or other construction materials. Therefore, it is expected that effects on water quality will be short-term and negligible as a result of the construction of the proposed development.

14. Cumulative Impacts

Cumulative impacts on fauna chiefly relate to increased noise and activity levels and potential impacts on water quality. Potential in-combination impacts from noise/disturbance are likely to be most pronounced during construction. This is a short-term impact which will be localised. Once the bridge is operational there will be an increase in vehicular and pedestrian disturbance within the footprint of the development. No other development or projects which would give rise to potential cumulative impacts have been identified. Therefore, given that the proposed development is located within an existing urban area and is located adjacent to two operational bridges no cumulative impacts are predicted to occur.

15. Environmental Protection Measures

The likely success of the proposed measures is high, either in their current form or as they will be adapted on-site to achieve the desired result. The measures have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage. It is clear that the environmental protection measures are designed to achieve a lowering or reducing of the risk of impact to acceptable levels. Whilst the proposed methods may be amended and supplemented, the risk that the environmental protection measures will not function effectively in preventing significant ecological impacts is low.

The construction works are standard in nature and well understood. Normal good construction practice and the standard construction environmental protection measures proposed will ensure that the risk of accidents will be low. During operation there will not be a significant increase in noise or activity associated with the development.

Construction measures – guidelines

- All personnel involved with the project will receive an on-site induction relating to operations and the environmentally sensitive nature of Natura 2000 sites and to re-emphasize the precautions that are required as well as the precautionary measures to be implemented. All staff and subcontractors have the responsibility to:
    - Work to agreed plans, methods and procedures to eliminate and minimise environmental impacts,
    - Understand the importance of avoiding pollution on-site, including noise and dust, and how to respond in the event of an incident to avoid or limit environmental impact;
    - Respond in the event of an incident to avoid or limit environmental impact;
    - Report all incidents immediately to their line manager;
    - Monitor the work place for potential environmental risks and alert the immediate line manager if any are observed; and

    - Co-operate as required, with site inspections.

- A construction environmental management plan will be prepared and implemented during site works which specifies environmental protection measures including relevant planning conditions. The key environmental protection measures which will be included in the plan are detailed as follows:

- The supervising ecologist will liaise with the contractor and will be responsible for dealing with any specific ecological issues which may arise during the works and liaising with statutory bodies if required.

- The employment of good construction management practices will minimise the risk of pollution of soil, storm water run-off, river water or groundwater. The Construction Industry Research and Information Association (CIRIA) in the UK has issued a guidance note on the control and management of water pollution from construction sites, *Control of Water Pollution from Construction Sites, guidance for consultants and contractors* (Masters-Williams et al 2001). These are outlined below:

- Hazardous material will be bunded to be able to contain 110% volume to guard against potential accidental spills.

- Appropriately designed sediment basins/silt traps will be utilised if required to filter surface water emissions from the site, should they arise, prior to entering any watercourse.

- Works will not be undertaken during periods of heavy rainfall.

- Wash down and washout of concrete transporting vehicles will not be permitted at the location of construction. Such wash down and washout activities will take place at an appropriate facility offsite or at the location where concrete was sourced.

- Spill kits are retained to ensure that all spillages or leakages are dealt with immediately and staff are trained in their proper use. Any such spills, in the unlikely event of their occurrence would be minor.

- The contractor will time work with tidal cycles to minimise impacts on tidal habitats.

Construction works – water quality

- The working area used during construction will be clearly outlined prior to the commencement of works and will be kept to the minimum area necessary to effectively complete the works. Vegetation will be retained where possible.

- All site personnel will be trained and aware of the appropriate action in the event of an emergency, such as the spillage of potentially polluting substances. In the event of spillage of any polluting substance and/or pollution of a watercourse, Wicklow County Council, Inland Fisheries Ireland and the NPWS shall be notified.

- All personnel involved with the project will receive an on-site induction relating to operations and the environmentally sensitive nature of the River Dargle and re-emphasise the precautions that are required as well as the environmental protection to be implemented.

- A silt fence will be installed downgradient of the site works and between the terrestrial works and sensitive aquatic receptors during construction. The use of Terrastop Premium Silt Fence (or similar) will provide effective protection during construction works.

- It is noted that all vehicles used on site will be inspected on a daily basis to ensure there are no minor leaks of hydrocarbons. All site personnel will be trained and aware of the appropriate action in the event of an emergency, such as the spillage of potentially polluting substances.

- All site personnel will be trained and aware of the appropriate action in the event of an emergency, such as the spillage of potentially polluting substances. Spill kits will be retained to ensure that all spillages or leakages are dealt with immediately and staff are trained in their proper use.

- Concrete/cement pouring will not take place during heavy rain when run off is likely due to excess water. Shuttering will be designed to accommodate small increases in the volume of material contained within the shuttered area due to rainfall.

- Wash down and washout of concrete transporting vehicles will not be permitted at the location of construction. Such wash down and washout activities will take place at an appropriate facility offsite or at the location where concrete was sourced.

Protection of habitats

- To prevent incidental damage by machinery or by the deposition of spoil during site works, any habitats earmarked for retention in close proximity will be securely fenced or sign posted early in the construction phase. These will be clearly visible to machine operators.
- Habitats that are damaged and disturbed will be left to regenerate naturally or will be rehabilitated and landscaped, as appropriate, once construction is complete. Disturbed areas will be seeded or planted using appropriate native grass or species native to the areas where necessary.

Invasive species and landscape

- A pre-construction surveys for invasive species should be carried out within the works area to ensure to high-risk invasive species are present.
- To prevent Japanese Knotweed from outside the site being inadvertently being brought into the site, the contractor will be required to inspect vehicles before using them on site, and will pay particular attention to caterpillar tracks and where trucks and dumpers are stowed. The supplier of fill will be required to provide a guarantee that the fill to be

imported does not contain knotweed. In addition, the fill will be inspected for signs of knotweed, prior to importation to site. The UK Environmental Agency's publication *Managing Japanese knotweed on development sites - The Knotweed Code of Practice* (EA 2013), states that inspection of topsoil brought into the site, should be carried out using the guidance in appendix I-IV of the code BS 3882:2007 '*The British Standard Specification for topsoil and requirements for use*'. This Standard was replaced subsequently by BS3882:2015 *Specification for Topsoil.* The inspection of fill will be carried out according to this Standard.

- Habitats that are damaged and disturbed will be left to regenerate naturally or will be rehabilitated and landscaped, as appropriate, once construction is complete. Disturbed areas will be seeded as soon as practical after completion of site works.
- The Contractor shall prepare a Biosecurity Method Statement detailing his/her proposed approach to ensuring that invasive species are not imported or spread during construction.
- All machinery will be thoroughly cleaned, dried and disinfected prior to arrival on site and before relocating to another site post-works using Virkon 1% biocide and departure from the site to prevent the spread of invasive species such as Asian Clam where the supervising ecologist considered this necessary basted on up to date and data and construction methodologies. This process will be detailed in the contractor's method statement.

Construction works – noise and vibration

- Best practice noise and vibration control measures will be employed by the contractor. The best practice measures set out in BS 5228 (2009) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site environmental measures, including, but not limited to the following:

    - The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected.

    - If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

    - Mobile plant will be switched off when not in use and will not be left idling.

    - All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Bird Protection Measures

- The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land, or any such growing in any hedge or ditch from the 1st of March to the 31st of August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. Nonetheless, it is recommended that vegetation be removed outside of the breeding season.

Otter Protection Measures

- A pre-construction otter survey will be carried out prior to the commencement of site works. Any holts found to be present will be subject to monitoring and mitigation as set out in the NRA *Guidelines for the Treatment of Otter prior to the Construction of National Road Schemes (2006b)*. If found to be inactive, exclusion of holts may be carried out during any season. No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will also not take place within 15m of such holts, except under license. The prohibited working area associated with otter holts will be fenced and appropriate signage erected. Where breeding females and cubs are present no evacuation procedures of any kind will be undertaken until after the otters have left the holt, as determined by a specialist ecologist. Breeding may take place at any season, so activity at a holt must be adjudged on a case by case basis. The exclusion process, if required, involves the installation of one-way gates on the entrances to the holt and a monitoring period of 21 days to ensure the otters have left the holt prior to removal.

16. Conclusions

Overall the development will impact primarily on low value habitats. There will be a net loss of a common terrestrial habitats. No adverse impact on designated sites or their conservation objectives will occur. No particular difficulties in the effective implementation of the prescribed environmental protection measures have been identified.

With the exception of localised impacts and short-term impacts during construction, no significant impacts on fauna are envisaged. No significant effects on seals, Otters or cetaceans are predicted to occur The loss of habitat will result in the loss of some feeding habitats for some mammals and bird species. It is considered probable that these species will be displaced into the surrounding area or to alternative roosting sites.The implementation of standard environmental protection measures will prevent the impact from the spread of invasive species from occurring.

Noise will be generated during the construction of the proposed development due to construction traffic and construction machinery. However, construction activities will take place during day time hours and will managed by the implementation of control measures. During

operation, levels of noise and activity will not be significant in the context of the surrounding landscape.

17. References

Banks Peter B and Bryant Jessica V Four-legged friend or foe? Dog walking displaces native birds from natural areas. (2007) Biol. Lett.

Bibby, C.J., Burgess, N.D. and Hill, D.A. (1992). Bird census techniques. BTO

Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S.H. (2000). *Bird Census Techniques*. Academic Press, London.

Blumstein D.T& Daniel J.C. 2005The loss of anti-predator behaviour following isolation on islands. Proc. R. Soc. B 272, 1663–1668.

CIRIA (2001). Control of water pollution from construction sites. E. Murnane, A. Heap, A. Swain (eds).

Crowe, O. (2005). Ireland's Wetlands and their Waterbirds: Status and Distribution. BirdWatch Ireland, Newcastle, County Wicklow

Cronin, M., Duck, C., Cadhla, O., Nairn, R., Strong, D. & O'Keeffe, C. (2007). An assessment of population size and distribution of Harbour seals in Republic of Ireland during the moult season in August 2003. Journal of Zoology.

Cronin, M. & McConnell, B. (2008) SMS seal: A new technique to measure haul-out behaviour in marine vertebrates. Journal of Experimental Marine Biology and Ecology.

EPA (2003) Advice notes on current practice in the preparation of Environmental Impact Statements. Environmental Protection Agency.

EPA (2002) Guidelines on the information to be contained in Environmental Impact Statements. Environmental Protection Agency.

EPA (2015) Revised Guidelines on the Information to be Contained in Environmental Impact Statements (Environmental Protection Agency, draft September 2015);

EPA (2015) Advice Notes for Preparing Environmental Impact Statements Draft September 2015

Fossitt J A (2000) A Guide to Habitats in Ireland .The Heritage Council, Kilkenny

Gilbert, G., Gibbons, D.W. & Evans, J. (1998) *Bird Monitoring Methods - a Manual of Techniques for Key UK Species.* RSPB: Sandy.

Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011)

Kiely et al., 2000 Grey seals: status and monitoring in the Irish and Celtic Seas

Lord A, Waas J.R, Innes J& Whittingham M.J. 2001Effects of human approaches to nests of northern New Zealand dotterels. Biol. Conserv 98, 233–240

Lynas, P., Newton, S.F. and Robinson, J.A. (2007). *The status of birds in Ireland: an analysis of conservation concern 2008-2013*. Irish Birds 8:149-166

NRA (2005b). Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes. National Road Authority.

NRA (2009). Guidelines for assessment of ecological impacts of National Road Schemes. National Road Authority.

NRA. (2006b). Guidelines for the protection and preservation of trees, hedgerows and scrub prior to, during and post construction of national road schemes. National Roads Authority.

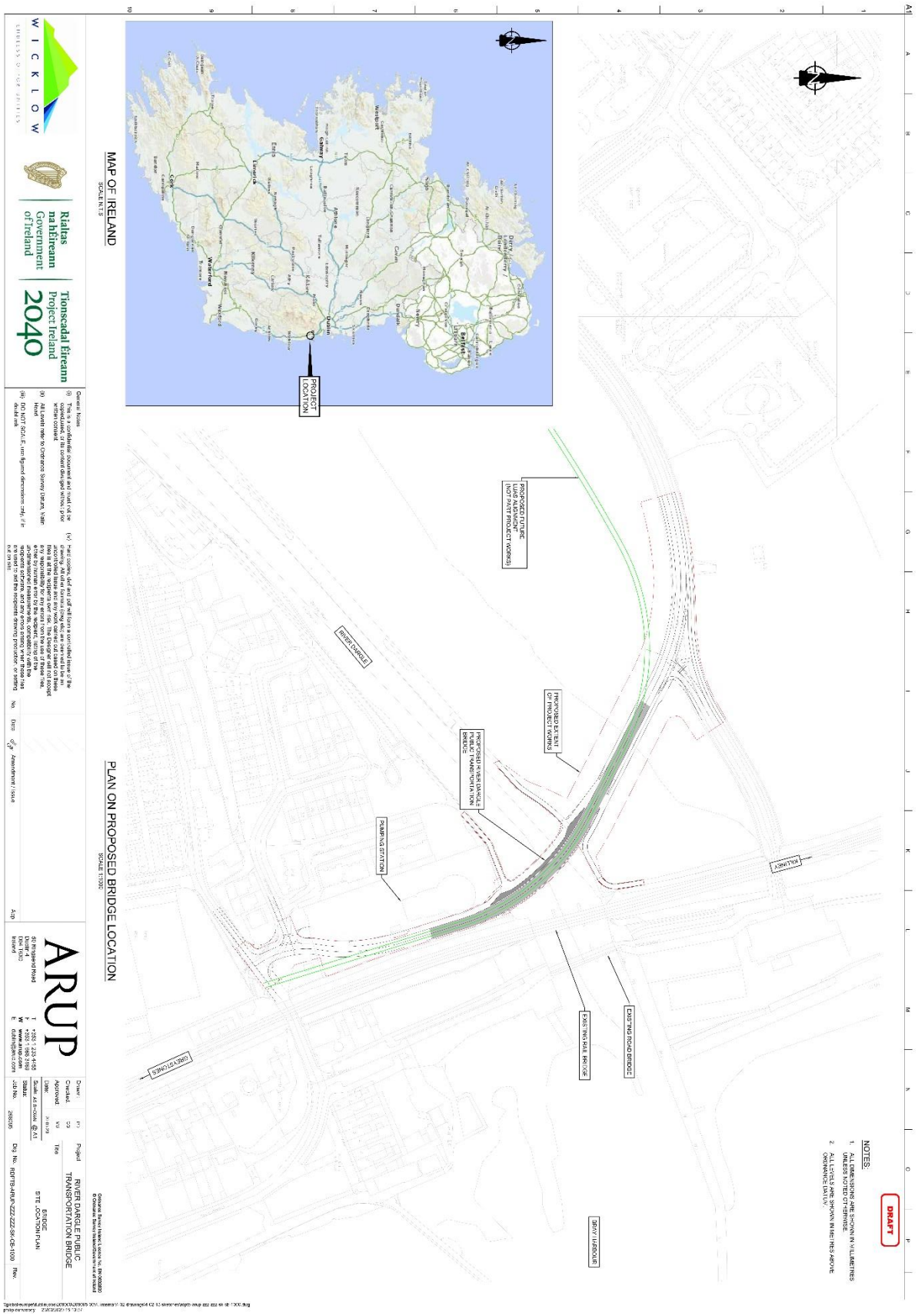
Reuther, C. & Dolev, A. (2000). New findings of otters (Lutra lutra) in Israel. IUCN Otter Spec. Group Bull. 17: 80-82.

Webb, D.A., Parnell, J. & Doogue, D. (1996) An Irish flora. Seventh edition. Dundalgan Press (W. Tempest), Dundalk.

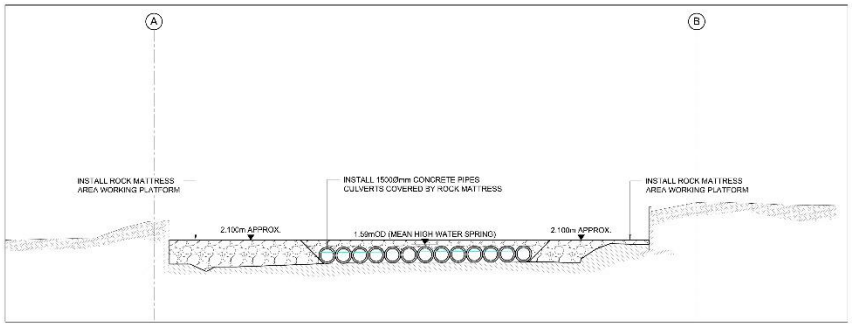
IEEM (2006) Guidelines for ecological impact assessment in the United Kingdom.

Invasive Species Ireland (2008). Best Practice Management Guidelines Japanese knotweed *Fallopia japonica*.

Appendix A. Site drawings



PLAN ON PROPOSED CONSTRUCTION SEQUENCE LAYOUT
SCALE 1:200
PLAN ON PROPOSED CONSTRUCTION SEQUENCE LAYOUT - CONTINUED
SCALE 1:200
NOTES:
DRAFT
ARUP
RIVER DARGLE PUBLIC TRANSPORTATION BRIDGE
CONSTRUCTION SEQUENCE SHEET 1
Rialtas na hÉireann Government of Ireland
Tionscadal Éireann Project Ireland 2040
WICKLOW

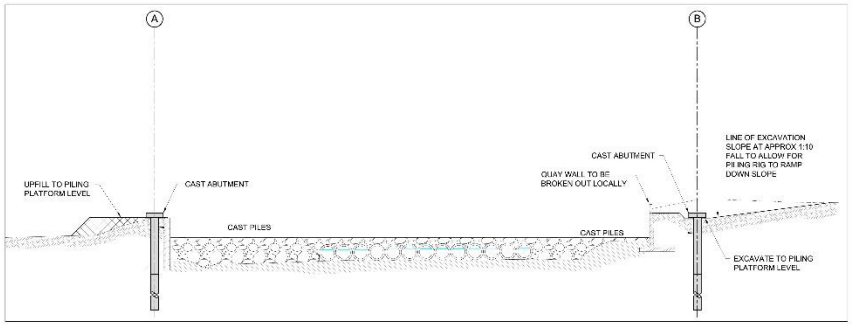


STAGE 1: INSTALL ROCK MATTRESS WORKING PLATFORMS AND PIPE CULVERTS

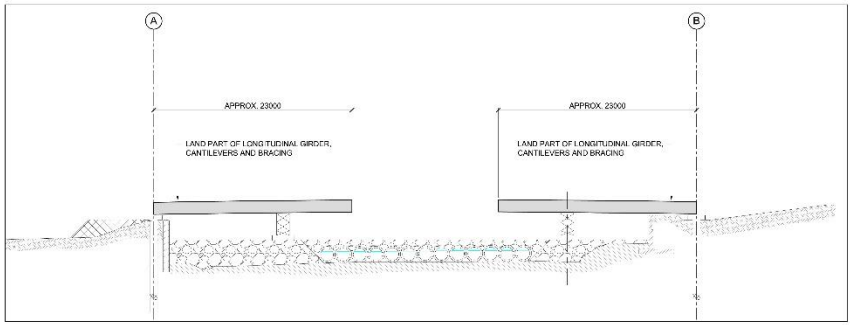
DRAFT

NOTES:

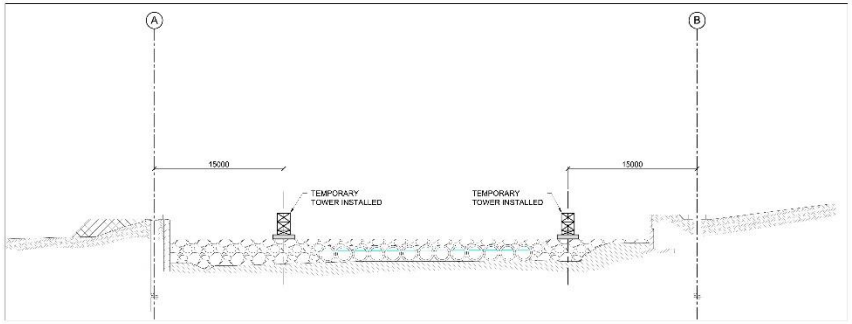
1. ALL DIMENSIONS ARE SHOWN IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE SHOWN IN METRES ABOVE ORDNANCE DATUM.



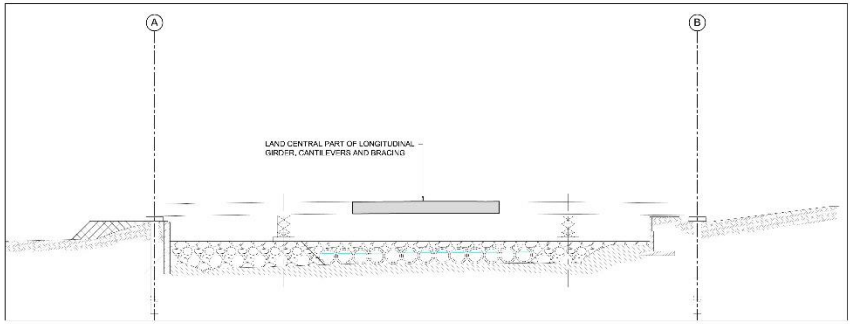
STAGE 2: EXCAVATION AND UPFILL TO FORMATION LEVEL, BREAK OUT QUAY WALL LOCALLY AND CAST PILES AND ABUTMENTS



STAGE 4: INSTALL END SEGMENTS OF LONGITUDINAL GIRDER, CANTILEVERS AND BRACING



STAGE 3: INSTALL TEMPORARY TOWERS



STAGE 5: INSTALL CENTRAL SEGMENT OF LONG. GIRDER, CANTILEVERS & BRACING

WICKLOW
ENDLESS OPPORTUNITIES

Rialtas na hÉireann Government of Ireland

Tionscadal Éireann Project Ireland 2040

General Notes

(i) This is a confidential document and must not be copied,used, or its content divulged without prior written consent.

(ii) All Levels refer to Ordnance Survey Datum, Malin Head.

(iii) DO NOT SCALE, use figured dimensions only, if in doubt ask.

(iv) Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg etc) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. The Designer will not accept any responsibility for any errors from the use of these files, either by human error by the recipient, listing of the un-dimensioned measurements, compatibility with the recipients software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

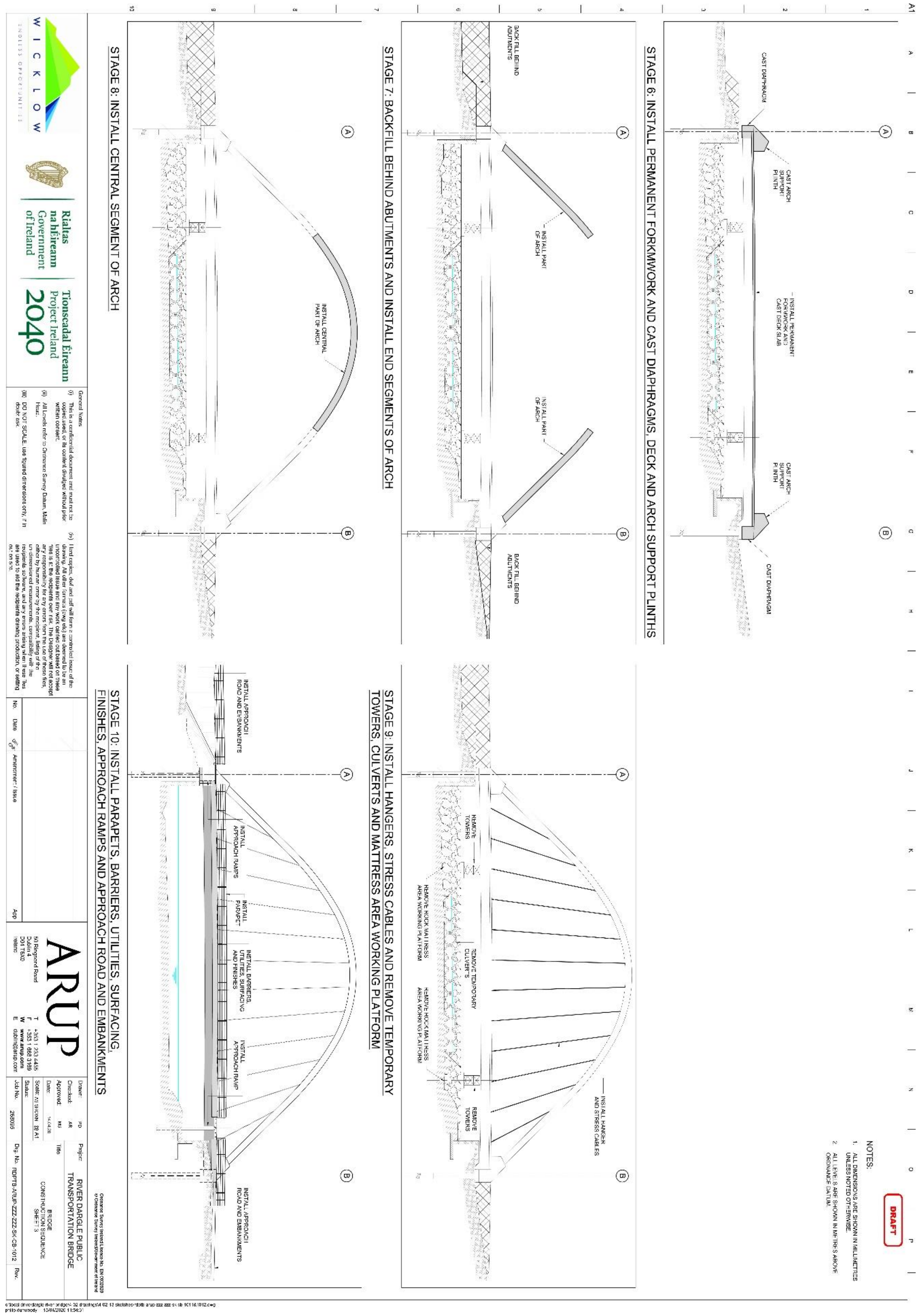
No.	Date	Amendment / Issue	App

ARUP
50 Ringsend Road
Dublin 4
D04 T6X0
Ireland
T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Drawn:	PD
Checked:	AR
Approved:	MS
Date:	14.04.20
Scale:	AS SHOWN @ A1
Status:	
Job No.	268095
Drg. No.	RDPTB-ARUP-ZZZ-ZZZ-SK-CR-1011
Rev.	

Project: RIVER DARGLE PUBLIC TRANSPORTATION BRIDGE

Title: BRIDGE CONSTRUCTION SEQUENCE SHEET 2



STAGE 6: INSTALL PERMANENT FORKMWORK AND CAST DIAPHRAGMS, DECK AND ARCH SUPPORT PLINTHS
CAST DIAPHRAGM
CAST ARCH SUPPORT PLINTH
INSTALL PERMANENT FORMWORK AND CAST DECK SLAB
STAGE 7: BACKFILL BEHIND ABUTMENTS AND INSTALL END SEGMENTS OF ARCH
BACKFILL BEHIND ABUTMENTS
INSTALL PART OF ARCH
STAGE 8: INSTALL CENTRAL SEGMENT OF ARCH
INSTALL CENTRAL PART OF ARCH
STAGE 9: INSTALL HANGERS, STRESS CABLES AND REMOVE TEMPORARY TOWERS, CULVERTS AND MATTRESS AREA WORKING PLATFORM
INSTALL HANGER AND STRESS CABLES
REMOVE TOWERS
REMOVE TEMPORARY CULVERTS
REMOVE ROCK MATTRESS AREA WORKING PLATFORM
STAGE 10: INSTALL PARAPETS, BARRIERS, UTILITIES, SURFACING, FINISHES, APPROACH RAMPS AND APPROACH ROAD AND EMBANKMENTS
INSTALL APPROACH ROAD AND EMBANKMENTS
INSTALL APPROACH RAMPS
INSTALL PARAPET
INSTALL BARRIERS, UTILITIES, SURFACING AND FINISHES
NOTES:
1. ALL DIMENSIONS ARE SHOWN IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE SHOWN IN METRES ABOVE ORDNANCE DATUM.
DRAFT
WICKLOW
Rialtas na hÉireann Government of Ireland
Tionscadal Éireann Project Ireland 2040
ARUP
RIVER DARGLE PUBLIC TRANSPORTATION BRIDGE
BRIDGE CONSTRUCTION SEQUENCE SHEET 3

Appendix B. NRA 2009 Guidelines

Table 1: Examples of valuation at different geographical scales

Ecological valuation: Examples

International Importance:
 	
• 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.
• Proposed Special Protection Area (pSPA).
• Site that fulfills the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).
• Features essential to maintaining the coherence of the Natura 2000 Network.[1]
• Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.
• Resident or regularly occurring populations (assessed to be important at the national level)[2] of the following:
  ○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or
  ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
• Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).
• World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
• Biosphere Reserve (UNESCO Man & The Biosphere Programme).
• Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).
• Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
• Biogenetic Reserve under the Council of Europe.
• European Diploma Site under the Council of Europe.
• Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).[3]

National Importance:

- Site designated or proposed as a Natural Heritage Area (NHA).
- Statutory Nature Reserve.
- Refuge for Fauna and Flora protected under the Wildlife Acts.
- National Park.
- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA);
  Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
- Resident or regularly occurring populations (assessed to be important at the national level)[4] of the following:
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Site containing 'viable areas'[5] of the habitat types listed in Annex I of the Habitats Directive.

County Importance:

- Area of Special Amenity.[6]
- Area subject to a Tree Preservation Order.
- Area of High Amenity, or equivalent, designated under the County Development Plan.
- Resident or regularly occurring populations (assessed to be important at the County level)[7] of the following:
  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.

- County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, [8] if this has been prepared.
- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (higher value):

- Locally important populations of priority species or habitats or natural heritage features
  identified in the Local BAP, if this has been prepared;
- Resident or regularly occurring populations (assessed to be important at the Local level)[9] of
  the following:
  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;
- Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (lower value):

- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;
- Sites or features containing non-native species that are of some importance in maintaining habitat links.

1 See Articles 3 and 10 of the Habitats Directive.

2 It is suggested that, in general, 1% of the national population of such species qualifies as an internationally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

3 Note that such waters are designated based on these waters' capabilities of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*).

4 It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

5 A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

6 It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.

7 It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

8 BAP: Biodiversity Action Plan

9 It is suggested that, in general, 1%of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle

Appendix D

Archaeological Screening Assessment

IAC Archaeology

ARCHAEOLOGICAL SCREENING ASSESSMENT AT RIVER DARGLE BRIDGE, BRAY, COUNTY WICKLOW

ON BEHALF OF: WICKLOW COUNTY COUNCIL

AUTHOR: ROSS WATERS

APRIL 2020

IAC PROJECT REF.: J3580

IRISH ARCHAEOLOGICAL CONSULTANCY LTD
ARCHAEOLOGY & CONSERVATION CONSULTANTS

T: (01) 201 8380 E: archaeology@iac.ie
Dublin I Belfast IAC.ie

DOCUMENT CONTROL SHEET

DATE	DOCUMENT TITLE	REV.	PREPARED BY	REVIEWED BY	APPROVED BY
31/01/20	Archaeological Screening Assessment at River Dargle Bridge, Bray, Co. Wicklow	0	Ross Waters	Grace Corbett	Faith Bailey
15/04/20	Archaeological Screening Assessment at River Dargle Bridge, Bray, Co. Wicklow	1	Ross Waters	Faith Bailey	Faith Bailey
29/04/20	Archaeological Screening Assessment at River Dargle Bridge, Bray, Co. Wicklow	2	Ross Waters	Faith Bailey	Faith Bailey

CONTENTS

LIST OF FIGURES

1 INTRODUCTION

1.1 GENERAL

The following report details an initial archaeological screening assessment which has been undertaken as part of the proposed bridge and road development across the River Dargle, Bray, County Wicklow (Figure 1, ITM 726673/719250). This assessment has been carried out in order to ascertain the potential impact of the proposed works on the archaeological and historical resource that may exist within the area and ascertain whether further studies are required in order to define potential impacts. The assessment was undertaken by Ross Waters of IAC Archaeology, on behalf of Wicklow County Council.

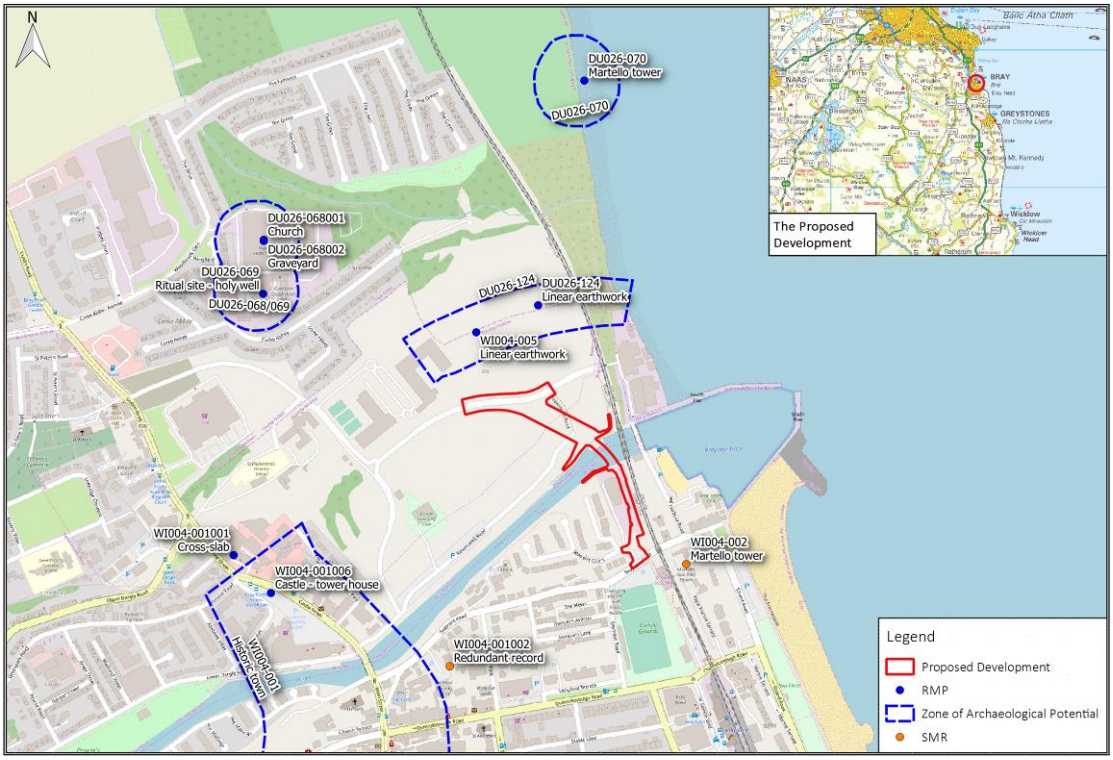


Figure 1: Site location and surrounding archaeological sites

1.2 THE DEVELOPMENT

Refer to Figure 2.

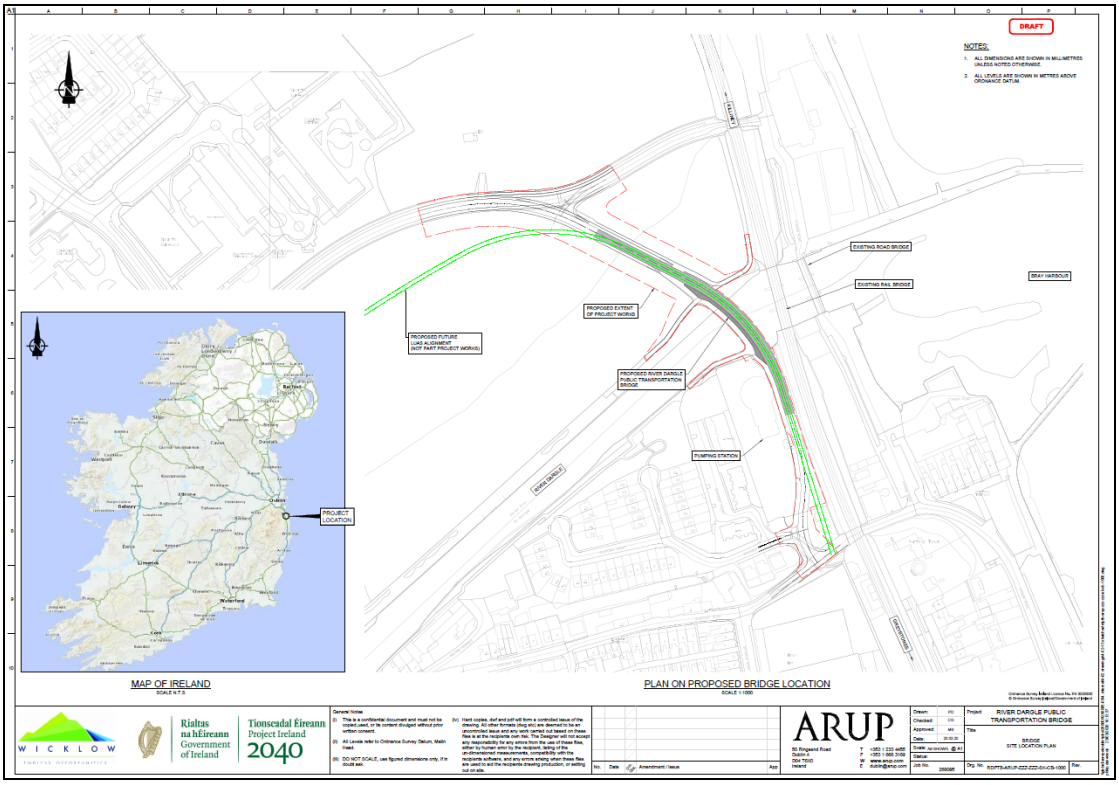


Figure 2: Plan of proposed development

2 RESULTS OF SCREENING ASSESSMENT

The proposed development area consists of a section of the River Dargle to the immediate west of the railway bridge, an area within the grounds of a pumping station on the south bank of the river connecting to the Seapoint Road, and an area within the former grounds of Bray Golf Course on the north bank. The site is situated in the townlands of Ravenswell, Bray Commons, and Bray, parishes of Oldconnaught and Bray, and barony of Rathdown, County Wicklow. Joyce (1870) claims that the area was named after the nearby hill as *Bri* translates to hill. Over time this was corrupted to Bree and then Bray.

The zone of notification for a section of the Pale boundary (RMP DU026-124/WI004-005) is located c. 45m to the north of the proposed development area and there are a further three zones of archaeological potential within a 500m radius of the proposed development. These are the zone of archaeological potential for Corke Abbey and the Abbey Well (RMP DU026-068/069) c. 320m to the northwest, the historic town of Bray (RMP WI004-001) c. 325m to the west-southwest, and a Martello tower (RMP DU026-070) c. 430m to the north (Figure 1). The areas contained within these zones are included within the Record of Monuments and Places (RMP). There are a further two RMP sites a cross-slab (RMP WI004-001001) and tower house (RMP WI004-001006) c. 450m and c. 440m to the west-southwest.

Two sites are listed in the Sites and Monuments Record within 500m of the proposed development. These consist of a Martello tower (SMR WI004-002), c. 65m to east and a redundant record (SMR WI004-001002), c. 345m to the southwest. Neither of these sites is subject to statutory protection as they are not included in the RMP.

2.1 PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

A review of the Excavations Bulletin (1970–2019) has shown that there have been three previous archaeological investigations within the proposed development, with a further 12 within the study area. These are summarised below.

Monitoring of geotechnical investigations in advance of the Shanganagh Bray Main Drainage Scheme were carried out within the proposed development area on the south and north bank of the River Dargle (Licence 05E0392, Bennett 2005:530). Further site investigations were monitored for the scheme c. 265-500m to the north and northwest; however, nothing of archaeological significance was encountered. The monitoring of topsoil stripping to facilitate the erection of a works compound on the north bank of the Dargle was also carried out within the proposed development (Licence 05E0392 ext., Bennett 2010:835). No archaeological features, finds, or deposits were encountered.

An underwater survey and geophysical survey were carried out within the proposed development area as part of a drainage scheme that traversed the Dargle, but no archaeological features were encountered (Licence 06R0107 and 06D0054, Collins and Mullee 2006).

A section of the Shanganagh Bray Main Drainage Scheme wayleave passed through the eastern limit of the Pale boundary (RMP DU026-124/WI004-005), at its most poorly preserved point c. 140m to the north of the proposed development area (Licence 02E1717, Bennett 2002:1960). A test trench was excavated at this point and exposed the levelled and reworked remains of the boundary bank. The Shanganagh Bray Main Drainage Scheme was also monitored as it travelled through the zone of notification for this monument in the grounds of the former Bray Golf Club (Licence 02E1717 ext., Bennett 2005:1703). This identified a low bank of redeposited natural aligned with the Pale boundary and appeared to be a continuation of the feature.

The linear earthwork traversing the grounds of the former Bray Golf Club, believed to represent the Pale boundary (RMP DU026-124/WI004-005), was also subject to archaeological testing in 2005. Two trenches were opened up at the feature c. 125-200m to the north however, no evidence for a fosse or construction material, other than topsoil, associated with the bank was revealed (Licence 04E0354, Bennett 2004:0491). Post-medieval pottery sherds and a fragment of glass were recovered. The results of testing suggested that the linear feature dates to the post-medieval and was a landscape feature associated with the former Ravenswell House and may have originally served as a field boundary. Archaeological testing in advance of a school development c. 50m to the north-northwest targeted the supposed location of the Pale boundary (DU026-124/WI004-005), which had been located via a geophysical survey (Licence 14E0225, Bennett 2014:203). This confirmed that the ditch was a 19th century feature.

Archaeological testing in advance of a development, c. 290m to the north of the proposed development area, identified one undated ditch (Licence 01E0220, Bennett 2001:1342).

A geophysical survey was carried out c. 450m to the west however the data was disturbed heavily by magnetic interference (Licence 08R0308, Nicholls 2008).

Works for a flood defence scheme along 4km of the River Dargle included widening and deepening the river and including a new culvert at Bray Bridge, c. 440m to the west of the proposed development (Licence 13E0121, Bennett 2013:509). Two arches of an earlier bridge were recorded within the arches of the existing 19th-century bridge. Two buttresses of the 1741 four-arch bridge are visible at low tide under the southern arches of the existing bridge and a third arch was uncovered as a result of excavation under the northern arch. This third arch dates to the 1736 bridge and was reused in the 1741 bridge.

The following five archaeological licences tabulated below did not encounter anything of archaeological significance.

TABLE 1: Licences of No Archaeological Significance

LICENCE NO.	REFERENCE	DISTANCE FROM DEVELOPMENT
11E0304	Bennett 2011:228	c. 35-500m north

LICENCE NO.	REFERENCE	DISTANCE FROM DEVELOPMENT
16E0340	Bennett 2016:366	c. 50m north-northwest
05E1312	Bennett 2005:393	c. 355 west-northwest
04E0163	Bennett 2004:1854	c. 385m southwest
17E0035	Bennett 2017:074	c. 500m west-southwest

2.2 TOPOGRAPHICAL FILES

An inspection of the topographical files for the study area of the proposed development revealed that a sherd of medieval pottery and a clay pipe fragment were recovered from the Ravenswell Road c. 150m to the southwest (NMI Ref.: 2005:6 and IA/27/2005) and a cross-incised slab at Castle Street c. 450m to the west-southwest (NMI Ref.: 1965:50). The slab is also recorded as an RMP (WI004-001001).

2.3 CARTOGRAPHIC ANALYSIS

William Petty's Down Survey, *Barony of Rathdown* (c. 1655) depicts the Dublin Road crossing the Bray Water (Dargle River), linking Little Bray and Old Bray. There is very little development is shown on either side of the river at this time. Jacob Nevill's *An Actual Survey of the County of Wicklow*, 1760 depicts the Bray Bridge crossing the Dargle, connecting Bray to the Corke lands. The town is depicted as a house on the south bank of the river and no other features are marked in the area of the proposed development.

The first edition OS map of 1838 is the first to accurately depict the area of the proposed development. It is located on two areas of sand on the north and south bank of the River Dargle. The southern portion of the development extends to an east-northeast to south-southwest orientated road that leads from Bray to a Martello tower (SMR WI004-002) and several structures to the east. Two boat houses are depicted to the east and a quay is annotated to the west. A tributary of the river runs south-southeast into the sea to the immediate east of the proposed development. The northern portion extends into two open fields to the east of Ravenswell House. The northernmost field contains a gravel pit and Corke Abbey and the Abbey Well are annotated to the c. 320m to the northwest (RMP DU026-068/069).

By the time of the 1909 OS map the northern half of the proposed development is situated within Bray Golf Links and contains the Ravenswell Road along the north bank of the river. Ravenswell House is annotated as a convent and contains a school. The southern half is situated within the grounds of a gas works and contains one of its structures. To the east of the development the Dublin and South Eastern Railway and Bray Harbour have been constructed (Figure 3). There has been significant development to the south of the site. The construction of the gas works within the site and the rail line directly adjacent to the site will most likely have caused ground disturbance within the site boundary.

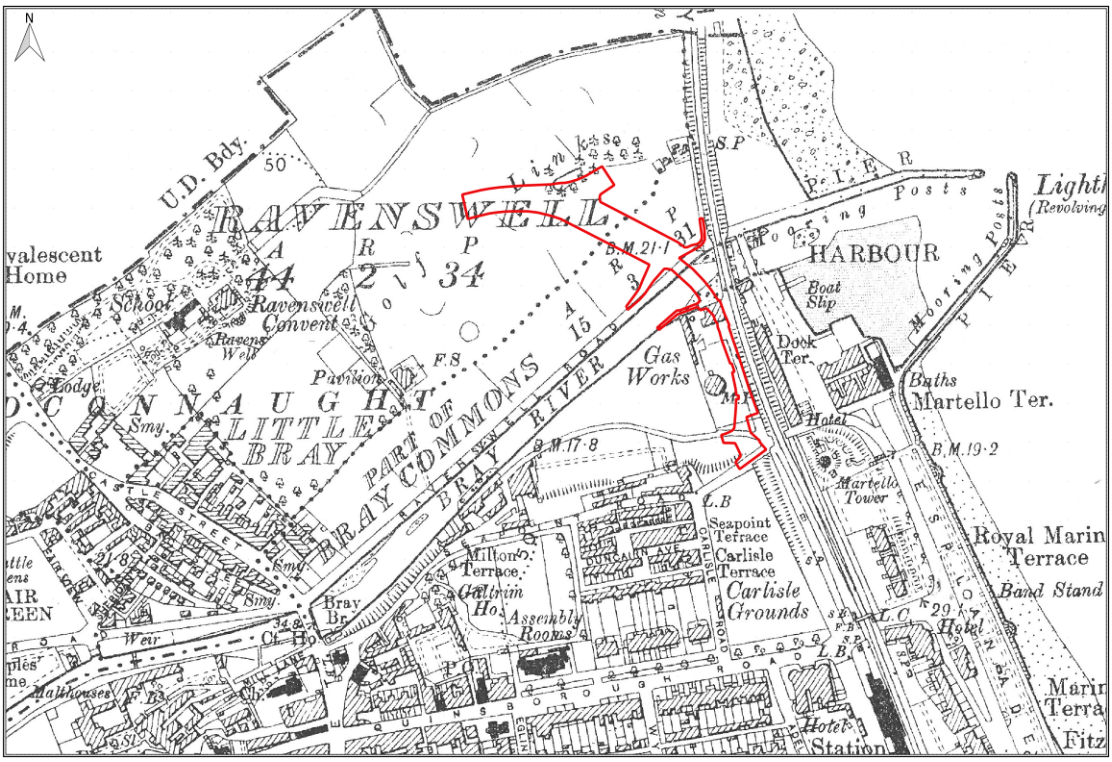


Figure 3: Extract from the OS map (1909), showing the proposed development area

The only change of note to the proposed development on the 1937 OS map is that the gas works is now annotated as a disused gasometer. There has been further development within Bray town (Figure 4).

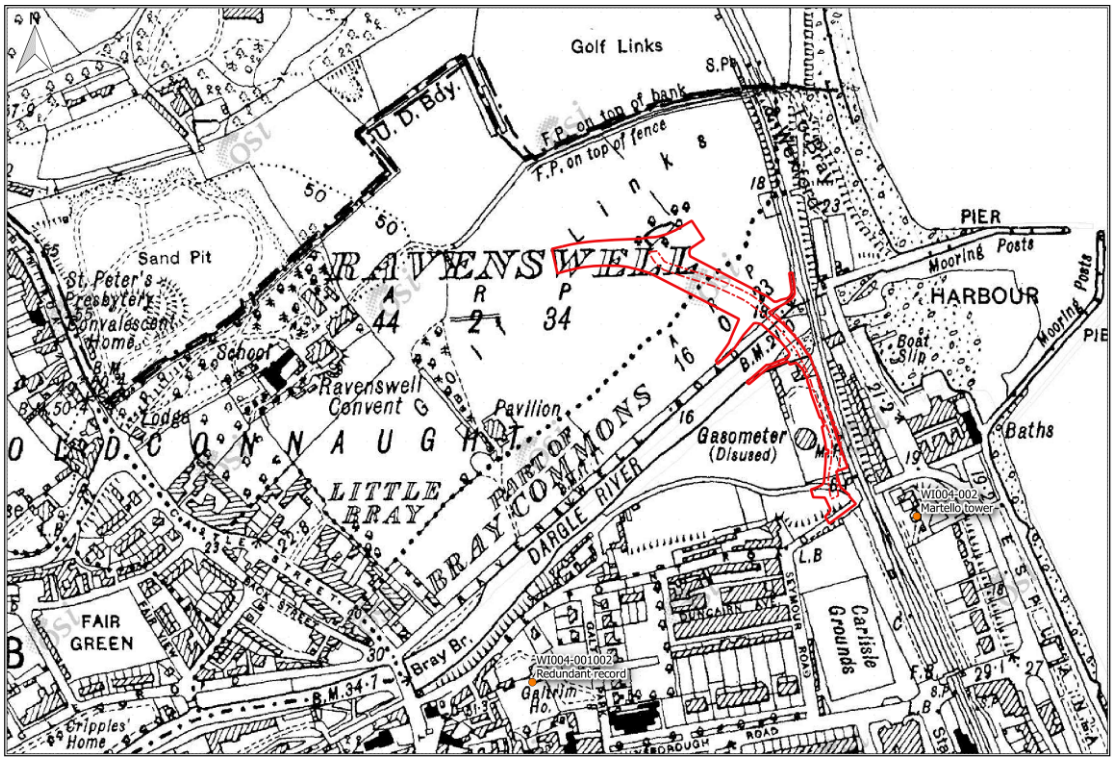


Figure 4: Extract from the third edition OS map (1937), showing the proposed development area

2.4 AERIAL PHOTOGRAPHIC ANALYSIS

Inspection of the aerial photographic coverage of the proposed development area held by the Ordnance Survey (1995-2013), Google Earth (2005-2018) and Bing Maps (2018) has been carried out as part of this assessment.

The proposed development area, on the southern banks of the river, is located within the grounds of a water pumping station connecting to the Seapoint Road on the 1995 OS satellite imagery, while the area on the northern bank is located within Bray Golf Club. Between the 2009 and 2013 Google Earth coverage the northern bank of the river was disturbed by works associated with the Shanganagh Bray Main Drainage Scheme. The 2017-2018 Google Earth coverage shows that the road within the northern extent of the proposed development was constructed in 2017 and that the north half of the development was further disturbed by infrastructure works associated with the school development to the north-northwest, with the exception of a small, undisturbed portion of the former golf course.

The only change noted within the southern half of the development is the construction of a footpath along the bank of the River Dargle on the 2016 Google Earth coverage. Nothing of archaeological significance was identified (Figure 5).

Figure 5: Aerial photographic coverage of the proposed development area (Google Earth 2017)

2.5 FIELD INSPECTION

The field inspection sought to assess the site, its previous and current land use, the topography and any additional information relevant to the report. During the course of the field investigation the proposed development and its surrounding environs were inspected.

The northern part of the proposed development has been subject to significant disturbance, although the green of the former Bray Golf Course remains undisturbed

(Plate 1). This area is uneven and rises to the southeast to a path along the riverbank (Plate 2).

The southern portion of the site is bordered by the railway line to the east and is situated within the grounds of a water pumping station, but this area was inaccessible at the time of survey (Plate 3). No previously unknown archaeological features were identified during the course of the inspection.

Plate 1: Northern portion of proposed development, facing northwest

Plate 2: Path along the north bank of the Dargle, facing northeast

Plate 3: Proposed development towards southern portion, facing east-southeast

3 PRELIMINARY IMPACT ASSESSMENT AND MITIGATION

3.1 IMPACT ASSESSMENT

- There are no predicted adverse impacts upon the recorded archaeological resource within the proposed scheme area.

- It is proposed to construct a new road to the north and south of the proposed bridge. There is potential for the development to have an adverse impact on previously unrecorded archaeological remains at the very northern end of this road, within the previously undisturbed greenfield section. This will be caused by ground disturbances associated with the proposed development.

- Ground disturbances associated with the construction of the bridge may have a negative adverse impact on any archaeological material that may survive along the riverbed or banks. Although previous underwater surveys have been carried out within the proposed development area, these works took place in 2006 and as such there is the potential that archaeological artefacts have been washed down river since or deposits exposed.

3.2 MITIGATION STRATEGY

- It is recommended that all topsoil stripping associated with the construction of the northern section of the proposed road, within the previously undisturbed greenfield area, be subject to archaeological monitoring. Full provision should be made available for the resolution of archaeological features, should that be deemed the most appropriate manner in which to proceed (following consultation with the DoCHG).

- No archaeological mitigation is deemed necessary along the southern end of the scheme, or in the area of previous disturbance along the northern bank of the river.

- It is recommended that an underwater survey is carried out within any areas of the river that may be impacted along with a metal detector survey along the river and the banks. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required. Any further mitigation will require approval from the National Monuments Service of the DoCHG.

4 REFERENCES

Bennett, I. (ed.) 1987–2010 *Excavations: Summary Accounts of Archaeological Excavations in Ireland*. Bray. Wordwell.

National Monuments Service, Department of Culture, Heritage and the Gaeltacht. *Sites and Monuments Record*, County Wicklow.

Nicholls, J. 2008 *Geophysical Survey Report Luas Line B2 Cherrywood to Bray/Fassaroe. Licence 08R0308*. Unpublished report by Archaeological Consultancy Services Ltd.

Cartographic Sources

William Petty, Down Survey, *Barony of Rathdown*, c. 1655

Ordnance Survey maps of County Wicklow, 1838-1937

Electronic Sources

www.excavations.ie – Summary of archaeological excavations from 1970–2019.

www.archaeology.ie – DoCHG website listing all SMR/RMP sites and results from the National Inventory of Architectural Heritage

www.osiemaps.ie – Ordnance Survey aerial photographs dating to 1995, 2000, and 2005, and 6-inch/25-inch OS maps.

www.googleearth.com – Aerial photographs of the proposed development area.

www.bingmaps.com – Aerial photographs of the proposed development area.

www.booksulster.com/library/plnm/placenamesC.php - Contains the text from *Irish Local Names Explained* by P.W Joyce (1870).