

WHITECHURCH STREAM FLOOD ALLEVIATION SCHEME

Natura Impact Statement



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1 INTRODUCTION

This Natura Impact Statement (NIS) report comprises information in support of the Appropriate Assessment (AA) in relation to an application by South Dublin County Council (SDCC) and Office of Public Works (OPW) for the Whitechurch Stream Flood Alleviation Scheme (FAS) in South County Dublin. It provides information and an assessment on whether the proposed development, alone or in combination with other plans and projects, is likely to have adverse effects on the integrity of any European site(s) (in accordance with the legislative context set out in **See Section 1.1 and Section 3.1**) in view of best scientific knowledge and the conservation objectives of the site(s).

1.1 Legislative Context

1.1.1 European Sites

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, better known as “The Habitats Directive”, provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of a European Union (EU)-wide network of sites known as Natura 2000 (hereafter referred to as ‘European sites’). In the Republic of Ireland, European sites comprise:

- Special Areas of Conservation (SACs) designated for habitats, plants, and non-bird species, under the Habitats Directive (92/43/EEC);
- Special Protection Areas (SPAs) designated for bird species and their habitats, under the Birds Directive (79/409/ECC as codified by Directive 2009/147/EC); and,
- ‘Candidate’ sites including ‘cSACs’. The process of designating cSACs as SACs is ongoing in Ireland. The term SAC is used throughout this report for both SACs and cSACs, given they are subject to equal protection.

1.1.2 Appropriate Assessment

1.1.2.1 European Context

Council Directive 92/43/EEC, better known as “The Habitats Directive”, provides legal protection for habitats and species of European importance. Article 6 of that directive contains provisions which “*govern the conservation and management of Natura 2000 sites.*” Article 6 has four main elements which work in concert to help in achieving wider EU biodiversity policy.

Article 6(1) addresses the establishment of the conservation measures necessary to maintain and restore habitats and species to favourable conservation status. Article 6(2) deals with prevention of habitat deterioration and species disturbance. Article 6(3) establishes the requirement for AA and, together with Article 6(4), sets out the decision-making tests for plans and projects likely to have a significant effect on or to adversely affect the integrity of European sites:

Article 6(3) states:

“Any plan or project not directly connected with or necessary to the management of the [European] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to appropriate assessment of its implications for the site in view of the site’s conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.”

Article 6(4) states:

“If, in spite of a negative assessment of the implications for the [European] site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.”

1.1.2.2 National Context

In the context of the proposed development, the requirement (to screen) for AA under the Habitats Directive is transposed by the Planning and Development Acts (2010 to 2018 as amended); ‘the Planning Acts’, and the Planning and Development Regulations (2010 to 2018, as amended).

Under Section 177U (5) of the Planning and Development Acts 2000-2010, as amended (‘the Planning Acts’), the competent authority shall determine that an AA of a proposed development is required if it cannot be excluded [emphasis added], on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site(s).

Under Section 177V (2) the competent authority shall take into account each of the following matters in their AA determination:

1. the Natura impact report or Natura impact statement, as appropriate;
2. any supplemental information furnished in relation to any such report or statement;
3. if appropriate, any additional information sought by the authority and furnished by the applicant in relation to a Natura impact statement;
4. any additional information furnished to the competent authority at its request in relation to a Natura impact report;
5. any information or advice obtained by the competent authority;
6. if appropriate, any written submissions or observations made to the competent authority in relation to the application for consent for proposed development;
7. any other relevant information.

Under the Planning Acts (177T), an NIS is defined as “a statement, for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed development, on its own or in combination with other plans or projects, for one or more than one European site, in view of the conservation objectives of the site or sites”. The NIS must “include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for one or more than one European site in view of the conservation objectives of the site or sites”.

1.2 Stages of Appropriate Assessment

According to European Commission guidance documents “Assessment of plans and projects significantly affecting Natura 2000 sites” (EC, 2001) and the “Managing Natura 2000 sites: The Provisions of Article 6 of the Habitats’ Directive 92/43/EEC” (EC, 2019), the obligations arising under Article 6 establish a step-wise procedure as follows

Stage 1: Screening for Appropriate Assessment

This process identifies whether the proposed development is directly connected to or necessary for the management of a European site(s) and identifies whether the development is likely to have significant impacts upon a European site(s) either alone or in combination with other projects or plans. The output from this stage is a determination for each European site(s) of not significant, significant, potentially significant, or uncertain effects. The latter three determinations will cause that site to be brought forward to Stage 2.

Stage 2: Appropriate Assessment

This stage considers the impact of the proposed development on the integrity of a European site(s), either alone or in combination with other projects or plans, with respect to: (i) the site's conservation objectives; and (ii) the site's structure, function and its overall integrity. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts is undertaken. The output from this stage is a Natura Impact Statement (NIS). This document must include sufficient information for the competent authority to carry out the appropriate assessment. If the assessment is negative, i.e. adverse effects on the integrity of a site cannot be excluded, then the process must consider alternatives (Stage 3).

Stage 3: Assessment of Alternatives

This process examines alternative ways of achieving the objectives of the project that avoid adverse impacts on the integrity of the European site. This assessment may be carried out concurrently with Stage 2 in order to find the most appropriate solution. If no alternatives exist or all alternatives would result in negative impacts to the integrity of the European sites, then the process either moves to Stage 4 or the project is abandoned.

Stage 4: Assessment where Adverse Impacts Remain

This stage includes the identification of compensatory measures where, in the context of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed.

2 PROPOSED DEVELOPMENT

The Office of Public Works (OPW) in partnership with South Dublin County Council (SDCC) and Dublin City Council (DCC) carried out a Catchment Flood Risk Assessment and Management (CFRAM) Study for the River Dodder Catchment. Whitechurch Stream was included as part of the study as it is a sub catchment of the Dodder Catchment. The 2014 River Dodder Catchment Flood Risk Management Plan (CFRMP)¹ identified a preferred flood risk management option for the Area of Potential Significant Risk (APSR) named as Tara Hill and St. Enda's, now referred to as Whitechurch Stream FAS.

The OPW and SDCC have initiated the development of a Flood Relief Scheme for Whitechurch Stream to alleviate fluvial flooding for the Tara Hill and St. Enda's APSR. The proposed Whitechurch Stream Flood Alleviation Scheme (FAS) (hereafter referred to as the proposed development), which is being designed and funded by the Office of Public Works, consists of a number of measures to improve the flood defences and improve conveyancing of flood water.

2.1 Project Description

A Preliminary Design Report has been prepared by the OPW (July 2019) which identified the viable options for the proposed work and identified a preferred option which is described below and is the subject of the Appropriate Assessment. The proposed development comprises a series of flood alleviation measures including debris management and the introduction of direct defences at various locations along Whitechurch Stream between St Enda's Park and the confluence of the Whitechurch Stream to the Owendoher River. The extent of the proposed development is illustrated in **Figure 2-4** and the various elements of the proposed development are illustrated in **Appendix A**.

In terms of the detailed design and the Appropriate Assessment process, where full detail is not yet known e.g. the requirement to retain or replace a pedestrian bridge, undertake remedial works to walls subject to further structural assessment, or to install instream sheet piling alongside structures, the precautionary principle requires that a worst-case scenario is assessed e.g. that works although not confirmed, will occur and as such all such possible project elements are assessed.

2.1.1 Advance Works

Advance works for the proposed development will entail a temporary works compound, to be located in a corner of the existing car park at the front of St. Enda's Park, off Sarah Curran Road. This facility will be secured from unauthorised access for the duration of the works and will include offices, welfare facilities, parking for site vehicles and plant at night, storage of equipment materials used in the construction phase and temporary storage of material to be re-used or awaiting removal by licenced waste contractor. Contaminated wastes e.g. spoil containing third schedule Invasive Alien Plant species material will be removed under appropriate waste permit and NPWS licence to a facility licenced to accept such waste therefore no quarantine area is required. Advance clearance of vegetation along and adjacent to the Whitechurch Stream in preparation for construction phase may also be required and material could be temporarily stored here until disposal.

2.1.2 Construction Phase

The estimated timeframe for construction works is approximately 12 months. The works are likely to be phased in sections due to accessibility and seasonal constraints with regard to instream works (where needed). There is likely to be a requirement for traffic management measures to be implemented for sections of the proposed works, particularly where the Whitechurch Stream runs alongside the narrow Whitechurch Road. The location

¹ RPS (2014). Dodder Catchment-based Flood Risk Assessment and Management Study – Flood Risk Management Plan

of the sections and identified projects elements corresponds to **Figure 2-1-2-3** and the design drawings in **Appendix A**.

2.1.2.1 Area 1 - Area downstream of Taylor's Lane and within St Enda's Park (Ch.: 0+000- 0+510.10)

- No flood alleviation measures proposed for this area.

2.1.2.2 Area 2 - Area between St Enda's Park and Sarah Curran Bridge Inlet (Ch.: 0+510.10- 0+572.25)

- Localised bank raising with rip rap erosion protection on the left bank to the design Level of 65.1m OD for approx. 50m length,
- Woodland planting on the left bank of Whitechurch Stream in St Enda's Park,
- Removal of trees and bankside vegetation to accommodate the proposed Works,
- Debris Trap and slipway at a suitable location upstream of Sarah Curran Bridge.

2.1.2.3 Area 3 - Area downstream of Sarah Curran Bridge outlet to Whitechurch Road Bridge Inlet (weir) (Ch.: 0+578.80- 0+688.70)

- Tree removal along the left bank to reduce blockage risk at Whitechurch Rd. Bridge,
- Bank protection measures on the left bank,
- Replacement of the wooden foot bridge approximately at Ch. 620. The replacement bridge will be a timber bridge of similar size and in the same location as the existing.

Areas 1,2 and 3 are outlined in **Figure 2-1**.

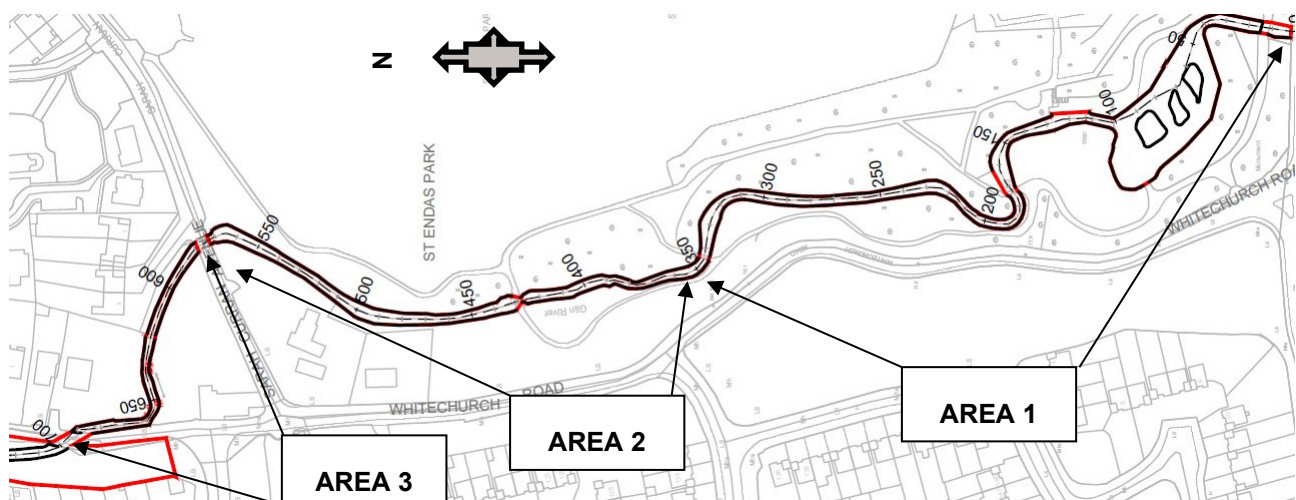


Figure-2-1: Areas 1, 2 and 3

2.1.2.4 Area 4 – Area from Whitechurch Road Bridge Outlet to St Gatiens Culvert inlet (Ch.: 0+700- 0+803.03),

- Tree clearing and vegetation removal on the right bank will be required to reduce blockage risk and to accommodate new flood defence walls.
- Bank protection will be required on the left bank.
- Underpinning will be required on the left bank.
- Proposed tree planting, bulb planting and grass seeding on Whitechurch Road – south of St Gatiens Court.

- New flood wall on the right bank side tying to existing stone wall (Level 62.95mOD) approximately 27m downstream of Whitechurch Rd. Bridge Outlet.
- New head wall at culvert inlet at level 62mOD with return wall on left bank which will replace existing railing.
- New right bank flood wall replacing existing fence. Design level at 62mOD. Wall height 1.1m-1.3m.
- Permanent sheet piling underneath new walls at St. Gatiens culvert inlet, extended upstream for approximately 30m.

2.1.2.5 Area 5 - Area from St Gatiens Court Culvert outlet to the inlet of the Garage Culvert at Rathfarnham Ford (Ch.: 0+828.07- 0+918.61)

- Removal of existing trees and vegetation from the right bank of Whitechurch Stream will be required to facilitate the works
- New head wall at St. Gatiens Court culvert outlet at level 61.8mOD with return wall left bank replacing railing and tying into existing wall
- New right bank flood wall replacing existing low wall and fence. Wall height generally 1.2m but raising to 1.9m at the Garage culvert
- Permanent sheet piling underneath new walls at St. Gatiens culvert outlet, extended downstream for 30m
- New head wall at culvert inlet level 60.4 mOD with return wall left bank tying into existing left bank wall. Wall height 1.9m
- New right bank flood wall tying into new head wall at Garage Culvert inlet at level 60.4mOD
- Permanent sheet piling underneath new wall at Garage Culvert inlet, extended upstream for 30m
- Proposed tree planting, bulb planting and grass seeding on Whitechurch Road – North of St Gatiens Court.
- Staged Trash screen with water level gauge to be provided at Garage Culvert inlet

2.1.2.6 Area 6 - Area from Garage Culvert at Rathfarnham Ford to Willbrook Lawn Twin Culvert Inlet (Ch.: 0+983.91- 1+132.91)

- Removal of existing trees and vegetation from both sides of Whitechurch Stream will be required to facilitate the works;
- Increase concrete plinth around culvert opening to 600mm above ground level and install new railing,
- New head wall to culvert outlet level 58.25mOD. Flood wall left and right bank tying into head wall to design level 58.25mOD. Wall height 1.2m above path level. Right bank wall to tie into existing wall downstream of existing bridge.
- Permanent sheet piling underneath new walls left and right bank, at Garage Culvert outlet, extended downstream for approximately 30m
- Retention of existing right bank walls downstream of existing bridge at Capri Site. Wall to be cladded with stone.
- Proposed beech hedgerow within existing open space upstream of Willbrook Lawn twin culvert
- Replace metal railing at parking area off Whitechurch Stream Bridge with low level 400mm defence wall and railing to tie into bridge parapet and railing.
- Replace left bank existing metal railing with low level defence wall with railing on the left bank, upstream of the inlet of Whitechurch Stream Bridge with wall height 600mm above existing ground levels. Wall and railing to tie into bridge parapet and railing.

Areas 4,5 and 6 are outlined in **Figure 2-2** below.

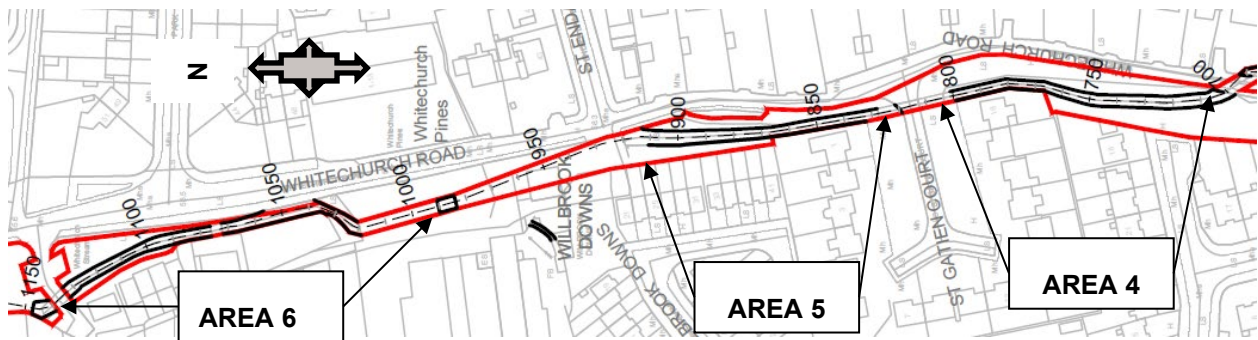


Figure-2-2: Areas 4, 5, and 6

2.1.2.7 Area 7 - Area from the outlet of the Twin Culvert at Willbrook Lawn to the Inlet of Bridge crossing Whitechurch Road (Ch.: 1+140.41- 1+410.43)

- Return wall around dual culvert inlet to tie into bridge parapet and existing boundary wall.
- Proposed tree planting on Whitechurch Road within existing open space immediately south of the junction between Whitechurch Road and Willbrook Lawn
- Localised left bank raising with rip rap erosion protection and permanent supports to be provided to decked structures along the bank.
- Left bank wire mesh fence panels at 1.2 m height above the footpath
- Proposed beech hedgerow along left bank fence.
- Right bank railing to be placed above existing wall. Top of railing at 1.2 m height above the footpath.
- Removal of existing trees and vegetation from both sides of Whitechurch Stream will be required. Existing walls right bank to be maintained at current level, however remedial works will be required.
- Suitably designed staged trash screen with water level gauge to be provided upstream of bridge/culvert face with access from the funeral home.
- Proposed planting at the open spaces immediately adjacent to the car park, upstream and downstream of the pedestrian bridge in Willbrook Lawn.

2.1.2.8 Area 8 - Bridge crossing Whitechurch Road outlet to Willbrook Road Culvert inlet (confluence with Owendoher) (Ch.: 1+420.20- 1+455)

- Tree and bankside vegetation management to reduce blockage risk to the culvert discharging to Owendoher.

Areas 7 and 8 are outlined in **Figure 2-3** below.

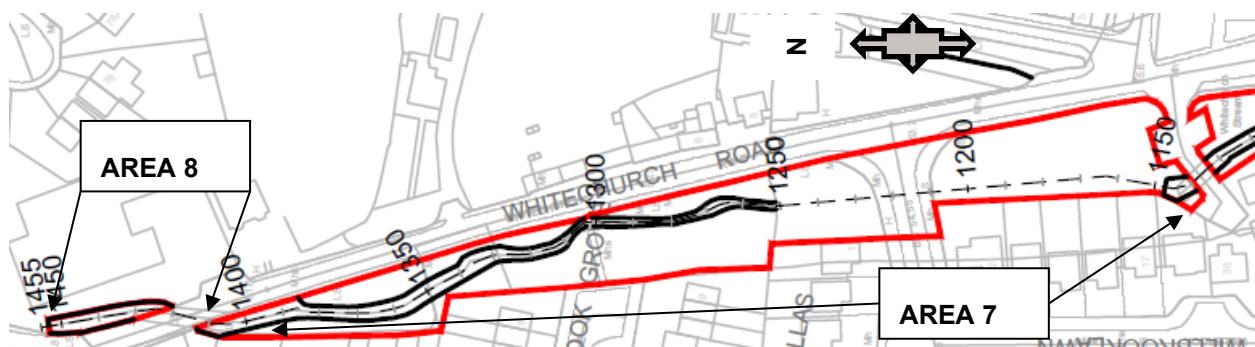


Figure 2-3: Areas 7 & 8

2.1.2.9 Landscape Works

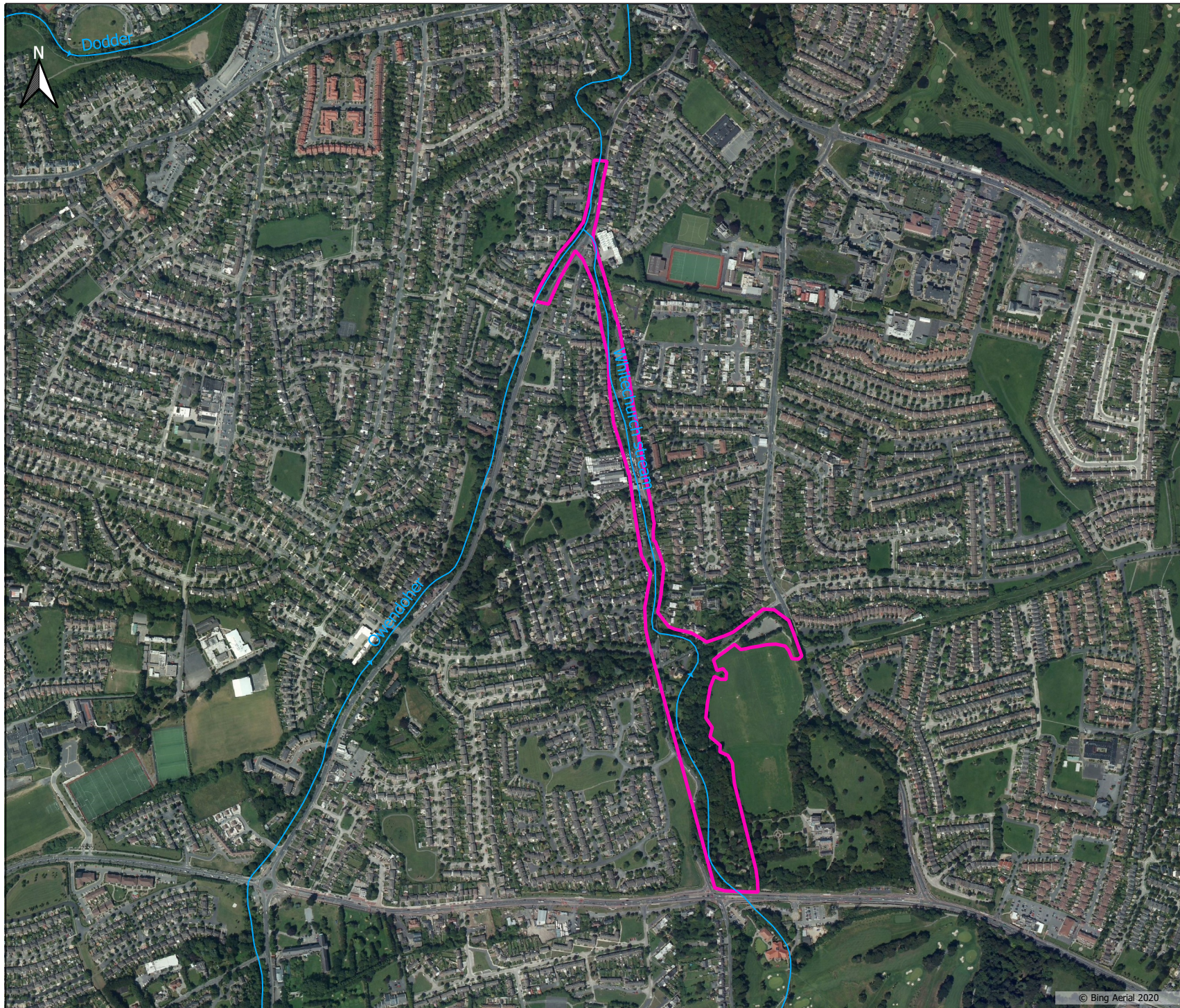
New planting and seeding are proposed in St Enda's Park and at five locations along Whitechurch Road to mitigate adverse landscape and visual effects. These measures include the following:

- Woodland planting on the left bank of Whitechurch Stream in St Enda's Park;
- Tree planting, bulb planting and grass seeding on Whitechurch Road, south of St Gatien Court;
- Tree planting, bulb planting and grass seeding on Whitechurch Road, north of St Gatien Court;
- Hedgerow planting within existing open space south of the Willbrook Lawn twin Culvert;
- Tree planting within the existing open space on Whitechurch Road, in the vicinity of Willbrook Lawn; and
- A mixed species hedgerow along the left bank of Whitechurch Stream near Willbrook Grove.

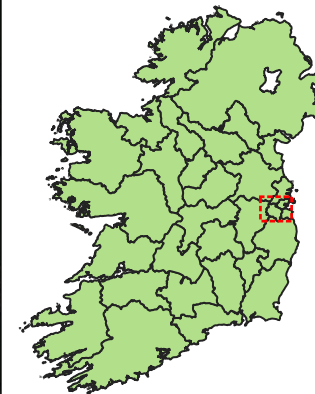
2.1.3 Operation Phase

The maintenance of the proposed flood alleviation scheme will be the responsibility of the Local Authority, although in terms of emergency repairs, the Local Authority would revert to the OPW. The following general measures will be required as part of the routine monitoring and maintenance. They include:

- Flood walls – Annual inspection and sealant replacement (every 5 years);
- Flap Valves (if any) – Inspection once every 5 years and replacement (every 25 years);
- Bank protection – Inspection once every 5 years and maintenance (as required);
- Tree Management – Annual inspection and maintenance (as required);
- Trash Screens – Twice-Weekly inspections and maintenance (as required); and
- Debris Traps – Bi-annual inspections and maintenance (as required).



Legend



Hydrological Connectivity Pathway

Indicative Extent of Survey Territory

Client



Project Whitechurch Stream Flood Alleviation Scheme

Title

Figure 2.4 Site Location and Survey Area



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3 METHODOLOGY

3.1 AA Guidance

EU and national guidance exist in relation to Member States' fulfilling their requirements under the EU Habitats Directive, with particular reference to Article 6(3) and 6(4) of that Directive. The methodology followed in relation to this AA has had regard to the following guidance:

- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of Environment, Heritage and Local Government (DoEHLG, 2009);
- Communication from the Commission on the Precautionary Principle (EC, 2000);
- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (known as MN2000), Office for Official Publications of the European Communities, Luxembourg, (EC, 2019);
- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Brussels (EC, 2001);
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission (EC, 2007);
- Nature and biodiversity cases: Ruling of the European Court of Justice (EC, 2006);
- Interpretation Manual of European Union Habitats. Version EUR 28. European Commission (EC, 2013); and
- Article 6 of the Habitats Directive: Rulings of the European Court of Justice (EC, 2014).

There have been significant changes to AA practice since both the EC (2001) and the DoEHLG guidance (2009), arising from practice and rulings in European, UK and Irish courts. These changes have been addressed in the preparation of this report.

3.2 Consultation

The following organisations were consulted by email in relation to this assessment:

- Development Applications Unit (DAU), Department of Culture, Heritage and the Gaeltacht;
- Inland Fisheries Ireland (IFI);
- Heritage Officer of South Dublin County Council; and
- OPW Staff, St. Enda's Park.

Consultation undertaken for the proposed development is summarised in **Table 3-1**:

Table 3-1: Summary of Consultation Responses Relevant to Appropriate Assessment

Consultee	Response Date	Key Issues Identified in Response
Development Application Unit (DAU), Department of Culture, Heritage and the Gaeltacht	No response received (at this time)	No response received (at this time)
Inland Fisheries Ireland	25/03/19	Importance of the Dodder System and consideration that the Whitechurch Stream is equally important. RPS summary notes of meeting (Appendix B)
Inland Fisheries Ireland	24/03/2020	Noted merits of a well vegetated riverbank in maintaining and maintaining diverse riparian zone. In terms of sheet piling, only use where no other solution exists. The use of Trash screen is not favoured, and the design should be cognisant of ensuring unhindered movement for fish. Also requested that IFI be posted on design.

Consultee	Response Date	Key Issues Identified in Response
		(Appendix B). Follow on telephone communication between SDCC and RPS with IFI on 06/04/2020 resulted in discrete changes to design and mitigation recommendations.
Heritage Officer, South Dublin County Council	Various	Discussions on IAPS sightings and Management and planting scheme
OPW Parks Staff, St Enda's Park	Various	Discussion on sightings. (Not strictly applicable to AA)

3.3 Ecological Data

3.3.1 Desk Study

This assessment was informed by a desktop study, which assessed the potential for all Qualifying Interests (QIs) (i.e. non-bird species and habitats) and Special Conservation Interests (SCIs) (i.e. bird species and their habitats) of European sites to occur, given their ecological requirements identified by Balmer *et al.* (2013) for SCIs, and the National Parks and Wildlife Service (NPWS) for QIs (NPWS, 2019 a,b,c).

SCI Birds and mobile QI species can travel many kilometres from their core areas, and desktop surveys assessed the potential presence of such species beyond the European sites for which they are QIs/SCIs. Desktop studies had particular regard for the following sources:

- EPA online interactive mapping tool²;
- Tabulated lists for all European sites in Ireland of SCIs and QIs, obtained through a data download from the NPWS website;
- Information on ranges of mobile QI populations in Volume 1 of NPWS' Status of EU Protected Habitats and Species in Ireland (NPWS, 2019a), and associated digital shapefiles obtained from the NPWS Research Branch;
- Information on ranges of mobile SCIs bird populations from Bird Atlas 2007–11 (Balmer *et al.*, 2013), excluding birds of prey whose ranges were determined with reference to Hardey *et al.* (2013);
- Mapping of European site boundaries and Conservation Objectives for relevant sites in County Dublin and beyond, as relevant, available online from the NPWS;
- Distribution records for mobile populations of European sites within the Zone of Influence (Zoi) held online by the National Biodiversity Data Centre (NBDC);
- Data including surface and ground water quality status, and river catchment boundaries available from the online database of the Environmental Protection Agency (EPA);
- National and regional surveys of semi-natural habitats, including grasslands (O'Neill *et al.*, 2013), saltmarsh (McCorry and Ryle, 2009; Devaney and Perrin, 2015), and woodland (Perrin *et al.*, 2008);
- Boundaries for catchments with confirmed or potential freshwater pearl mussel (FWPM) *Margaritifera margaritifera* populations in GIS format available online from the NPWS;
- Information through consultation; and,
- Planning reports for the proposed development, including an Ecological Impact Assessment (RPS 2020a), Screening for Appropriate Assessment (RPS 2019) and Landscape and Visual Assessment Report (RPS 2020b).

² Available online at <https://gis.epa.ie/EPAMaps/default>. Accessed November 2019. Reconfirmed March 2020.

3.3.2 Field Study

This NIS was informed by habitat and protected species surveys undertaken as part of the Ecological Impact Assessment of the proposed development site in 2018, 2019, and 2020 by RPS ecologists (RPS 2020a). The survey assessed the potential for all QIs/SCIs of European sites and scheduled³ invasive species to occur, given their ecological requirements identified by Balmer *et al.* (2013) for birds, and the NPWS for all other species/habitats (NPWS, 2019 b, c).

The survey included checks of suitable habitats for all highly mobile QI/SCI species potentially occurring. For instance, the Whitechurch stream was checked for the presence of potential common kingfisher *Alcedo atthis* nest sites, and potential breeding or resting sites of otter *Lutra lutra*. Numerous non-breeding SCI bird species travel many kilometres from their core areas, and surveys also assessed potential presence of roosting or feeding sites of such species. Species survey guidance had regard for sources including the National Roads Authority (NRA, 2009). The potential of any buildings, vegetation, or features within the Zone of Influence (Zoi) of the proposed development to offer nesting or roosting habitat to SCI bird populations, such as Kingfisher, was determined.

3.4 Relevant European Sites

The identification of relevant European sites to be included in this NIS was based on the identification of sources-pathways-receptors within the Zoi of the proposed development.

3.4.1 Source-pathway-receptor model

A source-pathway-receptor model is a standard tool used in environmental assessment. In order for an effect to be likely, all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism results in no likelihood for the effect to occur. The source-pathway-receptor model was used to identify a list of European sites, and their QIs/SCIs, with potentially Likely Significant Effects (LSEs) resulting in adverse effects on the integrity of a European site. These are termed as 'relevant' European sites/QIs/SCIs throughout this NIS.

3.4.2 Zone of Influence

The proximity of the proposed development to European sites, and more importantly QIs/SCIs of the European sites, is important when identifying potentially significant effects. During the initial scoping of this NIS, a 15 km Zoi was applied for impact assessment. A conservative approach has been used, which minimises the risk of overlooking distant or obscure effect pathways, while also avoiding reliance on buffer zones (e.g. 15 km), within which all European sites should be considered. This approach assesses the complete list of all QIs/SCIs of European sites in Ireland (i.e. potential receptors), instead of listing European sites within buffer zones. This follows Irish departmental guidance on AA:

"For projects, the distance could be much less than 15 km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects" (DEHLG, 2010; p.32, para 1).

Following the guidance set out by the NRA (2009), the proposed development has been evaluated based on an identified Zoi with regard to the potential impact pathways to ecological feature (e.g. mobile and static). The Zoi of the proposed development on mobile species (e.g. birds, mammals, and fish), and static species and habitats (e.g. saltmarshes, woodlands, and flora) is considered differently. Mobile species have 'range' outside of the European site in which they are QI/SCI. The range of mobile QI/SCI species varies

³ Invasive species scheduled to the EC (Birds and Natural Habitats) Regulations 2011-2015 ('the Regulations'). Under the Regulations, it is an offence to plant, disperse, allow or cause to disperse, spread or otherwise cause to grow in any place any species scheduled to the Regulations without a licence.

considerably, from several metres (e.g. in the case of whorl snails *Vertigo* spp.), to hundreds of kilometres (in the case of migratory wetland birds). Whilst static species and habitats are generally considered to have Zols within close proximity of the proposed development, they can be significantly affected at considerable distances from an effect source; for example, where an aquatic QI habitat or plant is located many kilometres downstream from a pollution source.

Hydrological linkages between the proposed development and European site (and their QIs/SCIs) can occur over significant distances; however, the significance of the impact will be site specific depending on the receiving water environment and nature of the potential impact. As a precautionary measure, a reasonable worst-case Zol for water pollution from the proposed development site is considered to be the surface water catchment. In this NIS, the surface water catchment is defined at the scale of Catchment Management Unit (CMU), as adopted in the River Basin Management Plan (RBMP) for Ireland 2018-2021 (DHPLG, 2018).

In this NIS, therefore, 'relevant' European sites are those within the potential Zone of Influence (Zol) of activities associated with the construction and operation of the proposed development, where adverse effects to integrity of QIs/SCIs of these European sites could arise.

4 RECEIVING ENVIRONMENT

This Section details the desktop and field survey results, in order to describe the relevant receiving environment of the proposed development. The relevant receiving environment relates to anything that may be directly or indirectly related to the QIs/SCIs of relevant European sites.

4.1 Overview of the Proposed Development

The proposed development is located along a discrete section of the Whitechurch Stream in south County Dublin (**Figure 2-4**), within a predominantly suburban landscape comprising public roads and residential properties and to a lesser extent, commercial properties. The upper (Southern) extent of the proposed development includes St Enda's Park, although the proposed development is confined to the front of the Park in the North-eastern corner with limited works inside the boundary, and the temporary works compound being established in the public carpark and a small bit of ground at the back of the adjacent playing fields.

4.2 European Sites

Proximal European sites to the proposed development are those at the mouth of Dublin Bay namely

- South Dublin Bay SAC (00210)
- North Dublin Bay SAC (000206)
- South Dublin Bay and River Tolka Estuary SPA (004024)
- North Bull Island SPA (004006)

In addition, Wicklow Mountains SAC (001209) was included owing to the presence of QI species Otter (*Lutra lutra*). Despite the lack of direct hydrological connectivity between the Whitechurch Stream and other watercourses which flow from the SAC to the Dodder catchment, the territorial range of Otter is such that it is within the potential Zol of the proposed project.

There are no other European sites considered relevant to the Zol of the proposed development site and all other European sites within 15km of the proposed development have been assessed in terms of all QIs/SCIs and connectivity.

The European sites located within 15 km of the proposed development, that are discounted from further consideration as per the Screening for Appropriate Assessment report (RPS 2019) and summarised in **Section 5**) include:

- Ballyman Glen SAC (000713);
- Knocksink Woods SAC (000725);
- Glenasmole Valley SAC (001209);
- Wicklow Mountains SPA (004040);
- Dalkey Island SPA (004172); and
- Rockabill to Dalkey Island SAC (003000).

These sites are deemed to be protected from potential negative effects arising from bad management within the proposed development due to their locations and lack of proximity or connectivity to the same.

The Conservation Objectives of the relevant European sites within the Zol of the proposed development are shown in **Table 4-2**. Other relevant European sites are discussed in the Screening for Appropriate Assessment report (Summary provided in **Section 5**). All European sites identified in this report are illustrated in **Figure 4-1**.

WHITECHURCH STREAM FAS-NIS

Table 4-1: Conservation Objectives for European sites referenced in the Natura Impact Statement.

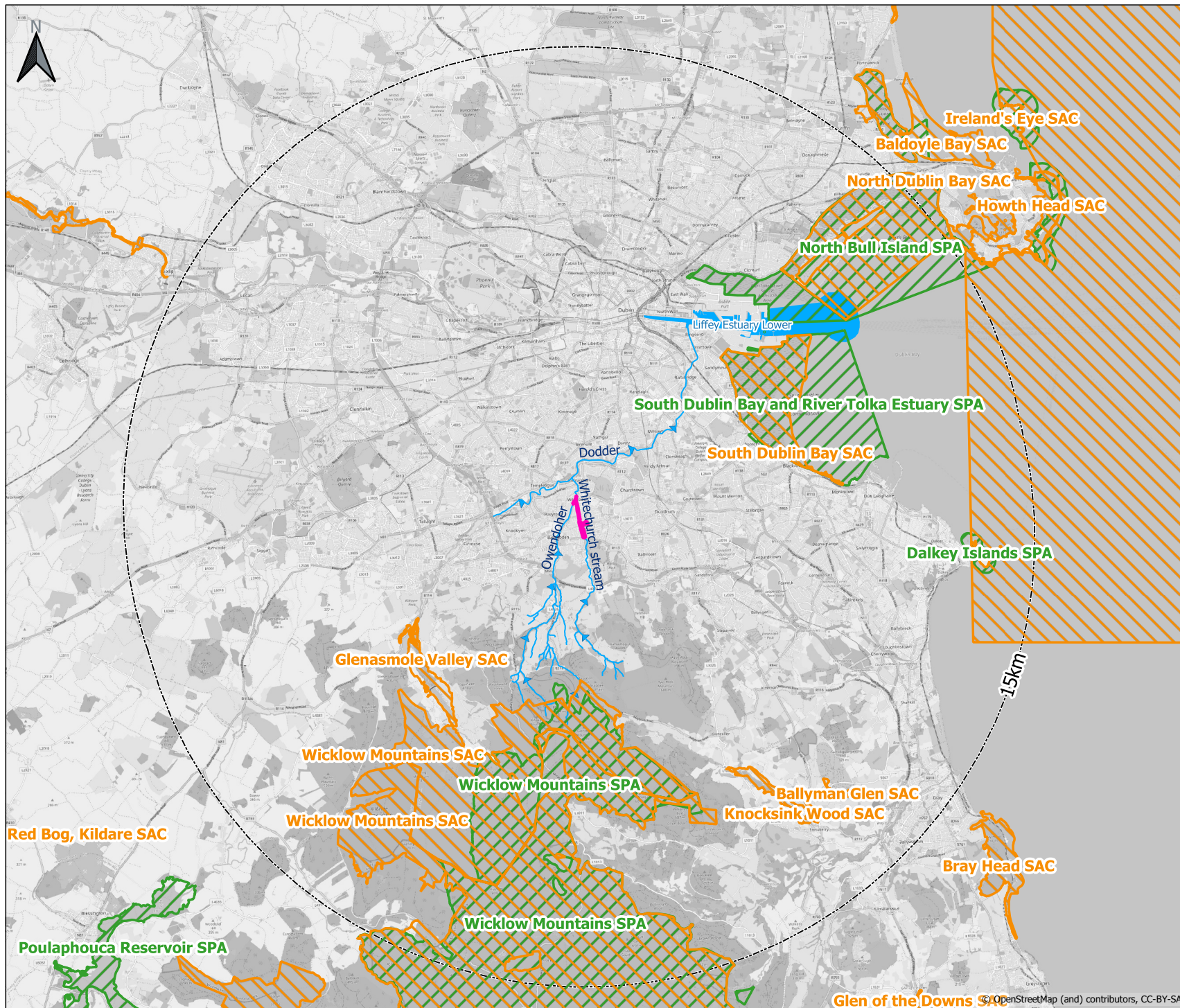
Site Code	Distance	Conservation Objectives Version	Qualifying Interests (QI's) /Special Conservation Interests (SCI's)	Conservation Objectives
South County Dublin SAC (000210)	ca. 12km	Site Specific Conservation Objectives Version 1.0 22/08/13	Annex I Habitats Mudflats and sandflats not covered by seawater at low tide [1140]	To maintain the favourable conservation condition of the Annex I habitat in South Dublin Bay SAC (1140) for which are defined by a list of attributes and targets
North County Dublin SAC (000206)	ca. 13km	Site Specific Conservation Objectives Version 1.0 06/11/13	Annex I Habitats Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glauco-Puccinellietila maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritima</i>) [1410]	To maintain the favourable conservation condition of the following Annex I habitats in North Dublin Bay SAC (1140, 1330, 1410) for which are defined by a list of attributes and targets.
			Annex I Habitats Annual vegetation of drift lines [1210] <i>Salicornia</i> and other annuals colonising mud and sand [1310] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) * [2130] Humid dune slacks [2190]	To restore the favourable conservation condition of Annex I habitats in North Dublin Bay SAC (1210, 1310, 2110, 2120, 2130, 2190) which are defined by a list of attributes and targets.
			Annex II Species Petalwort (<i>Petalophyllum ralfsii</i>) [1395]	To maintain the favourable conservation condition of Petalwort in North Dublin Bay SAC which is defined by a list of attributes and targets
Wicklow Mountains SAC (02122)	ca. 7km	Site Specific Conservation Objectives Version 1 31/07/17	Annex I Habitats Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> [3130] Natural dystrophic lakes and ponds [3160] Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030]	To maintain the favourable conservation condition of the Annex I habitat in Wicklow Mountains SAC (3130, 3160, 6130) for which are defined by a list of attributes and targets
				To restore the favourable conservation condition of Annex I habitats in Wicklow Mountains SAC (4010, 4030, 4060, 6230, 7130, 8110, 8210, 8220, 91A0)

WHITECHURCH STREAM FAS-NIS

Site Code	Distance	Conservation Objectives Version	Qualifying Interests (QI's) /Special Conservation Interests (SCI's)	Conservation Objectives
			<p>Alpine and Boreal heaths [4060]</p> <p>Calaminarian grasslands of the Violetalia calaminariae [6130]</p> <p>Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230]</p> <p>Blanket bogs (* if active bog) [7130]</p> <p>Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) [8110]</p> <p>Calcareous rocky slopes with chasmophytic vegetation [8210]</p> <p>Siliceous rocky slopes with chasmophytic vegetation [8220]</p> <p>Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p> <p>Annex II Species</p> <p><i>Lutra lutra</i> (Otter) [1355]</p>	<p>for which are defined by a list of attributes and targets.</p> <p>To Maintain the favourable conservation condition of Otter in Wicklow Mountains SAC which is defined by a list of attributes and targets.</p>
North Bull Island SPA (004006)	ca. 12km	Site Specific Conservation Objectives Version 1.0 09/03/15	<p>SCIs</p> <p>Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]</p> <p>Shelduck (<i>Tadorna tadorna</i>) [A048]</p> <p>Teal (<i>Anas crecca</i>) [A052]</p> <p>Pintail (<i>Anas acuta</i>) [A054]</p> <p>Shoveler (<i>Anas clypeata</i>) [A056]</p> <p>Oystercatcher (<i>Haematopus ostralegus</i>) [A130]</p> <p>Golden Plover (<i>Pluvialis apricaria</i>) [A140]</p> <p>Grey Plover (<i>Pluvialis squatarola</i>) [A141]</p> <p>Knot (<i>Calidris canutus</i>) [A143]</p> <p>Sanderling (<i>Calidris alba</i>) [A144]</p> <p>Dunlin (<i>Calidris alpina</i>) [A149]</p> <p>Black-tailed Godwit (<i>Limosa limosa</i>) [A156]</p> <p>Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]</p>	To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA (A046, A048, A052, A054, A056, A130, A140, A141, A143, A144, A149, A156, A157, A160, A162, A169, A179).

WHITECHURCH STREAM FAS-NIS

Site Code	Distance	Conservation Objectives Version	Qualifying Interests (QI's) /Special Conservation Interests (SCI's)	Conservation Objectives
			Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162] Turnstone (<i>Arenaria interpres</i>) [A169] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]	To maintain the favourable conservation condition of the wetland habitat in North Bull Island SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:
South Dublin Bay and River Tolka Estuary SPA (004024)	ca. 13km	Site Specific Conservation Objectives Version 1.0 09/03/15	SCIs Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Redshank (<i>Tringa totanus</i>) [A162] Roseate Tern (<i>Sterna dougalli</i>) [A192] Common Tern (<i>Sterna hirundo</i>) [A193] Arctic Tern (<i>Sterna paradisaea</i>) [A194] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Dunlin (<i>Calidris alpina</i>) [A149] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland & waterbirds [A999]	To maintain the favourable conservation condition of the wetland habitat in South Dublin Bay and River Tolka Estuary SPA as a resource for the regularly occurring migratory waterbirds that utilise it.



Legend

- Hydrological Connectivity Pathway
- Indicative Extent of Survey Territory
- Zone of Influence
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)

Source: NPWS (December 2019)

Client

Project **Whitechurch Stream Flood Alleviation Scheme**

Title

Figure 4.1 European Sites within 15km of the Proposed Development

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Issue Details	
Drawn: HF	Project: MDW0825
Checked: TR	File Ref:
Approved: MD	MDW0825QG1002F01
Scale: 1:175,000 @ A4	Projection:
Date: 27/03/2020	IRENET95 / ITM

Notes

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4.3 Habitats

4.3.1 Terrestrial

The nearest terrestrial QI habitat to the proposed development are coastal habitats: intertidal mudflats, sand-dunes and saltmarshes. These are all located in excess of 12 km downstream of the proposed development. No terrestrial habitats within the footprint or Zol of the proposed development have affinities to QI habitats or offer any significant supporting value to QIs or SCIs of any European sites.

4.3.2 Aquatic

The site of the flood alleviation works is located within the Whitechurch Stream (EPA Code: 09K06, EPA River Waterbody Code IE_EA_09O011700). The EPA name for this watercourse is the Kilmashogue, although it is also known as the Glynn/Glin River or Whitechurch Stream. In this report it is referred to as the Whitechurch Stream. This stream rises from Kilmashogue and Tibbradden Mountains and flows in a northerly direction. It flows under the M50, through Marley Park, Grange Golf Club and St. Enda's Park. It then runs parallel with the Whitechurch Road being diverted underground for short sections and then enters the Owendoher River (EPA Code: 09O01, EPA River Waterbody Code: 09O11700) at the Whitechurch /Ballyboden /Willowbrook roads junction. There are a number of weirs located along the length of Whitechurch Stream (4 weirs and 6 culvert/bridge structures). The Owendoher River flows north for another 0.84km before flowing into the Dodder River, which also has a number of weirs along its length (10 weirs and 16 culverts) (RPS 2016). Please see **Appendix C** Aquatic Report for further information.

Both the Whitechurch Stream and the Owendoher River, which are suburbanised in their lower reaches, are spate rivers characterised by rapid increases in water levels. Both form part of the Dodder_SC_010 WFD sub-catchment. The Whitechurch Stream is not a European site; however, it does discharge into Dublin Bay downstream of the proposed development which it is hydrologically connected to European sites.

4.3.3 Flora and Invasive Alien Plants

Two invasive alien plants, scheduled to the European Communities (Bird and Natural Habitat Regulations) 2011 (as amended), were recorded during the field surveys of the proposed development. Four populations of Japanese knotweed (*Fallopia japonica*) were noted from the study area, although only three are directly impacted by the proposed works. There are a number of clumps of Three-cornered garlic (*Allium triquetrum*) from the area, with some in close proximity to the largest area of Japanese knotweed. Given the nature of the project and the need to construct new flood relief measures there is potential for invasive alien plants, scheduled to the European Communities (Bird and Natural Habitat Regulations) 2011(as amended) to be spread present within the footprint or Zol of the proposed development. However, these would not ordinarily result in a likely significant effect to European sites and as such their impact on the environment and management is dealt with under the EclA (RPS 2020a) submitted separately.

4.4 Mobile Species

4.4.1 Qualifying Interests

Desk study results indicated that several QI mobile species have been recorded with 10 km of the proposed development site, while the field survey found evidence for QI mobile species within the Zol of the proposed development. The nearest mobile QI species – Otter, included as a QI for Wicklow Mountains SAC (site code 2122), which is located ca. 4.75 km due south of, and partially within the same Catchment Management Unit for the proposed development.

4.4.1.1 Mammals

4.4.1.1.1 QI Otter

Otter are considered vulnerable given their reliance on fish food supplies, sensitivity to disturbance and pollution in addition to their short life cycle and small litter sizes (Channin, 2003). Of most importance are natal or breeding holting sites where Otters rear their young. Holting sites can be difficult to identify given that they can be unmarked by spraint, can occur in scrub, steep embankments and inaccessible areas. However, on occasion visible excavations in embankments are present and observations of adults frequenting a holting site can give away their presence. Otters can also use man-made structures for holting which include culverts, large crevices, bridge aprons and even abandoned buildings.

The field surveys carried out during the appropriate season (commencing October 2018 and a number of follow-on visits up to April 2019, and again in March 2020) found evidence of otter activity, and breeding or resting sites within the Zol of the proposed development site. Otter activity is well documented from the Dodder River as far down as its confluence with the River Liffey (See Macklin *et al.* 2019). Thus, it cannot be conclusively ruled out the construction disturbance along this otter territory will be impacted during the works to the Whitechurch Stream.

The nearest SAC designated for QI otter within ca. 4.75 km of the proposed development site – Wicklow Mountains SAC, although the hydrological pathway is more circuitous. The Whitechurch Stream which rises in the foothills of Wicklow mountains (outside of the SAC boundary) and does not overlap with or pass through the SAC.

In Ireland, the territory of female river otters who are territorial has been estimated as 7.5 ± 1.5 km (6.5 ± 1.0 km in coastal environments (see Reid *et al.*, 2013). The Owendoher River, to which the Whitechurch Stream discharges, rises in the northern boundary of the Wicklow Mountains SAC and provides a hydrological link for which QI Otter can transit.

4.4.1.1.2 QI Bats

The proposed development is outside the favourable reference range of the lesser horseshoe bat *Rhinolophus hipposideros* (NPWS, 2019 a, c), which is the only bat species designated as a QI in Ireland. The species is restricted to the western Atlantic seaboard and has never been recorded in Co. Dublin. There are no SACs for the species within at least 150 km of the proposed development site. Maximum foraging ranges for the species from its SACs have not been recorded exceeding 6 km in Ireland (e.g. 5.2 km in Galway; Rush and Billington, 2014), or Wales (4.2 km; Bontadina *et al.*, 2002). The range of this light-sensitive bat species of rural areas does not overlap with the Zol of the proposed development.

4.4.1.2 Fish

QI Atlantic salmon *Salmo salar* and QI Lamprey (*Lampetra fluviatilis*, *Lampetra planeri*, and *Petromyzon marinus*) records were not returned from the environmental data search from the NBDC. While the proposed development is within the favourable reference range of Atlantic salmon, Brook lamprey and River Lamprey, it is outside the favourable reference range for sea lamprey (NPWS, 2019c). The nearest European sites designated for QI Atlantic salmon, QI River lamprey (River Boyne and River Blackwater SAC) and QI Brook Lamprey (River Nore and River Blackwater SAC) are outside the CMU in which the proposed development is located. There is no freshwater hydrological links between the proposed development and these European sites.

4.4.1.3 Invertebrates

There are no suitable habitats for QI freshwater pearl mussel *Margaritifera margaritifera* or QI Irish freshwater pearl mussel *Margaritifera durrovensis* within the Zol of the proposed development. The habitat of the freshwater pearl mussel in Ireland is restricted to near natural, clean flowing waters, often downstream of ultra-oligotrophic lakes (NS2, 2010). Pearl mussels require stable cobble and gravel substrate with very little fine material below pea-sized gravel (NS2, 2010). The Zol of the proposed development is outside the

favourable reference range of QI pearl mussels (NPWS, 2019c). The nearest known population of QI pearl mussel to the proposed development is the River Nore and River Blackwater SAC which is outside the CMU in which the proposed development is located. There is no hydrological links between the proposed development and these European sites.

There is no suitable habitat for QI marsh fritillary butterfly *Euphydryas aurinia* within the Zol of the proposed development. The Zol of the proposed development is outside the favourable reference range of QI marsh fritillary (NPWS, 2019c). The nearest European site with QI marsh fritillary butterfly is Ballynafagh Lake SAC (site code 1387), located ca. 32 km west of the proposed development, which is outside the potential dispersal range of the species (i.e. ca. 10 km, according to Zimmerman *et al.*, 2011).

QI whorl snails (Geyer's whorl snail *Vertigo geyeri*; Narrow-mouthed whorl snail *Vertigo angustior*; and Desmoulin's whorl snail *Vertigo moulinsiana*) records were not returned from the environmental data search from the NBDC. The Zol of the proposed development is outside the favourable reference range of QI whorl snails (NPWS, 2019c). The nearest known population of QI Geyer's whorl snail *Vertigo geyeri* & Narrow-mouthed whorl snail *Vertigo angustior* to the proposed development is Pollardstown Fen SAC approximately 37.5km west south west of the proposed development. This site is within the CMU in which the proposed development is located, however, there is no hydrological links between it and the proposed development.

4.4.1.4 QI Plants

No QI plant species - Petalwort (*Petalophyllum ralfsii*), Killarney fern (*Trichomanes speciosum*), Marsh saxifrage (*Saxifraga hirculus*) or Slender naiad (*Najas flexilis*) were recorded during the desk or field studies. The Zol of the proposed development is outside the favourable reference range of QI plant species (NPWS, 2019c).

The nearest known population of a QI plant species (Petalwort) to the proposed development is North Dublin Bay SAC within the same CMU in which the proposed development is located. While there is a hydrological link between the proposed development and the European sites, this species is found in dune slacks and as such will not be impacted by the proposed development.

4.4.1.5 Invasive Alien Species

A number of invasive alien species, scheduled to the EC (Birds and Natural Habitats) Regulations 2011-2015, were noted during the desk search, namely Himalayan knotweed (*Persicaria wallichii*), Bohemian knotweed (*Fallopia bohemica*), Giant hogweed (*Heracleum mantegazzianum*), Indian balsam (*Impatiens glandulifera*), as well as Japanese knotweed (*Fallopia japonica*) and Three-cornered garlic (*Allium triquetrum*), both of which were recorded on field survey. These two species are known from both up and downstream locations of the proposed development. Owing to the nature of the proposed development, there is real likelihood that they could spread into downstream. However, given the nature of the plants, it is unlikely, albeit not implausible (Richards *et al.* 2008) that they would become established in coastal environments.

4.4.2 Special Conservation Interests

The desk study returned records for twenty SCI bird species from the preceding 10 years, within 10 km of the proposed development (**Table 4-2**) and a further 2 more from approximately 20 and 30 years ago - Corncrake and Merlin. However, the field survey recorded the presence of SCI Kingfisher (*Alcedo atthis*) and SCI black-headed Gull (*Chroicocephalus ridibundus*) and Herring Gull (*Larus argentatus*) (overflying) within the Zol of the proposed development. There were no habitats offering nesting or foraging sites for most SCI species (including Kingfisher) within the footprint of the proposed development, although St. Enda's Park may support some roosting/feeding species, particularly during inclement weather. The species that might temporarily be impacted in terms of commuting are Kingfisher and Mallard, whilst Black headed gull will not be impacted by the proposed development by virtue of the open parkland habitat that it utilises being outside the Zol of the proposed works.

Table 4-2: SCI Birds Returned from NBDC Data Search

Species Name	Record Count	Date of Last Record
Arctic Tern (<i>Sterna paradisaea</i>)	2	31/12/2011
Bar-tailed Godwit (<i>Limosa lapponica</i>)	2	31/12/11
Black-headed Gull (<i>Chroicocephalus (Larus) ridibundus</i>)	21	03/12/17
Black-legged Kittiwake (<i>Rissa tridactyla</i>)	1	31/12/11
Black-tailed Godwit (<i>Limosa limosa</i>)	1	31/12/11
Common Coot (<i>Fulica atra</i>)	15	22/04/16
Common Eider (<i>Somateria mollissima</i>)	1	18/05/15
Common Goldeneye (<i>Bucephala clangula</i>)	1	18/05/15
Common Greenshank (<i>Tringa nebularia</i>)	3	31/12/11
Common Kingfisher (<i>Alcedo atthis</i>)	35	03/09/17
Common /Mew Gull (<i>Larus canus</i>)	10	31/12/11
Common Pochard (<i>Aythya ferina</i>)	2	31/12/11
Common Redshank (<i>Tringa totanus</i>)	8	31/12/11
Common Shelduck (<i>Tadorna tadorna</i>)	4	31/12/11
Common Tern (<i>Sterna hirundo</i>)	3	31/12/11
Dunlin (<i>Calidris alpina</i>)	3	31/12/11
Eurasian Curlew (<i>Numenius arquata</i>)	10	04/12/17
Eurasian Oystercatcher (<i>Haematopus ostralegus</i>)	8	28/02/13
Eurasian Teal (<i>Anas crecca</i>)	5	31/12/11
Eurasian Wigeon (<i>Anas penelope</i>)	2	31/12/11
European Golden Plover (<i>Pluvialis apricaria</i>)	4	31/12/11
Gadwall (<i>Anas strepera</i>)	1	31/12/21
Great Cormorant (<i>Phalacrocorax carbo</i>)	12	01/09/17
Greater Scaup (<i>Aythya marila</i>)	1	31/12/11
Grey Heron (<i>Ardea cinerea</i>)	48	03/12/17
Grey Plover (<i>Pluvialis squatarola</i>)	2	31/12/11
Hen Harrier (<i>Circus cyaneus</i>)	1	31/07/72
Herring Gull (<i>Larus argentatus</i>)	43	12/06/16
Lesser Black-backed Gull (<i>Larus fuscus</i>)	9	30/09/16
Light Bellied Brent Goose (<i>Branta bernicla</i> subsp. <i>hrota</i>)	2	31/12/11
Little Egret (<i>Egretta garzetta</i>)	11	03/12/17
Little Grebe (<i>Tachybaptus ruficollis</i>)	21	22/04/16
Mallard (<i>Anas platyrhynchos</i>)	54	29/09/16
Northern Lapwing (<i>Vanellus vanellus</i>)	4	31/12/11
Northern Shoveler (<i>Anas clypeata</i>)	1	31/12/11
Red Knot (<i>Calidris canutus</i>)	2	31/12/11
Red-breasted Merganser (<i>Mergus serrator</i>)	1	31/12/11
Ringed Plover (<i>Charadrius hiaticula</i>)	1	31/12/11
Sanderling (<i>Calidris alba</i>)	2	31/12/11
Tufted Duck (<i>Aythya fuligula</i>)	27	22/04/16

5 APPROPRIATE ASSESSMENT – STAGE 1: SCREENING

5.1 Screening for Appropriate Assessment

Under Section 177U (1) of the Planning Acts, a Screening for AA of the proposed development shall be carried out by the competent authority to assess in view of best scientific knowledge, if that proposed development, individually or in combination with other plans or projects, is likely to have a significant effect(s) on any European sites.

In order to comply with the requirements of Article 6(3) of the EU Habitats Directive, the process of Screening for AA was undertaken for the proposed development. The Screening for AA (RPS, 2019) assessed the potential for the project to result in likely significant effects on any European sites, either alone or in combination with other plans or projects. A standalone Screening for Appropriate Assessment Report has been included in the planning application documentation.

5.2 Potential for Likely Significant Effects

In light of the April 2018 judgement of the Court of Justice of the European Union⁴, mitigation measures may not be considered when deciding whether to 'Screen in' a project plan to the requirement for AA. Potential for LSE resulting from pollution risks to the downstream European sites in Dublin Bay and impacts to QI Otter species informed the recommendation of the Screening for Appropriate Assessment (RPS, 2019).

5.3 Screening for Appropriate Assessment Conclusion

On completion of the AA Screening process, it was concluded that the potential for likely significant effects on three (3) SAC's and two (2) SPA's from the proposed development was present, therefore, the AA process should proceed to the preparation of a Natura Impact Statement (NIS).

The European sites were:

- South Dublin Bay SAC;
- North Dublin Bay SAC;
- Wicklow Mountains SAC;
- North Bull Island SPA; and
- South Dublin Bay and River Tolka Estuary SPA.

Through an assessment of the source-pathway-receptor model, which considered the Zol of effects from the proposed development and the potential in-combination effects with other plans or projects, the following findings were reported:

- The absence of comprehensive mitigation measures to control surface water pollution during construction and operation of the proposed development it is anticipated that silt, hydrocarbons, and/or other contaminants (oils, fuels, concrete etc.) entering the river are being transported downstream to the habitats (QI habitats and habitat supporting QI and SCI species). This has the potential for LSEs to downstream European sites in Dublin Bay.
- In the absence of comprehensive mitigation measures to control surface water pollution during construction and operation of the proposed development it is anticipated that silt, hydrocarbons, and/or

⁴ Case C 323/17, REQUEST for a preliminary ruling under Article 267 TFEU from the High Court (Ireland), made by decision of 10 May 2017, received at the Court on 30 May 2017, in the proceedings People Over Wind, Peter Sweetman v Coillte.

other contaminants (oils, fuels, concrete etc.) may enter the Whitechurch Stream impacting the food source for the QI Otter from Wicklow Mountains.

6 APPROPRIATE ASSESSMENT – STAGE 2 NATURA IMPACT STATEMENT

The requirement to carry out a NIS is reliant on the conclusion arrived at during the Screening process (See **Section 5** and RPS, 2019). In order to determine if the identified source-pathway-receptor linkages may adversely affect the integrity of any European site(s), the following steps are taken:

- Identification of the information required, including the proposed development, linkages to European sites, and description of relevant European sites;
- Examination of the site-specific conservation objectives and attributes of QIs/SCIs of relevant European sites; and
- Prediction of any adverse effect to the integrity of any European site(s), including in-combination effects.

6.1 Required Information

6.1.1 Proposed Development

The proposed development has been described in detail in **Section 2** of this report.

6.1.2 Linkages to European Sites

The connectivity between the proposed development and all European sites has been assessed. The three SAC's (South Dublin Bay and North Dublin Bay, Wicklow Mountains) and the two SPAs (North Bull Island and South Dublin Bay and River Tolka Estuary) have been identified as relevant European sites for this NIS. The source-pathway-receptor model for the proposed development is detailed in **Table 6-1**. Only relevant QIs/SCIs identified are brought forward to the next part of the NIS assessment.

The QIs and SCIs of the five European sites are described, with regard to source-pathway-receptor link(s) within the ZoI of LSE of the proposed development, in **Tables 6.2** and **6.3**. QIs and SCIs with identified source-pathway-receptor link(s) are carried forward for further assessment; while QIs and SCIs with no identified source-pathway-receptor link(s) are not assessed further in this NIS.

Table 6-1: Source-Pathway-receptor Model for the Proposed Development

Phase	Source of Potential Effect	Description of Effect Pathway	Potential Zol of Effect	Potential Relevance of Effect to AA
Construction	Noise, vibration, lighting and human presence during movements of vehicles and staff associated with construction activities.	During construction, noise or other construction-related disturbance could reduce the ability of populations of QI/SCI species to forage, roost or breed.	Varies by species. Generally assessed within 500 m of the proposed development footprint for wintering birds (see Madsen, 1985; Smit & Visser, 1993; and Rees <i>et al.</i> , 2005). However, distance can be significantly lower (e.g. 150 m for otter underground sites (NRA, 2006)), or higher (e.g. hen harriers may take flight when nesting at up to 750 m from disturbance (Whitfield <i>et al.</i> , 2008)).	Relevant. With the exception of Otter, no QI(s)/SCI(s) of relevant European sites were identified within the Zol of noise, vibration, lighting and human presence during the construction of the proposed development. While no Otter habitation features within the 150m ZOI of proposed works have been recorded during surveys, impacts on commuting territory in respect of installation of sheet piling cannot be ruled out.
	Surface water run-off carrying suspended silt or contaminants into local watercourses.	Silt, hydrocarbons, and/or other contaminants (oils, fuels, etc.) may enter nearby watercourses through surface water run-off.	The Zol of effects from contaminated surface water is difficult to accurately estimate as it will depend on numerous factors including the type and concentration of pollutants, assimilative capacity of receiving waters, and time of year (related to water levels). As a precautionary measure, a reasonable worst-case Zol for water pollution from the proposed development site is considered to be the downstream surface water catchment. In this NIS the surface water catchment is defined at the scale of Catchment Management Unit (CMU) as adopted in the River Basin Management Plan (RBMP) for Ireland 2018-2021 (DoHPLG, 2018). The open coastlines, where Coastal Waterbodies begin, are considered to fall within the potential Zol of significant effects.	Relevant. There is potential for pollution from surface water run-off to effect QI(s)/SCI(s) of relevant European sites during the construction of the proposed development.
	Disturbance of invasive species during the construction of the proposed development.	Construction activities could lead to the dispersal of scheduled invasive species either via machinery, materials, clothing or wild animals.	The Zol of effects for spread of terrestrial invasive species is difficult to accurately estimate, as plant fragments may be spread on tyre treads to distant unrelated sites. In relation to water-borne spread of vegetation, the Zol generally is restricted to the surface water Catchment Management Unit.	Not Relevant. Scheduled invasive plants are known to occur within the Zol of construction activities associated with the proposed development, and there is potential for these species to enter the proposed development site via machinery. However, although there is some scientific literature of the potential for Japanese knotweed to become established in coastal habitats, the likelihood of the third scheduled IAPS becoming established in

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				coastal habitats is considered unlikely owing to the pathway and the highly dynamic nature of the marine sites.
	Changes of groundwater quality, yield and/or flow paths associated with earthworks during construction.	Construction activities (e.g. earthworks) could interfere with groundwater quality, yields and/or flow paths, potentially affecting the water quality or habitats dependent on groundwater supply.	The potential Zol of effects from earthworks to ground water quality, flow or/ or yield is difficult to accurately estimate as it will depend on factors including the depth and intrusion of excavations, and time of year (related to water levels). As a precautionary measure, a reasonable worst-case spatial Zol is considered to be 500 m from the point of excavation; which is a precautionary doubling of the 250 m stated as the potential Zol from intrusive excavations to sensitive upland peatland sites (SEPA, 2014).	Not Relevant. There is potential for pollution from groundwater to effect QI(s)/SCI(s) of relevant European sites during the construction of the proposed development.
Operation	Noise, vibration, lighting and human presence during movements of vehicles and staff associated with construction activities.	During Operation, noise or other construction-related disturbance could reduce the ability of populations of QI/ SCI species to forage, roost or breed.	Varies by species. Generally assessed within 500 m of the proposed development footprint for wintering birds (see Madsen, 1985; Smit & Visser, 1993; and Rees <i>et al.</i> , 2005). However, distance can be significantly lower (e.g. 150 m for otter underground sites (NRA, 2006)), or higher (e.g. hen harriers may take flight when nesting at up to 750 m from disturbance (Whitfield <i>et al.</i> , 2008)).	Relevant. Apart from Otter, no QI(s)/SCI(s) of relevant European sites were identified as being impacted within the Zol of noise, vibration, lighting and human presence during the construction of the proposed development. There should be no direct impact on identified otter habitation/resting spots within the Whitechurch Stream as these are upstream of the proposed works. However, it cannot be ruled out that during the operation of the scheme and as a result of the maintenance works, that QI Otter population does not immediately recover.
	Surface water run-off carrying suspended silt or contaminants into local watercourses.	Silt, hydrocarbons, and/or other contaminants (oils, fuels, etc.) may enter nearby watercourses through surface water run-off.	The Zol of effects from contaminated surface water is difficult to accurately estimate as it will depend on numerous factors including the type and concentration of pollutants, assimilative capacity of receiving waters, and time of year (related to water levels). As a precautionary measure, a reasonable worst-case Zol for water pollution from the proposed development site is considered to be the downstream surface water catchment. In this NIS the surface water catchment is defined at the scale of Catchment Management Unit (CMU) as adopted in the River Basin Management	Relevant. There is potential for pollution from surface water run-off to effect QI(s)/SCI(s) of relevant European sites during the operation of the proposed development.

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			Plan (RBMP) for Ireland 2018-2021 (DoHPLG, 2018). The open coastlines, where Coastal Waterbodies begin, are considered to fall outside the potential Zol of significant effects.	
	Disturbance of invasive species during the operation of the proposed development.	Operational activities could lead to the dispersal of scheduled invasive species either via machinery, materials, clothing or wild animals.	The Zol of effects for spread of terrestrial invasive species is difficult to accurately estimate, as plant fragments may be spread on tyre treads to distant unrelated sites. In relation to water-borne spread of vegetation, the Zol generally is restricted to the surface water Catchment Management Unit.	Not Relevant. Although third scheduled invasive plants are known to occur within the Zol of operation activities associated with the proposed development, and there is potential for their spread and establishment downstream as a result of the construction works, it is considered unlikely that they would become established in European sites based on the environmental conditions of the coastal habitats.
	Changes of groundwater quality, yield and/or flow paths associated with maintenance during operation.	Operational activities (e.g. earthworks and infilling) could interfere with groundwater flow paths, potentially affecting the quality or distribution of habitats dependent on groundwater supply.	The potential Zol of effects from earthworks to ground water quality, flow or/and yield is difficult to accurately estimate as it will depend on factors including the depth and intrusion of excavations, and time of year (related to water levels). As a precautionary measure, a reasonable worst-case spatial Zol is considered to be 500 m from the point of excavation; which is a precautionary doubling of the 250 m stated as the potential Zol from intrusive excavations to sensitive upland peatland sites (SEPA, 2014).	Not Relevant. There is potential for pollution from groundwater to effect QI(s)/SCI(s) of relevant European sites during the operation of the proposed development.

Table 6-2: Proposed Development Link(s) with the identified SACs

QI (priority habitat indicated with asterisk)	Relevance to the ZoI of Likely Significant Effects of the Proposed Development	Source-Pathway-Receptor Link(s)
South Dublin Bay SAC		
Mudflats and sandflats not covered by seawater at low tide [1140]	Mudflats and sandflats not covered by seawater at low tide has been mapped and was identified as being in the southern part of Dublin Bay, sheltered behind Great south wall (NPWS 2013a). Furthermore, this is a highly dynamic habitat subject to considerable tidal disturbance. As such, it would not be possible to distinguish a sedimentation impact from the proposed development from those associated with tidal cycles.	No links identified
North Dublin Bay SAC		
Mudflats and sandflats not covered by seawater at low tide [1140]	Mudflats and sandflats not covered by seawater at low tide has been mapped and was identified as located to the front and rear of Bull Island (NPWS 2013b). This is a highly dynamic habitat subject to considerable tidal disturbance. As such, it would not be possible to distinguish a sedimentation impact from the proposed development from those associated with tidal cycles.	No links identified.
Annual vegetation of drift lines [1210]	Annual vegetation of drift lines has been mapped and was identified as being discontinuously located to the seaward side of Bull Island (NPWS 2013b).	Links identified. There is potential, albeit limited for strandline vegetation to be affected by contamination generated during the construction of the proposed development.
<i>Salicornia</i> and other annuals colonising mud and sand [1310]	<i>Salicornia</i> and other annuals colonising mud and sand has been mapped and was identified as being located to the landward side of Bull Island (NPWS 2013b). This is a highly dynamic habitat subject to considerable tidal disturbance. As such, it would not be possible to distinguish a sedimentation impact from the proposed development from those associated with tidal cycles.	Links identified. There is potential, albeit limited for mudflat vegetation to be affected by contamination generated during the construction of the proposed development.
Atlantic salt meadows (<i>Glaucopuccinellietila maritima</i>) [1330]	Atlantic salt meadows (<i>Glaucopuccinellietila maritima</i>) has been mapped and was identified as being located to the landward side of Bull Island (NPWS 2013b).	Links identified. There is potential for Atlantic salt meadows to be affected by contamination generated during the construction of the proposed development.
Mediterranean salt meadows (<i>Juncetalia maritima</i>) [1410]	Mediterranean salt meadows (<i>Juncetalia maritima</i>) has been mapped and was identified as being located to the landward side of Bull Island (NPWS 2013b).	Links identified. There is potential for Mediterranean salt meadows to be affected by contamination generated during the construction of the proposed development.
Embryonic shifting dunes [2110]	Embryonic shifting dunes has been mapped and was identified as being located to the seaward side of Bull Island (NPWS 2013b).	Links identified. There is potential for embryonic dunes to be affected by contamination generated during the construction of the proposed development.

QI (priority habitat indicated with asterisk)	Relevance to the Zol of Likely Significant Effects of the Proposed Development	Source-Pathway-Receptor Link(s)
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]	Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) has been mapped and was identified as being located to the seaward side of Bull Island (NPWS 2013b).	Links identified. There is potential for shifting dunes to be affected by contamination generated during the construction of the proposed development.
Fixed coastal dunes with herbaceous vegetation (grey dunes) * [2130]	Fixed coastal dunes with herbaceous vegetation (grey dunes) * has been mapped and was identified as being located to the central parts of Bull Island (NPWS 2013b). Owing to the terrestrial nature of the habitat, it is unlikely that it would be impacted by the proposed development.	No links identified
Humid dune slacks [2190]	Humid dune slacks has been mapped and was identified as being located to the central parts of Bull Island (NPWS 2013b). Owing to the terrestrial nature of the habitat, it is unlikely that it would be impacted by the proposed development.	No links identified
Petalwort (<i>Petalophyllum ralfsii</i>) [1395]	The petalwort, by virtue of its preference for disturbed ground within dune hollows and slacks (NPWS 2013b) is unlikely that it would be impacted by the proposed development.	No links identified
Wicklow Mountains SAC		
Otter (<i>Lutra lutra</i>) [1355]	The known commuting areas of the species has been mapped (NPWS 2017). Although not directly hydrologically connected to the SAC for which Otter is designated for, an active holt was identified upstream of the proposed development. The forage and roaming territory includes downstream to the Owendoher River and likely further afield.	Links identified. There is potential for Otter to be affected through disturbance to and/or interference with its' commuting territory during the phased construction works of the proposed development.
Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> [3130]	The habitat has been mapped as occurring at discrete locations (NPWS 2017). Owing to the distribution and lack of connectivity of the habitat, it is unlikely that it would be impacted by the proposed development.	No links identified
Natural dystrophic lakes and ponds [3160]	The habitat has been mapped as occurring at discrete locations (NPWS 2017). Owing to the distribution and lack of connectivity of the habitat, it is unlikely that it would be impacted by the proposed development.	No links identified
Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010]	The extent of this habitat is not mapped (NPWS 2017). However, owing to the upland nature of the habitat, it is unlikely that it would be impacted by the proposed development.	No links identified
Alpine and Boreal heaths [4060]	The extent of this habitat is not mapped (NPWS 2017). However, owing to the upland nature of the	No links identified

QI (priority habitat indicated with asterisk)	Relevance to the Zol of Likely Significant Effects of the Proposed Development	Source-Pathway-Receptor Link(s)
	habitat, it is unlikely that it would be impacted by the proposed development.	
Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6103]	The habitat has been mapped as occurring at discrete locations typical on old mine spoil (NPWS 2017). Owing to the distribution and lack of connectivity of the habitat, it is unlikely that it would be impacted by the proposed development.	No links identified
Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230]	The extent of this habitat is not mapped (NPWS 2017). However, owing to the upland nature of the habitat, it is unlikely that it would be impacted by the proposed development.	No links identified
Blanket bogs (* if active bog) [7130]	The extent of this habitat is not mapped (NPWS 2017). However, owing to the upland nature of the habitat, it is unlikely that it would be impacted by the proposed development.	No links identified
Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8110]	The extent of this habitat is not mapped (NPWS 2017). However, owing to the upland nature of the habitat, it is unlikely that it would be impacted by the proposed development.	No links identified
Calcareous rocky slopes with chasmophytic vegetation [8210]	The extent of this habitat is not mapped (NPWS 2017). However, owing to the upland nature of the habitat, it is unlikely that it would be impacted by the proposed development.	No links identified
Siliceous rocky slopes with chasmophytic vegetation [8220]	The extent of this habitat is not mapped (NPWS 2017). However, owing to the upland nature of the habitat, it is unlikely that it would be impacted by the proposed development.	No links identified
Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]	The habitat has been mapped as occurring at locations at a considerable distance from the proposed development (NPWS 2017). Owing to the distribution and lack of connectivity of the habitat, it is unlikely that it would be impacted by the proposed development.	No links identified

Table 6-3: Proposed Development Link(s) with the Identified SPAs

SCI	Relevance to the Zol of Likely Significant Effects of the Proposed Development	Key Source-Pathway-Receptor Link(s)
North Bull Island SPA		
Light Bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Shelduck (<i>Tadorna tadorna</i>) [A048]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Teal (<i>Anas crecca</i>) [A052]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Pintail (<i>Anas acuta</i>) [A054]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Shoveler (<i>Anas clypeata</i>) [A056]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Oystercatcher (<i>Haematopus ostralegus</i>) [A130]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Golden Plover (<i>Pluvialis apricaria</i>) [A140]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Grey Plover (<i>Pluvialis squatarola</i>) [A141]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Knot (<i>Calidris canutus</i>) [A143]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Sanderling (<i>Calidris alba</i>) [A144]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Dunlin (<i>Calidris alpina</i>) [A149]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Black-tailed Godwit (<i>Limosa limosa</i>) [A156]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Curlew (<i>Numenius arquata</i>) [A160]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not	No links identified

SCI	Relevance to the Zol of Likely Significant Effects of the Proposed Development	Key Source-Pathway-Receptor Link(s)
	likely usage of proximal habitats within the Zol of the proposed development have been identified.	
Redshank (<i>Tringa totanus</i>) [A162]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Turnstone (<i>Arenaria interpres</i>) [A169]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). The bird was noted from St Enda's Park and as such could be subject to temporary construction disturbance. But as such there will be no loss nesting habitat from the SPA.	Link Identified
Wetlands & Waterbirds [A999]	No specific wetland habitat is mapped. The NPWS have mapped the SPA territory and do identify subites within the 2012 roosting surveys. There is potential for contaminants generated during the proposed development or IAPS to be carried into local surface waters, and enter the SPA, thereby potentially reducing habitat quality.	Link Identified
South Dublin Bay and River Tolka Estuary SPA		
Light Bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]	Roosting locations for the SCI species have been mapped in 2012 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Knot (<i>Calidris canutus</i>) [A143]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Sanderling (<i>Calidris alba</i>) [A144]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Redshank (<i>Tringa totanus</i>) [A162]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Roseate Tern (<i>Sterna Dougallii</i>) [A192]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Roseate Tern (<i>Sterna Dougallii</i>) [A192]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Common Tern (<i>Sterna hirundo</i>) [A193]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Arctic Tern (<i>Sterna paradisaea</i>) [A194]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not	No links identified

SCI	Relevance to the Zol of Likely Significant Effects of the Proposed Development	Key Source-Pathway-Receptor Link(s)
	likely usage of proximal habitats within the Zol of the proposed development have been identified.	
Oystercatcher (<i>Haematopus ostralegus</i>) [A130]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Ringed Plover (<i>Charadrius hiaticulaa</i>) [A137]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Golden Plover (<i>Pluvialis apricaria</i>) [A140]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Grey Plover (<i>Pluvialis squatarola</i>) [A141]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Dunlin (<i>Calidris alpina</i>) [A149]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). No roosting habitat not likely usage of proximal habitats within the Zol of the proposed development have been identified.	No links identified
Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]	Roosting locations for the SCI species have been mapped in 2011 (NPWS 2104). The bird was noted from St Enda's Park and as such could be subject to temporary construction disturbance. But as such there will be no loss nesting habitat from the SPA.	Link Identified
Wetlands & Waterbirds [A999]	No specific wetland habitat is mapped. The NPWS have mapped the SPA territory and do identify subsites within the 2012 roosting surveys. There is potential for contaminants generated during the proposed development or IAPS to be carried into local surface waters, and enter the SPA, thereby potentially reducing habitat quality.	Link Identified

Based on the findings in **Tables 6-2** and **6-3**, South Dublin Bay SAC is not considered further in the NIS process as it can be shown that there is no link between the proposed development and the single QI for the SAC. Furthermore, a number of QI habitats and the single species from North Dublin Bay SAC are likewise removed from further consideration as no link exists between the proposed development and the QI for the SAC. In terms of Wicklow Mountains SAC, the only QI for which a potential link exists, relates to otter which is a mammal that can range beyond the boundary of the designated site.

In respect of North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA, there is no linkage between the proposed development and the majority of the SCI species of both of these coastal SPA's by virtue of their habitat requirements, and their absence from the Zol of the proposed development.

The NPWS Natura 2000 data form, dated September 2017, provides status assessments for QIs of North Dublin Bay SAC (NPWS 2017e) and Wicklow Mountains SAC (NPWS 2017d). For each relevant QI of the identified SAC's, the site-level and national conservation status, and the site-level and national threats are detailed in **Table 6-4**.

Table 6-4: Conservation Status and Threats to Relevant QI's of North Dublin Bay SAC and Wicklow Mountains SAC

Relevant QI	Site-Level Conservation Status (NPWS, 2017b)	National Conservation Status (and Trend) (NPWS, 2019b)	Primary Site-level Threats from the Proposed Development (Professional Judgement Applied to NPWS, 2017b)	Other National Threats from NPWS (2019 a,b)
North Dublin Bay SAC				
Annual vegetation of drift lines [1210]	B	Favourable - Stable	Species Composition change (Succession) K02.01 Invasive non-native species (I01)	Reduction or loss of specific habitat features (J03.01) Changes in Abiotic conditions (M01)
Atlantic salt meadows (<i>Glauco-Puccinellietila maritima</i>) [1330]	B	Favourable - Stable	Species Composition change (Succession) K02.01	Changes in Abiotic conditions (M01)
Mediterranean salt meadows (<i>Juncetalia maritima</i>) [1410]	B	Favourable - Stable	Species Composition change (Succession) K02.01	Changes in Abiotic conditions (M01)
Embryonic shifting dunes [2110]	A	Favourable - Stable	Species Composition change (Succession) K02.01 Invasive non-native species (I01)	Reduction or loss of specific habitat features (J03.01) Changes in Abiotic conditions (M01)
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]	B	Favourable - Stable	Species Composition change (Succession) K02.01 Invasive non-native species (I01)	Reduction or loss of specific habitat features (J03.01) Changes in Abiotic conditions (M01)
Wicklow Mountains SAC				
<i>Lutra lutra</i> (Otter) [1355]	No status	Favourable - Improving	Collapse of terrain, landslide (L05), Tree surgery, felling for public safety, removal of roadside trees (G05.06),	Roads D01.02, Pollution to surface waters H01

The NPWS Natura 2000 data form, dated September 2017, provides status assessments for QIs of the North Bull Island SPA (NPWS, 2017c), South Dublin Bay and River Tolka Estuary SPA (NPWS, 2017b). For each relevant SCI of the identified SPAs, the site-level conservation status, short and long-term population trends, and the site-level and international threats are detailed in **Table 6-5**.

Table 6-5: Conservation Status and Threats to Relevant SCIs of North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA

Relevant SCI	Site-Level Conservation Status (NPWS, 2014)	Long term site population trend and population change based on 2 five-year means (NPWS, 2014)	Primary Site-level Threats from the Proposed Development (Professional Judgement Applied to NPWS, 2017b)	Other threats identified by Birdlife International ⁵
North Bull Island SPA				
Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]	Unfavourable	Decrease (-33)	Degradation of downstream Habitat and loss of roost potential	Avian influenza & Botulism. Coastal oil spills & Contamination
Wetlands & Waterbirds [A999]	N/A	N/A	Loss/Degradation of habitat and Spread of IAPS	Agricultural intensification, wetland drainage, flood control, afforestation, land reclamation, industrial development, encroachment of <i>Spartina</i> spp. on mudflats, improvement of marginal grasslands, disturbance on intertidal mudflats from construction work.
South Dublin Bay and River Tolka Estuary SPA				
Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]	Unfavourable	Decrease (-33)	Degradation of downstream Habitat and loss of roost potential	Avian influenza & Botulism. Coastal oil spills & Contamination
Wetlands & Waterbirds [A999]	N/A	N/A	Loss/Degradation of habitat and Spread of IAPS	Agricultural intensification, wetland drainage, flood control, afforestation, land reclamation, industrial development, encroachment of <i>Spartina</i> spp. on mudflats, improvement of marginal grasslands, disturbance on intertidal mudflats from construction work.

⁵ BirdLife International Data Zone. Available online at <http://datazone.birdlife.org/species/search>. Accessed October 2019. Reconfirmed March 2020

6.1.3 Brief Description of European Sites within the Zol that are further assessed

There are four European sites within the Zol of the proposed development, namely North Dublin Bay SAC and Wicklow Mountains SAC, and the North Bull Island and South Dublin Bay and River Tolka Estuary SPA. A pollution effect pathway was identified between the proposed development and the three downstream European sites, as well as *ex situ* disturbance to QI Otter in respect of Wicklow Mountains SAC.

No effect pathways have been identified between the proposed development and other European sites, based on the Zol's identified in **Section 3.6.2**, and the known or potential distribution of mobile QI/SCI features identified in **Section 4**.

6.1.3.1 North Dublin Bay SAC

The SAC is centred on the inner part of Dublin Bay, extending northwards from the Bull wall and includes Bull Island. The island is a sandy spit that formed after engineering works in Dublin port and has over time seen increased. The site holds good examples of nine coastal habitats both sand-dune and saltmarsh that are listed on Annex I of the E.U. Habitats Directive; one of which is a priority habitat. The terrestrial part of the SAC supports a number of rare and scarce plants including some which are legally protected (e.g. *Petalophyllum ralfsii*), as well as some of the invertebrates are of national importance. Given the range of habitats, the SAC which overlaps with SPA and supports internationally important numbers of some wintering bird species.

6.1.3.2 Wicklow Mountains SAC

Covering and extensive part of Wicklow uplands and associated valleys, it is characterised by a complex mosaic that encompasses a considerable number of Annexed habitats and species of interest when the overlapping SPA is included, as well as a number of rare or protected species. Of key importance in terms of the proposed development is the presence of QI otter (*Lutra lutra*) whose territory likely extends beyond the SAC boundary.

6.1.3.3 North Bull Island SPA

Like North Dublin Bay SAC, this SPA occupies much of the same territory. The presence of extensive intertidal flats could with saltmarsh and inner lagoon make this an attractive site for birds. Despite its proximity to the Capital and the pressure and disturbance of considerable recreational activity, this estuarine complex, it is an important site for wintering wildfowl. It is of international importance for a number of wintering birds, but also supports nationally important numbers of other birds and the regular presence of a number of Annex I bird species.

6.1.3.4 South Dublin Bay and River Tolka Estuary SPA

This is an extensive estuarine complex that covers much of Dublin Bay, both the southern sections of the bay along with Booterstown marsh and the discharge of the Tolka River to the immediate south of Bull Island (North Bull Islands SPA). The SPA includes extensive areas of intertidal flats. For this reason, the site is of considerable ornithological importance given its extent, diversity of habitat and availability of feeding resource. It supports an internationally important population of Light-bellied Brent Goose and nationally important populations of a further nine wintering species. Furthermore, the site supports a nationally important colony of breeding Common Tern and is an internationally important passage/staging site for three tern species.

6.2 Conservation Objectives

6.2.1 North Dublin Bay SAC

Site specific Conservation Objectives for North Dublin Bay SAC are available (NPWS, 2013b). **Table 6-6** identifies the Conservation Objective attributes which could be adversely affected by the proposed development, for 'relevant' QIs scoped into the assessment.

Table 6-6: Conservation Objective Attributes for North Dublin Bay SAC

Relevant QI	Site Specific Conservation Objective (NPWS)	Site Specific Attributes Potentially affected by the Proposed Development
Annual vegetation of drift lines [1210]	To restore the favourable conservation condition	Habitat area Vegetation composition – negative indicator species
Atlantic salt meadows (<i>Glaucopuccinellietila maritima</i>) [1330]	To maintain the favourable conservation condition	Habitat area Vegetation composition – negative indicator species
Mediterranean salt meadows (<i>Juncetalia maritima</i>) [1410]	To maintain the favourable conservation condition	Habitat area Vegetation composition – negative indicator species
Embryonic shifting dunes [2110]	To restore the favourable conservation condition	Habitat area Vegetation composition – negative indicator species
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]	To restore the favourable conservation condition	Habitat area Vegetation composition – negative indicator species

6.2.2 Wicklow Mountains SAC

Site specific Conservation Objectives for Wicklow Mountains SAC are available (NPWS, 2017). **Table 6-7** identifies the Conservation Objective attributes which could be adversely affected by the proposed development, for 'relevant' SCIs scoped into the assessment.

Table 6-7: Conservation Objective Attributes for Relevant SAC

Relevant QI	Site Specific Conservation Objective (NPWS)	Site Specific Attributes Potentially affected by the Proposed Development
Otter (<i>Lutra lutra</i>)	To maintain the favourable conservation condition of Otter in Wicklow Mountains SAC	Distribution Extent of terrestrial habitat Fish biomass available Barriers to connectivity

6.2.3 North Bull Island SPA

Site specific Conservation Objectives for North Bull Island SPA are available (NPWS, 2015a). **Table 6-8** identifies the Conservation Objective attributes which could be adversely affected by the proposed development, for 'relevant' SCIs scoped into the assessment.

Table 6-8: Conservation Objective Attributes for Relevant SPA

Relevant SCI	Site Specific Conservation Objective (NPWS, 2015a)	Site-Specific Attributes Potentially affected by the Proposed Development
Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]	To maintain or restore the favourable conservation condition of the bird species	Distribution
Wetlands & Waterbirds [A999]	To maintain the favourable conservation condition of the wetland habitat in North Bull Island SPA as a resource for regularly occurring migratory waterbirds that utilise it.	Habitat Area

6.2.4 South Dublin Bay and River Tolka Estuary SPA

Site specific Conservation Objectives for South Dublin Bay and River Tolka Estuary SPA are available (NPWS, 2015b). **Table 6-9** identifies the Conservation Objective attributes which could be adversely affected by the proposed development, for 'relevant' SCIs scoped into the assessment.

Table 6-9: Conservation Objective Attributes for Relevant SPA

Relevant SCI	Site Specific Conservation Objective (NPWS, 2015b)	Site-Specific Attributes Potentially affected by the Proposed Development
Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]	To maintain the favourable conservation condition of the bird species	Distribution
Wetlands & Waterbirds [A999]	To maintain the favourable conservation condition of the wetland habitat in South Dublin Bay and River Tolka Estuary SPA as a resource for regularly occurring migratory waterbirds that utilise it.	Habitat Area

6.3 Predicted Effects

The prediction of potential effects from the proposed development (alone) to the integrity of European sites is presented in this Section. Cumulative effects from the proposed development in-combination with other plans or projects are presented in **Section 6.3.5**.

6.3.1 North Dublin Bay SAC

The prediction of effects from the proposed development to the integrity (based on QIs) of the North Dublin Bay SAC is set out in **Table 6-10**.

Table 6-10: Prediction of Effects on Site Integrity (QIs) in North Dublin Bay SAC during Construction and Operation

Relevant QI	Effect Pathway	Relevant Site-Level Threat	Predicted Adverse Effect(s) Triggers to relevant QI
Annual vegetation of drift lines [1210]	Surface water pollution Dispersal of scheduled invasive Species	Species composition change (succession) (K02.01) and invasive non-native species (I01)	Habitat area: None predicted as proposed development avoids activity within the habitat. Vegetation composition:

Relevant QI	Effect Pathway	Relevant Site-Level Threat	Predicted Adverse Effect(s) Triggers to relevant QI
			Predicted impacts resulting from surface water pollution.
Atlantic saltmeadows (Glaucopuccinelliatia) [1330]	Surface water pollution Dispersal of scheduled invasive Species	Species composition change (succession) (K02.01) and invasive non-native species (I01)	Habitat area: None predicted as proposed development avoids activity within the habitat. Vegetation composition: Predicted impacts resulting from surface water pollution.
Mediterranean salt meadows (Juncetalia maritimi) [1410]	Surface water pollution Dispersal of scheduled invasive Species	Species composition change (succession) (K02.01) and invasive non-native species (I01)	Habitat area: None predicted as proposed development avoids activity within the habitat. Vegetation composition: Predicted impacts resulting from surface water pollution.
Embryonic shifting dunes [2110]	Surface water pollution Dispersal of scheduled invasive Species	Species composition change (succession) (K02.01) and invasive non-native species (I01)	Habitat area: None predicted as proposed development avoids activity within the habitat. Vegetation composition: Predicted impacts resulting from surface water pollution.
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]	Surface water pollution Dispersal of scheduled invasive Species	Species composition change (succession) (K02.01) and invasive non-native species (I01)	Habitat area: None predicted as proposed development avoids activity within the habitat. Vegetation composition: Predicted impacts resulting from surface water pollution.

6.3.2 Wicklow Mountains SAC

The prediction of effects from the proposed development to the integrity (based on QIs) of the Wicklow Mountains SAC are set out in **Table 6-11**.

Table 6-11: Prediction of Effects on Site Integrity (QIs) in Wicklow Mountains SAC during Construction and Operation

Relevant QI	Effect Pathway	Relevant Site-Level Threat	Predicted Adverse Effect(s) Triggers to relevant QI
Otter (<i>Lutra lutra</i>) [1355]	Disturbance to habitat and 10m metre riparian buffer and commuting territory Surface water pollution Dispersal of scheduled invasive Species	Species composition change (succession) (K02.01)	Distribution: No change in habitation predicted. Possible disturbance to or temporary reduction in territory extent. Fish biomass available: pollution/sedimentation event resulting in mortality/reduction in food resource Barriers to connectivity: temporary obstruction or/reduction of commuting routes during proposed works.

6.3.3 North Bull Island SPA

The prediction of effects from the proposed development to the integrity (based on SCIs) of the North Bull Island SPA are set out in **Table 6-12**.

Table 6-12: Prediction of Effects on Site Integrity (QIs) in North Bull Island SPA during Construction and Operation

Relevant SCI	Effect Pathway	Relevant Site-Level Threat	Predicted Adverse Effect(s) Triggers to relevant SCI
Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]	Surface water pollution Dispersal of scheduled invasive Species	Discharges and Loss/change to habitat Invasive non-native species	Distribution: None predicted as proposed development avoids activity within <i>ex-situ</i> habitat. Temporary negligible disturbance of SCI species outside core forage area.
Wetlands & Waterbirds [A999]	Surface water pollution Dispersal of scheduled invasive Species	Discharges and Loss/change to habitat invasive non-native species	Extent: No direct impact predicted as proposed development avoids activity within the habitat. However, predicted impacts resulting from surface water pollution.

6.3.4 South Dublin Bay and River Tolka Estuary SPA

The prediction of effects from the proposed development to the integrity (based on SCIs) of the South Dublin Bay and River Tolka Estuary SPA is set out in **Table 6-13**.

Table 6-13: Prediction of Effects on Site Integrity (QIs) in South Dublin Bay and River Tolka Estuary SPA during Construction and Operation

Relevant SCI	Effect Pathway	Relevant Site-Level Threat	Predicted Adverse Effect(s) Triggers to relevant SCI
Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]	Surface water pollution Dispersal of scheduled invasive Species	Discharges and Loss/change to habitat Invasive non-native species	Distribution: None predicted as proposed development avoids activity within <i>ex-situ</i> habitat. Temporary negligible disturbance of SCI species outside core forage area
Wetlands & Waterbirds [A999]	Surface water pollution Dispersal of scheduled invasive Species	Discharges and Loss/change to habitat invasive non-native species	Extent: No direct impact predicted as proposed development avoids activity within the habitat. However, predicted impacts resulting from surface water pollution.

6.3.5 In Combination Effects

Legislation, guidance and case law (See **Section 1.1** and **Section 3.1**) requires that in-combination effects with other plans or projects are considered. On this basis, a range of other plans and projects were considered in terms of their potential to have in-combination effects with the proposed development. The assessment of in-combination effects has regard for developments potentially affecting the downstream European sites, with which a potential pathway has been identified. The Natura Standard Data Form (NPWS Website) for the four sites identify the most important impacts (high and medium) and activities with high effect on the various European sites, not all of which would be pertinent in respect of the current project as:

North Dublin Bay SAC⁶

- E03 - Discharges
- E01 - Urbanised areas, human habitation
- E02 - Industrial or commercial areas
- G01.02 - walking, horse-riding and non-motorised vehicles
- K03.06 - antagonism with domestic animals
- H01.09 - diffuse pollution to surface waters due to other sources not listed
- J01.01 - burning down
- A04 - grazing
- G01.01 - nautical sports
- H01.03 - other point source pollution to surface water
- F02.03 - Leisure fishing
- G02.01 - golf course
- I01 - invasive non-native species

Wicklow Mountains SAC⁷

- G01.03.02 - off-road motorized driving
- E03.01 - disposal of household / recreational facility waste
- K04.05 - damage by herbivores (including game species)
- B06 - grazing in forests/ woodland
- G01.04 - mountaineering, rock climbing, speleology
- G05.07 - missing or wrongly directed conservation measures
- G01.02 - walking, horse-riding and non-motorised vehicles
- I01 - invasive non-native species
- K01.01 - Erosion
- A04 - grazing
- G02.09 - wildlife watching
- G05.01 - Trampling, overuse
- A05.02 - stock feeding
- E01 - Urbanised areas, human habitation
- F03 - Hunting and collection of wild animals (terrestrial)
- L05 - collapse of terrain, landslide

⁶ <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF000206.pdf>

⁷ <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF002122.pdf>

- F04.02 - collection (fungi, lichen, berries etc.)
- G05.04 - Vandalism
- G01 - Outdoor sports and leisure activities, recreational activities
- G05.06 - tree surgery, felling for public safety, removal of roadside trees
- G04.01 - Military manoeuvres
- J01.01 - burning down
- D01.01 - paths, tracks, cycling tracks
- C01.03 - Peat extraction
- F03.02.02 - taking from nest (falcons)

North Bull Island SPA⁸

- G01.02 - walking, horse-riding and non-motorised vehicles
- D01.05 - bridge, viaduct
- E03 - Discharges
- G01.01 - nautical sports
- E03 - Discharges
- D03.02 - Shipping lanes
- E02 - Industrial or commercial areas
- D01.02 - roads, motorways
- G02.01 - golf course
- E01.01 - continuous urbanisation

South Dublin Bay and River Tolka Estuary SPA⁹

- E02 - Industrial or commercial areas
- E01 - Urbanised areas, human habitation
- J02.01.02 - reclamation of land from sea, estuary or marsh
- E03 - Discharges
- G01.02 - walking, horse-riding and non-motorised vehicles
- D01.02 - roads, motorways
- F02.03 - Leisure fishing
- K02.03 - eutrophication (natural)
- G01.01 - nautical sports
- F02.03.01 - bait digging / collection

⁸ <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF004006.pdf>

⁹ <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF004024.pdf>

6.3.5.1 Plans

6.3.5.1.1 National Development Plan 2018-2027

National Strategic Outcome 8 “Transition to Low Carbon and Climate Resilient Society” of the National Development Plan 2018-2027 (Government of Ireland, 2018) – recognises the appropriateness of the objective in the context of spatial policy and its influence on where we live. It provides high level details on the requirement to support major flood relief projects. It does not set out any National Strategic Outcomes and no specific mention of the current project is provided, which are deemed to create in-combination effects with the proposed development.

6.3.5.1.2 South Dublin County Development Plan 2016-2022

The County Development Plan sets out several relevant biodiversity objectives, including:

- HCL12 Objective 1 – To prevent development that would adversely affect the integrity of any Natura 2000 site located within and immediately adjacent to the County and promote favourable conservation status of habitats and protected species including those listed under the Birds Directives, the Wildlife Acts and the Habitats Directive.
- HCL12 Objective 2 – To ensure that project that give rise to significant direct, indirect or secondary impacts on Natura 2000 sites, either individually or in combination with other plans or projects, will not be permitted unless the following is robustly demonstrated in accordance with Article 6(4) of the Habitats Directive and S177AA of the Planning and Development Act (2000-2010) or any superseding legislation:
 - There are no less damaging alternative solutions available; and
 - There are imperative reasons of overriding public interest (as defined in the Habitats Directive) requiring the project to proceed; and
 - Adequate compensatory measures have been identified that can be put in place.
- HCL15 Objective 1 - To ensure that development does not have a significant adverse impact on rare and threatened species, including those protected under the Wildlife Acts 1976 and 2000, the Birds Directive 1979 and the Habitats Directive 1992.
- HCL15 Objective 2 - To ensure that, where evidence of species that are protected under the Wildlife Acts 1976 and 2000, the Birds Directive 1979 and the Habitats Directive 1992 exists, appropriate avoidance and mitigation measures are incorporated into development proposals as part of any ecological impact assessment.

6.3.5.1.3 River Basin Management Plan 2018-2021

The River Basin Management Plan for Ireland 2018 – 2021 (DoHPLG, 2018) sets out the condition of Irish waters and a summary of status for all monitored waters in the 2013 – 2015 period, including a description of the changes since 2007 – 2009. The objectives of the RBMP are to:

- Prevent deterioration;
- Restore good status;
- Reduce chemical pollution; and
- Achieve water related protected areas objectives

Nationally, both monitored river water bodies and lakes at high or good ecological status, appear to have declined by 3% since 2007 – 2009; nevertheless, this figure does not reflect a significant number of improvements and dis-improvements across these waters since 2009. Provisional figures from the EPA suggest that approximately 900 river water bodies and lakes have either improved or dis-improved. In addition, the previously observed long term trend of decline in the number of high-status river sites has continued. Chapter 5 of the RBMP presents results of the catchment characterisation process, which

identifies the significant pressures on each water body that is *At Risk* of not meeting the environmental objectives of the WFD. Importantly, the assessment includes a review of trends over time to see if conditions were likely to remain stable, improve or deteriorate by 2021. This work was presented in the RBMP for 81% of water bodies nationally, which had been characterised at the time. 1,517 water bodies were classed *At Risk* out of a total of 4,775, or 32%. An assessment of significant environmental pressures found that agriculture was the most significant pressure in 729 number river and lake water bodies that are *At Risk*. Urban wastewater, hydromorphology and forestry were also significant pressures amongst others.

6.3.5.1.4 Water Quality

The Water Framework Directive (WFD) 2000/60/EC provides a framework for the protection and improvement of rivers, lakes, marine and ground waters in addition to water-dependent habitats. The aim of the WFD is to prevent any deterioration in the existing status of water quality, including the protection of good and high-water quality status where it exists. The second cycle River Basin Management Plan, covering the period 2018 – 2021, was published in April 2018. The Plan sets out a proposed framework for the protection and improvement of Ireland's water environment in line with Water Framework Directive objectives. It was determined that the multiple River Basin District approach used in the 2009-2015 Management Plan was not as effective as expected so the 2018-2021 Management Plan has defined a single River Basin District (DoHPLG, 2018). This national strategy outlined all the actions required to improve the water quality, with county councils and Irish Water playing an important role in the implementation of the plan. There are binding obligations on all Irish local authorities including South Dublin County Council to achieve good status of surface waters, under the terms of the EU Water Framework Directive 2000/60/EC, and in related policies in the SDCC County Development Plans, e.g. Surface and groundwater Objectives such as IE2 Objectives 1- 11 which reinforces the Council Policy

"It is the policy of the Council to manage surface water and to protect and enhance ground and surface water quality to meet the requirements of the EU Water Framework Directive".

6.3.5.1.5 Flooding

The Dodder CFRAMS study was a pilot study that covered all of the Dodder catchment. It was subject to Strategic Environmental Assessment (RPS 2014)¹⁰. The study arose out of a number of flooding incidents, most notably during the 1986 'Hurricane Charlie' fluvial event, again in 2002 in conjunction with a tidal event, and in 2011 during widespread flooding resulting from heavy rainfall. During these events, extensive damage was caused in the lower reaches of the catchment where the river flows through south Dublin to the confluence with the Liffey Estuary, a nutrient sensitive area under the Urban Wastewater Treatment Directive (91/271/EEC). The Dodder CFRAMS made a number of recommendations and the SEA statement identified that these proposed flood risk management options could give rise to a number of positive environmental effects, but also negative environmental effects that could not be avoided. It further noted that the effects were likely to be limited in their scope and duration Project specific Appropriate Assessment at a scheme level was also recommended.

The current Whitechurch Stream Flood Alleviation Scheme is an offshoot of the earlier CFRAMS study, and as such is the subject of the current Appropriate Assessment.

6.3.5.2 Projects

A search was conducted of planning applications (projects) within the vicinity of the proposed development, using the South Dublin County Council planning portal map viewer¹¹ and the Department of Housing, Planning and Local Government EIA portal map viewer¹². The search was limited to the five-year period

¹⁰ RPS (2014) Dodder Catchment Flood Risk Management Plan – SEA Statement.

¹¹ Available online <https://www.sdcc.ie/en/services/planning/planning-applications/>. Accessed 2019. Re-accessed March 2020

¹² Available online at <http://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1>. Accessed November 2019. Re-accessed March 2020.

preceding the date of issue of this report and excluded retention applications (i.e. typically local-scale residential or commercial developments where an impact has already occurred), incomplete, withdrawn, and refused applications. The relevant projects with potentially for in-combination adverse effect on the integrity of European sites, are detailed in **Table 6-14**.

A search of An Bord Pleanála's website was completed to identify any relevant applications, including Strategic Infrastructure Development (SID) and Strategic Housing Development (SHD) in the past three years, or in close proximity to the proposed development. No relevant projects were identified that had potential for in-combination adverse effect on the integrity of European sites.

A number of planning applications in proximity to the proposed development have the potential to result in surface water and/or groundwater pollution. The bulk of the projects are consented and include measures to ensure pollution to surface water or groundwater does not occur. Many of the small-scale projects in the previous five years have been carried out.

There is a project, Reference SD09A/055 & PL06S.235823, for a number of which subsequent amendments to an original consent have been sought and refused. Taking a conservative approach, and in the absence of final detail of management of construction and operational management of the earlier consented development at the Capri site, there is a possibility for in-combination pollution to surface water or groundwater to occur, by virtue of its suggested proximity to the Whitechurch Stream (10m), particularly if the consented development were to be undertaken at the same time as the proposed flood alleviation scheme.

Furthermore, for the project SD20A/0016 also at the Capri site, its application contains a proposal for the control of identified invasive alien plant species but in the absence of a final management regime for the invasive plant species, there is a possibility for in-combination impacts. This development also details the 'replacement of existing bridge' as part of the proposed works and as this would take place along Whitechurch Stream there is potential for in-combination impacts. However, where pollution prevention measures are outlined regarding this structural alteration, in-combination impacts can be deemed as null.

Another development SD16A/0247 was consented in April 2017 but has not yet commenced. It occurs along and atop the culverted sections of the river at of the former Maxol petrol station on Whitechurch Road.

6.3.5.3 In combination Conclusion

While it is recognised that the above mentioned projects have the potential to result in combination impacts if carried out simultaneously and by virtue of the absence of detail on the management of invasive alien plant species and on construction and environmental protection measures and the measures provided for in respect of the Whitechurch Stream FAS, no in-combination pathways exist. However, it should be noted, that the OPW in light of any works associated with the proposed development should be cognisant of any future Invasive Species Management Plans prepared for Capri.

No other pathways have been identified by which any plan or project could have a likely significant in-combination effect on any of the European sites. It is then concluded that there is no potential for cumulative or in-combination impacts.

There is no potential for significant likely cumulative impacts once the proposed development is in operation at the subject site.

Residual effects of the proposed development, following mitigation measures, are discussed in **Section 7.5**.

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Table 6-14: Planning Search Results from the County Planning and EIA Portal Maps

Planning Application Reference Number	Project/Applicant Name and Proposed Location	Brief Development Description	Application Status/ Outcome	Approximate Distance and Direction from Proposed Development	Date Planning Application Granted
SD158/0013	Cycling and Walking Scheme. South Dublin County Council, Grange Road	The project involves the construction and upgrading of a walking and cycle scheme and public realm improvement scheme on Grange Road (R822). The scheme route runs parallel to proposed development at an approximate distance of 160m. The Whitechurch Stream provides a hydrological pathway to downstream European sites via the Dodder river. South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA are located approximately 13km downstream, however the Grange Road proposed development is separated from the Whitechurch Stream by residential development and road networks buffering any potential pollutants.	Closed to submissions 074/12/2015	On Grange Road, alongside the eastern boundary of St Enda's Park	Not given
Various	Housing Upgrades. Various applicants	There are a large number of residential planning applications currently in the planning system throughout the South Dublin County Council administrative area. Without supporting available documents (e.g. AA screenings, NIS or EIAR) it is difficult to identify specific implications to groundwater and surface water; however, such developments are often subject to drainage and mitigation requirements under permission grants and construction is temporary and localised minimising the duration of potential disturbance.			
S18A/0433	Gerard O'Connor. Change of house type of the approved dwellings to 4 semi-detached, 3 bed dwellings and associated car parking for 8 cars, access bridge, road and footpath and modify existing bridge for a pedestrian entrance and associated site works and landscaping on a site with permission granted for 4 semi-detached, 2 bedroom with study	Although the centre application was refused by the Local Authority, there is a long planning history associated with this site and a permitted grant of planning and later modification to same remain valid. The originally development was originally consented under SD09A/0055 after appeal to ABP. The conditions included confirmation prior to development of surface and foul water management on the site owing to the recognised potential to impact to the Whitechurch Stream. It is not known if these have been submitted. Further applications, the majority of which were refused, but for which a modification was approved after appeal. There were conditions that related back to the original planning Ref Sd09A/055 and ABP decision PL06S.235823. In the absence of final detail of management of construction and operational management of polluting substances and or disturbance by virtue of proximity to watercourse (suggested at less than 10metres in accordance with objectives of County Development Plan), it cannot be ruled out that if the consented development were to be undertaken at the same time as the proposed flood alleviation scheme, that an in-combination impact would not occur.	SD18A/0433 refused permission 12/02/19 Original Planning permission SD09A/055 & PL06S.23582 3 And follow on Modification to consented design SD11B/0236	Capri, on Whitechurch Road, alongside Whitechurch Stream	15/12/2009. ABP appeal not upheld. Permission granted 20/05/2010 17/02/2012, ABP Pleanála appeal declared invalid. Date of Final grant: 24/10/2016

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Planning Application Reference Number	Project/Applicant Name and Proposed Location	Brief Development Description	Application Status/ Outcome	Approximate Distance and Direction from Proposed Development	Date Planning Application Granted
	dwelling and associated works under SD09A/0055 and SD11B/0236.				
SD20A/0016	Gerard O'Connor. Change of house type of the approved dwellings to 4 semi-detached, 3 bed dwellings; replacement of existing bridge and 1.2m flood defence walls, internal road and footpaths; 8 car parking spaces and associated site works and landscaping on previously granted site for 4 semi-detached, 2 bedroom with study dwellings and associated works under SD09A/0055 and SD11B/0236.	This is the latest application associated with this site and previous applications are discussed above under application S18A/0433. Regarding the current application, there is direct connectivity to the Whitechurch Stream and waterborne pollution has the potential to be washed into the stream. The levels of pollution have been described as negligible and localised and mitigation measures are recommended, in-combination impacts were ruled out. Furthermore, the screening for appropriate assessment indicated that potential impacts as a result of the development would cause neither direct nor indirect significant impacts to any protected site or nearby waterbody. On the contrary, the Ecological Impact Assessment raises issues regarding the presence of third schedule invasive- Japanese Knotweed, but it was concluded that the spread of this species is negligible due to the proposal to excavate and dispose of all sources of this invasive species on site by a specialist contractor in advance of construction works. A proposal for Japanese Knotweed control is included but as this application is still pending and there is no final detail of the final management regime for this invasive species during the construction and operation phase it cannot be ruled out that if the consented development were to be undertaken at the same time as the proposed flood alleviation scheme, that an in-combination impact would not occur.	Pending. Decision due 22/03/20.	Capri, on Whitechurch Road, alongside Whitechurch Stream.	23/03/20 Request Additional Information. No details on planning website as yet.
SD16A/0247	Gordon Anderson. Demolition of existing buildings, closing vehicular access at southern end of site and retaining main vehicular entrance at northern end, construction of new 3 storey building over basement, with storage facilities in basement, two 1 bed apartments on ground floor, two 2	The Screening for Appropriate Assessment included environmental data relating to a previously detected hydrocarbon spillage in groundwater. There is connectivity via a site culvert that ultimately discharge to the Whitechurch Stream and it was noted that contamination could ultimately arrive at Dublin Bay, although rated as low to moderate (Separate consultants conclusions). It was stated that the risk to water quality from the proposed development would be protected against through the implementation of mitigation measures including stormwater attenuation and flood mitigation. No loss of Annexed habitat or impacts to SCI species were predicted. There is a reliance on mitigation measures to ensure that no adverse impacts on water quality within a small site. There was no data in respect of mobile species including Otter. The consented development has not yet commenced, although there are a number of preconstruction requirements to be discharged to the Planning Authority in advance of any	Granted	Whitechurch Road, southern side of Rathfarnham Ford Garage, alongside Whitechurch Stream.	24//04/17

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Planning Application Reference Number	Project/Applicant Name and Proposed Location	Brief Development Description	Application Status/ Outcome	Approximate Distance and Direction from Proposed Development	Date Planning Application Granted
	bed apartments on second floor and third floors, a communal roof garden, and all associated site and development works.	works commencing. And while it is unknown when and if works might commence, there remains the possibility that an in-combination impact on the water quality and disturbance to otter were both developments to occur simultaneously.			
SD18B/0535	PK Casey & E Duffy. Construction of vehicular entrance to the curtilage of a Protected Structure to accommodate 3 car spaces on a paved surface that shall abut directly onto the public realm; provision of pedestrian entrance and path to the back of the spaces, to access the period house directly; erection of a 2m high boundary metal fence and 1m hedge screening along the boundary facing St. Patricks Cottages replacing the existing chain-link fence.	With the exception of a tree constraints report, there was no AA provided in respect of the application. However, given the nature of the proposed development and its location, it is considered unlikely, by virtue of the nature of the project, were it granted planning to result in LSE on European sites.	Granted 16/09/19	The Millhouse, Whitechurch Road, Rathfarnham, Dublin 14	Under appeal to An Bord Pleanála who issued an acknowledgement letter on 6th of November that it will take into account submission made in respect of the appeal
SD19B/0341	John Bowden Erection of railings and granite base wall to front and side at extended Site 7 (to include former Site 8) Silveracre Avenue (within the curtilage of a Protected Structure, Silveracre House, RPS 277).	There was no AA provided in respect of the application. However, by virtue of the nature of the proposed development, it is considered unlikely, by virtue of the nature of the project, were it granted planning to result in LSE on European sites.	Granted	7, Silveracre Avenue, Sarah Curran Avenue, Dublin 16	21/10/2019

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Planning Application Reference Number	Project/Applicant Name and Proposed Location	Brief Development Description	Application Status/ Outcome	Approximate Distance and Direction from Proposed Development	Date Planning Application Granted
D13A/0370/E	Housing development. M & N O'Grady Development Ltd, Nutgrove Avenue, Rathfarnham	Residential development consisting of 47 detached houses located 1km east of the proposed development with project extension granted. Permission is granted until 2024. The Whitechurch Stream provides a hydrological pathway to Downstream European sites via the Dodder river. South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA are located approximately 13km downstream. However, the ongoing construction works for the Nutgrove housing development is separated from the Whitechurch Stream by 700m of residential development and road networks providing a significant buffering to any potential pollutants.	Granted		Permission granted to 2024
SD17A/0263	Extension to Golf course. The Trustees of Grange Golf Club, Taylor's Lane, Rathfarnham	Extension to Grange Golf Club located immediately south of the proposed development. The extension of the golf course playing area into the car-park has potential for in-combination impacts to the Whitechurch Stream proving a pathway to South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA located 14km downstream. The potential for effects arise during construction as this is immediately upstream of the proposed development. Permissions for the extension are however subject to the compliance of drainage and disposal of surface water with technical requirements of the Council's Water Services and/or Irish Water as appropriate including the Greater Dublin Regional Code of Practice for Drainage Works. As such, the potential for significant in-combination effects to European Sites is deemed unlikely.	Granted	Upstream of St. Enda's Park	Permission granted 22/09/17
SD178/0003	Dodder Greenway. South Dublin County Council	A section of proposed Dodder Greenway (within the administrative boundary of SDCC) is being developed 1km downstream of the proposed development. The Greenway route is approximately 14km in length and has potential to lead to in-combinations impacts through habitat loss, disturbance and water quality implications. This development has however been subject to the appropriate environmental assessments informing the design process and it is currently understood that there will be further assessments to identify and mitigate such impacts. While sections of the Dodder Greenway within the SDCC administrative borough have been undertaken, the remainder of the project, extending downstream in the DCC and DLR administrative boundaries has been halted owing to reconsideration of project.	Closed to Submissions 22/06/2017	Downstream of proposed development	Not given on website
3324/19	Private Development on Lands at the former Paper Mills site, bounded by the river	Planning permission sought for the following revisions to the previously approved development Planning reg. ref.- 3159/17 (96 units to 116 units) as part of an overall composite development on the site to include the following previous planning permission reg. ref.- 2620/14 (parent	Last date for Observations 25 July 2019	Alongside River Dodder	Application Withdrawn

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Planning Application Reference Number	Project/Applicant Name and Proposed Location	Brief Development Description	Application Status/ Outcome	Approximate Distance and Direction from Proposed Development	Date Planning Application Granted
	Dodder to the east, Clonskeagh Road to the west, Clonskeagh bridge to the South West, Dublin 6	<p>permission 88 units), reg. ref.- 2308/16 (88 units to 96 units), reg. ref.- 2477/17 (20 units) and reg. ref.- 2996/17 (ESB substation). The revisions to the development consist of a change of block to a Build to Rent; block of accommodation. Revisions to block 4 include the reconfiguration of ground floor plan including changing 3 no. 2 bed apartments to 1 no. 2 bed apartment and 2 no. 1 bed apartments, provision of a ground floor communal room and alterations to the penthouse plan consisting of changing 2 no. 2 bed apartments to 1 no. 2 bed apartment and 2 no. 1 bed apartments, incorporating an overall increase in apartment units from 14 to 15 with the addition of a new ground floor communal room, bringing the total number of units on the lands from 136 units to 137 units.</p> <p>The original application was subject to planning including Screening for Appropriate Assessment. The design included for attenuated surface water management, diversion of the foul sewer to Irish Water treatment facilities, in recognition of the requirements of the Greater Dublin Drainage Strategic Drainage Study (GDSDS 2005) and reviewing the QI and Sci for downstream European sites, it was concluded that the project either alone or in combination with other plans or projects were not likely to result in significant effects to the integrity of the Natura 2000 network. The site has been cleared, but it is unclear if works have commenced on the originally consented application. Notwithstanding this fact, the measures included in the original design if implemented should not result in an LSE to European sites as previously concluded.</p>			
N/A	Blood Stoney Bridge	The proposed Blood Stoney Bridge is currently at the preliminary design stage. It will provide a new crossing point from New Wapping Street to Blood Stoney Road in the Dublin Dockland Area and will be a pedestrian and cycling-only facility. The Blood Stoney Bridge development is approximately 12km downstream from the proposed development however provides potential for potential in-combination effects on downstream European Sites via hydrological pathways to South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA. The scope of works and potential impacts are currently unknown as this application is pre-planning, however the development will be subject to the appropriate environmental considerations including Appropriate Assessment before planning approval.	Pre-application Stage	Approximately 10km downstream	
N/A	Dodder Public Transportation Bridge	Dublin City Council has commenced the planning and design of the Dodder Public Transportation Opening Bridge. The scheme comprises a new public transportation opening bridge over the River Dodder at its	Pre-application Stage	Approximately 9.5km downstream	

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Planning Application Reference Number	Project/Applicant Name and Proposed Location	Brief Development Description	Application Status/ Outcome	Approximate Distance and Direction from Proposed Development	Date Planning Application Granted
		confluence with the River Liffey along with the construction of approach roads associated with the bridge; the construction of a new control building; the provision of a new club house and facilities for St Patrick's Boat Club; the reclamation of land to the west of Tom Clarke Bridge to facilitate the build; the landscaping of the area between York Road/Thorncastle street and the R131 over the extents of the project. The development will be subject to the appropriate environmental considerations including Appropriate Assessment before planning approval.			
N/A	Point Pedestrian Bridge	Dublin City Council are currently preparing tender documents to procure a designer for this scheme. The project has not yet been fully defined or designed at this stage. Once developed, this project will be required to undertake the appropriate assessments including EIA and AA Screening and consider the cumulative effects resulting from all other projects as appropriate. An assessment of cumulative effects with this project without detail on scale and design is not feasible at this stage and is not included as part of this assessment.	Pre tender Stage	Approximately 11km downstream	

7 MITIGATION MEASURES

For the purposes of this assessment the term ‘mitigation measures’ refers to *“those measures which aim to minimise, or even cancel, the negative impacts on a site that are likely to arise as a result of the implementation of a plan or project. These measures are an integral part of the specifications of a plan or project”* (Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC, January 2007).

Based on the Appropriate Assessment carried out in **Section 6**, the mitigation will focus on the following potential pathways:

- Surface water pollution; and
- Disturbance to Otter.

South Dublin County Council in conjunction with the OPW and any contractor appointed by SDCC, shall be required to comply with, and implement, the requirements and mitigation measures as set out here (**Section 7.1**, **Section 7.2** and **Section 7.3**). It is further required that these measures are incorporated, in full, into a Construction Environmental Management Plan (CEMP) (**Section 7.4.1**).

Residual effects of the proposed development, following mitigation measures outlined here, are discussed in **Section 7.5**.

7.1 Surface Water Management

7.1.1 Construction

The construction works shall be undertaken within a framework of environmental protection practices defined and co-ordinated via a CEMP (**Section 7.4**). The CEMP shall provide measures that meet legislative requirements, and key regulatory guidance that define good working practices during construction, most notably the CIRIA guidance for the ‘Control of Water Pollution from Construction Sites’ (CIRIA, 2001). Prior to construction commencing, the preliminary CEMP (**Appendix D**) shall be revised to include all protective measures recommended in this NIS, and the Ecological Impact Assessment submitted under separate cover (RPS 2020a).

- Prior to construction works a Waste Management Plan (WMP) shall be prepared to outline the methodology for dealing with generated spoil and in particular Invasive Alien plant material and vector soil, during excavation, handling and disposal of any such material;
- Existing surface water drainage infrastructure (e.g. gullies) will not be interfered with or blocked during the proposed works. However, neither will they be used for the unattenuated discharge of silt-laden waters from the works;
- Surface water drains shall be ‘plugged’ as necessary to prevent contaminated surface water entering the Whitechurch Stream, via drainage;
- Stockpiling of construction materials shall be strictly prohibited within 5 m of any existing surface water drainage, ditch or water-laden channel. Stockpiling of excavated material should ideally occur in the works compound;
- Excavations, where necessary shall be left open for minimal periods to avoid acting as a conduit for surface water flows;
- All ready-mixed concrete shall be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline waste waters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite;
- Concrete shall be contained and managed appropriately to prevent pollution of watercourses;

- Concrete pouring will be prevented during periods of heavy rainfall (Yellow rain warning event or higher), and quick setting mixes will be preferable;
- Waste materials shall be stored in designated areas that are isolated from surface water drains. Skips, where used, shall be closed or covered to prevent materials being blown or washed away and to reduce the likelihood of contaminated water leakage;
- Temporary construction compounds shall not be located within the planning boundary of the proposed development;
- No harmful materials shall be deposited into any watercourses, including drainage ditches/pipes on or adjacent to the site;
- Protection measures shall be put in place to ensure that all hydrocarbons used during the construction works are appropriately handled, stored and disposed of in accordance with recognised standards. These measures will include:
 - Hazardous materials including diesel, fuel oils, solvents, paints and/or lubricants stored on site will be stored within suitably designed bunded areas with a bund volume of 110% of the capacity of the largest tank/container.
 - Re-fuelling of plant shall not occur within 50m of any watercourse or surface water/groundwater feature. Drip trays shall be used and appropriate spill kits shall be kept available;
 - Machinery used on site shall be regularly inspected to ensure there is no leakage from them and to ensure the machinery will not cause contamination of watercourses;
 - Where required, fuel shall be transported in a mobile, double skinned tank and a spill tray will be used when refuelling (if taking place outside a compound area);
 - Waste oils and hydraulic fluids shall be collected in leak-proof containers and removed from the site for disposal or re-cycling;
 - Only emergency breakdown maintenance shall be carried out on site e.g. alongside the watercourse. Emergency procedures and spillage kits will be readily available at strategic site locations and construction staff will be familiar with emergency procedures; and
 - Any spillage of fuels, lubricants or hydraulic oils shall be immediately contained, with an appropriate emergent response put in place (**Section 7.3**). Any contaminated soil will be removed from the site and properly disposed of to a suitably licenced facility.
- Protection measures shall be put in place to ensure that all contaminated soil and water disturbed/generated during the construction are appropriately handled, stored and disposed of in accordance with recognised standards. These measures will include:
 - Any excavations shall be supervised by a suitably qualified person. If contamination is encountered this should be appropriately segregated to prevent cross contamination;
 - Any materials to be disposed of offsite are required to be Waste Acceptance Criteria (WAC) tested to classify the material as either; inert, non-hazardous, or hazardous. The waste shall be disposed of at the appropriate licenced or permitted waste facility.
 - The excavation and handling of any potentially contaminated material could increase the mobilisation of any contaminants present. This presents a risk from leaching, surface run-off, migration through the subsurface, and direct contact (human health);
 - Should contamination be encountered during construction, further site investigations are required to delineate any potential contamination within the subsurface;
 - Excavated contaminated material (including IAPS material or IAPS contaminated soil) shall be appropriately stockpiled on plastic liners (if not taken offsite (under licence) immediately). The

stockpile shall be covered with plastic to prevent the ingress of rainwater. The stockpile shall be bunded to collect any contaminated surface water run-off. The excavated material shall be WAC (Waste Acceptance Criteria) tested for appropriate disposal or reuse on site;

- During piling any contaminated arisings shall be stockpiled as previously described and WAC tested for appropriate disposal or reuse on site; and
- Any contaminated water generated from contaminated material shall be containerised in an Intermediate Bulk Container (IBC)/tank, tested and disposed of at an appropriate facility.

7.1.2 Operation

The operation of the flood alleviation measures should not ordinarily result in operational impacts along the watercourse that would adversely affect the integrity of the downstream European sites. However, in the unlikely event of an emergency operation being required along the watercourse, the following measures shall be implemented:

- Responding staff (OPW) shall operate to the documented scheduled maintenance or emergency procedures and shall have spillage kits readily available; and
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, with an appropriate emergent response put in place (**Section 7.3**). Any contaminated soil shall be removed from the site and properly disposed of.

7.2 Emergency Response & Environmental Training

The OPW and/or any Contractor appointed by them, shall prepare an Emergency Response Plan (ERP) which will be included in the finalised and approved CEMP (**Section 7.5**). The ERP measures shall include:

- The OPW's proposed training of relevant staff, including cover staff, in the implementation of the ERP and the use of spill kits;
- A method for which all OPW staff, and/or any Contractor appointed by the OPW, will ensure that all personnel working on site are trained in pollution incident control response. A regular review of weather forecasts of heavy rainfall is required, and the OPW is required to prepare a contingency plan for before and after such events;
- The details of procedures to be undertaken by the OPW in the event of the release of any sediment into a watercourse, or any spillage of chemicals, fuel or other hazardous wastes or other such risks that could lead to a pollution incident, including flood risks;
- A confirmation of the number and specification of spill kits which shall be carried by the OPW, as a minimum; and
- Information on clean-up procedures to include the following:
 - The OPW shall immediately initiate appropriate clean-up operations and notify the Local Authority and Inland Fisheries Ireland of any sediment releases, hydrocarbon leakages or spillages during the construction activities;
 - The OPW shall contain the bulk of the spill immediately using a spill kit (on terrestrial land) before placing the contaminated absorbent material and the contaminated soil in a stockpile at least 50 m from, and downslope of any watercourses; and
 - All contaminated material shall be underlain and covered by plastic to prevent leachate generation, until such time as it can be removed off-site by an appropriately licensed waste management company.

7.3 Ecological Requirements

Given the sensitivity of the Whitechurch Stream and its hydrological connection to the Dodder catchment, an Environmental Clerk of Works (EnCOW) should be nominated by the appointed contractor for the duration of the works to advise and/or monitor sensitive operations. Where confirmation of new ecological data may occur, the EnCOW may call upon the services, as required, of a suitably qualified and experienced ecologist.

7.3.1 QI Otter

7.3.1.1 Construction

The identified holt as well as an adjacent couched upstream of the works will not be directly impacted by the proposed development. The construction of an artificial holt is not required. Nor is there a requirement at this time to seek a derogation licence to temporarily close the holt, owing to the distance upstream of the proposed works. New holts could, however, be established in the interim between planning and construction, although unlikely outside of St Enda's Park. The phasing of the proposed development will impact upon commuting /foraging routes along the Whitechurch Stream. Otters normally avoid human disturbance and as such although impacted by the changing landscape, should continue to be able to commute downstream, often at night when works are not underway. Where local construction impediments or culverts exist, otter are known to exit the watercourse and track along dry ground alongside the obstruction before returning to the watercourse corridor.

In the interest of best practice and to ensure compliance with legal protection afforded to otters the following mitigation measures are proposed:

- Prior to construction works commencing, the appointed contractor shall engage the services of a suitably qualified ecologist to conduct a preconstruction otter survey of the proposed development including downstream of the tie-in to the Owendoher River. The survey should be undertaken in accordance with *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes* (NRA, 2006).
- The EnCoW shall maintain a watching brief until such time that mobilisation of plant and personnel is completed along the proposed development.
- If an active otter holt is confirmed within 150m of the proposed works, then works within this ZoI will be immediately halted and the local NPWS conservation ranger will be contacted. This may require an application for a derogation licence from the NPWS to exclude the otter holt. If required, any further mitigation measures required will follow those outlined in the *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes* (NRA, 2006) and will be agreed with the NPWS at the time of licence application.
- In respect of the proposed sheet piling operations, these are construed as instream works and as such all instream works along the Whitechurch Stream can only be undertaken during the period July to September. Thus, to minimise the potential impact on otter commuting territory including potentially that of young, fledgling otter, it is proposed that sheet piling operations where required be carried out in the latter half of the IFI-approved season e.g. August and September, which would reduce the potential disturbance to commuting territory of young otters.

7.3.1.2 Operation

No specific mitigation measures in respect of Otter are proposed during the operation phase of the works

7.3.2 Avifauna

7.3.2.1 Construction

To limit the potential impact of construction on breeding birds including Annex I or SCI year-round species, any vegetation removal/trimming (including individual trees, treelines and hedgerows) will not be permitted during the breeding bird season (1st March to 31st August inclusive). If this seasonal restriction cannot be accommodated, a suitably qualified ecologist will be required to confirm presence/absence of breeding birds prior to removal/trimming and seek a derogation licence from NPWS as necessary.

7.3.2.2 Operation

No specific mitigation measures in respect of birds are proposed during the operation phase of the works.

7.3.3 Protection of Aquatic Ecology

7.3.3.1

Some of the measures proposed for the protection of the aquatic resource as recommended in the aquatic report in **Appendix C** and are captured as standard construction measures in other sections of this NIS mitigation measures e.g. **Section 7.1.1**. Nonetheless the measures are reiterated in the NIS, as they overlap with measures already recommended for with the ecological protection of the Whitechurch Stream and downstream areas including European sites.

- All works to facilitate the flood alleviation scheme shall be conducted in accordance with IFI guidance and with plans and timing of works agreed;
- Given the importance of brown trout in the Owendoher, any instream works in the Whitechurch Stream should be avoided. If required, this shall be conducted outside of the spawning season (e.g. instream works to be undertaken between July to September) and with IFI approval upon review of contractor method statement;
- Obligations under WFD should maintain the current status of the Whitechurch Stream and Owendoher River and degradation prevented. Therefore, the necessary measures to protect water quality should be incorporated into the implementation of the flood alleviation works;
- If de-watering is necessary to allow works to proceed, water pumped from the contained area should be passed through a settlement pond or prefabricated settlement tanks with oil interceptor before being discharged to the river.
- If required, areas which will be dammed and dewatered should be kept to the minimum required. Except where absolutely necessary, machinery should operate from the bankside and not instream.
- If the removal of any structures within the stream is required, it should be first assessed whether large volumes of sediment have not accumulated behind the structure as this will be released downstream upon removal. If this is the case, then measures will be required to prevent this. The method should be agreed with IFI and sediment disposed of correctly;
- Where possible precast concrete should be used;
- Any wash down from trucks, machinery should be conducted away from the watercourse and trapped on site, allowed to settle and reach neutral pH before release;
- For construction activities close to the riverbank, eroded sediments should be retained on site with erosion and sediment control structures such as sediment traps, silt fences and sediment control ponds. Sediment ponds and grit/oil interceptors should be placed at the end of drainage channels; and
- No further obstructions to fish passage should be placed in the stream, nor included in the design, which is already suffering from a number of historical barriers.

7.4 Construction Environmental Management Plan (CEMP)

A preliminary CEMP has been prepared by the OPW in respect of the proposed development (**Appendix D**). Prior to commencement of construction, it shall be updated to include all of the environmental mitigation measures outlined in this NIS and the accompanying EcIA (RPS 2020a). The preliminary CEMP will be reviewed with a suitably qualified ecologist/environmental specialist prior to the commencement of any construction activities. The CEMP will remain a 'live' document throughout the duration of the construction activities, to allow for input and throughout the duration of the project.

The CEMP will incorporate the following measures set out in this NIS as well as any additional measures recommended in the EcIA (RPS 2020a):

- All construction mitigation measures for surface water set out in **Section 7.1.1**;
- Emergency response and environmental training set out in **Section 7.3**; and
- Ecological mitigation measures set out in **Section 7.3**.

7.5 Residual Impacts

Guidance provided by the Irish Government (DoEHLG, 2010) states that:

"If the competent authority considers that residual adverse effects remain, then the plan or project may not proceed without continuing to stage 3 of the AA process: Alternative Solutions"

Taking into account the mitigation measures identified and set out in this NIS, no residual adverse effects within the Zol of the proposed development have been identified (**Table 7-1**).

Table 7-1: Identification of Residual Adverse Effects within the Zol of the Proposed Development

Relevant QI/SCI	Potential Impacts Identified	Potential Cumulative Impacts Identified	Mitigation Proposed	Residual Adverse Effects Identified
Annual vegetation of drift lines [1210]	Surface water pollution	Yes	Yes	None
Perennial vegetation of stony banks [1220]	Surface water pollution	Yes	Yes	None
Atlantic salt meadows (Glaucopuccinellietila maritimae) [1330]	Surface water pollution	Yes	Yes	None
Mediterranean salt meadows (Juncetalia maritimi) [1410]	Surface water pollution	Yes	Yes	None
Embryonic shifting dunes [2110]	Surface water pollution	Yes	Yes	None
Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]	Surface water pollution	Yes	Yes	None
Wetlands and Waterbirds [A999]	Discharges resulting in Loss/change to habitat	Yes	Yes	None
Otter (<i>Lutra lutra</i>) [1355]	Disturbance of commuting/foraging territory, and discharges resulting in changes to food resource	Yes	Yes	None

8 CONCLUSION OF THE APPROPRIATE ASSESSMENT

This NIS has been prepared following the Department of the Environment, Heritage and Local Government guidance 'Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities' (DEHLG, 2010). As stated in that guidance document, the requirement of the AA is not to prove what the impacts and effects will be, but rather to establish beyond reasonable scientific doubt that adverse effects on site integrity will not result.

RPS has prepared this NIS to document the analysis and evaluation seeking to establish whether or not, in view of best scientific knowledge and applying the precautionary principle, and in light of the conservation objectives of relevant European sites, the proposed development, either individually or in combination with other plans or projects, will adversely affect the integrity of any European sites.

The construction and operation of the proposed development has been detailed (**Section 2**), and the receiving environment has been described (**Section 4**). A number of European sites have been identified within the ZOI of the proposed development via the following effect pathways (**Section 6**):

- surface water pollution; and
- impacts to QI Otter territory.

To minimise, or even cancel, the negative impacts on European sites that are likely to arise as a result of the proposed development, mitigation measures have been recommended (**Section 7**). These mitigation measures provide recommendations for surface water management, invasive species management, emergency responses and environmental training, and site management during construction and operation of the proposed development. Provided the full implementation of mitigation measures are carried out, it is envisaged that there will be no significant residual effects on the integrity of any European sites.

In conclusion, it is the opinion of RPS that in view of best scientific knowledge and applying the precautionary principle, and in light of the conservation objectives of the relevant European sites, the proposed development, either individually or in combination with other plans or projects, will not have an adverse effect on the integrity of any European site(s), given the implementation of mitigation measures outlined.

9 REFERENCES

Balmer, D., Gillings, S., Caffrey, B., Swann, B., Downie, I., Fuller, R. (2013) *Bird Atlas 2007-2011*. British Trust for Ornithology.

Chanin, P. (2003). *Ecology of the European Otter*. Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature, Peterborough

CIRIA (2001) Guideline Document C532 Control of Water Pollution from Construction Sites.

Devaney, F.M., and Perrin, P. (2015) Saltmarsh Angiosperm Assessment Tool for Ireland (SMAATIE) (2013-W-DS-10). EPA Research End of Project Report. End of Project Report and associated Practitioner's Manual (EPA Research Report No. 163). Prepared for the Environmental Protection Agency by BEC Consultants Ltd.

DoEHLG (2009) Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities. Rev. Feb 2010. Department of Environment, Heritage and Local Government.

DoHPLG (2018) River Basin Management Plan for Ireland 2018-2021. Department of Housing, Planning and Local Government.

EC (2000) Communication from the Commission on the precautionary principle. Brussels, 2.2.2000. COM (2000) 1 final. European Communities, Luxembourg.

EC (2001) Assessment of plans and projects significantly affecting Natura 2000 sites Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Brussels.

EC (2006) Nature and biodiversity cases: Ruling of the European Court of Justice. Office for Official Publications of the European Communities, Luxembourg.

EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission. Office for Official Publications of the European Communities, Luxembourg.

EC (2013) Interpretation manual of European Union Habitats. EUR 28, April 2013: European Commission G Environment, Nature ENV B.3.

EC (2014) Article 6 of the Habitats Directive: Rulings of the European Court of Justice.

EC (2018) Commission notice "Managing Natura 2000 sites, The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC". Brussels, 21.11.2018, C (2018) 7621 final. European Communities, Luxembourg.

GDSDS (2005) Greater Dublin Strategic Drainage Study Final Strategy Report. Greater Dublin Strategic Drainage Study.

Macklin, R., Brazier, B. & Sleeman, P. (2019). *Dublin City otter survey*. Report prepared by Triturus Environmental Ltd. for Dublin City Council as an action of the Dublin City Biodiversity Action Plan 2015-2020.

McCorry, M., and Ryle, T (2009) Saltmarsh Monitoring Project 2007-2008. Volume 1, contract reference D/C/227, Final report (2009). A Report for Research Branch, National Parks and Wildlife Service.

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

NPWS (2014) Conservation Objectives Supporting Document Version 1 for North Bull Islands SPA and South Dublin Bay and River Tolka Estuary SPA. National Parks and Wildlife Service, Department of Arts, Heritage, and the Gaeltacht.

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

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

NPWS (2017a). *Conservation Objectives: Wicklow Mountains SAC 002122. Version 1*. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

NPWS (2019a) The Status of Protected EU Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished Report, National Parks & Wildlife Services. Department of Culture, Heritage and the Gaeltacht, Dublin.

NPWS (2019b) The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitats Assessments. Unpublished Report, National Parks and Wildlife Service. Department of Arts, Heritage and the Gaeltacht, Dublin.

NPWS (2019c) The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished Report, National Parks and Wildlife Service. Department of Culture, Heritage and the Gaeltacht, Dublin.

NPWS (2017b) NATURA 2000 - STANDARD DATA FORM: SITE IE0004024, SITE NAME Sandymount Strand/Tolka Estuary SPA. 2017-09.

NPWS (2017bc) NATURA 2000 - STANDARD DATA FORM: SITE IE0004006, SITE NAME North Bull Island SPA.

NPWS (2017d) NATURA 2000 - STANDARD DATA FORM: SITE IE0004024, SITE NAME Wicklow Mountains SAC 002122.

NPWS (2017e) NATURA 2000 - STANDARD DATA FORM: SITE IE0004024, SITE NAME North Dublin Bay SAC 000206.

NRA (2006) *Guidelines for the Treatment of Otters during the Construction of National Road Schemes*. National Roads Authority.

NRA (2008) *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*. National Roads Authority.

NRA (2009) *Guidelines for Assessment of Ecological Impacts of National Roads Schemes. Revisions 2, 1st June 2009*. National Roads Authority.

O'Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013) *The Irish semi-natural grasslands survey 2007-2012. Irish Wildlife Manuals*, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.

OPW (2019). *Whitechurch Stream Flood alleviation Scheme – Preliminary Design Report* (July 2019) 2800/PDR/001/B.

Perrin, P., Martin, J., Barron, S., O'Neill, F., McNutt, K., and Delaney, A. (2008) *National Survey of Native Woodlands 2003-2008*. Volume I: Main report. A report submitted to the National Parks & Wildlife Service.

Rees, E. C., Bruce, J. H., & White, G. T. (2005) *Factors affecting the behavioural responses of whooper swans (Cygnus c. cygnus) to various human activities*. Biological conservation, 121(3), 369-382.

Reid, N., Hatden, B., Lundy, M.G., Pietravalle, S., McDonald, R.A., & Montgomery, W.I. (2013). *National Otter Survey of Ireland 2010/12*. Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Richards, C.L., Schrey, A.W., Pigluccis, M. (2008). *Invasion of diverse habitats by few Japanese knotweed genotypes is correlated with epigenetic differentiation*. Ecology letters. **15**, pp 1016-1025.

RPS (2014). *Dodder Catchment-based Flood Risk Assessment and Management Study – Flood Risk Management Plan*.

RPS (2020a). *Whitechurch Flood Alleviation Scheme - Ecological Impact Assessment Report*. Report prepared on behalf of SDCC in support of planning submission.

RPS (2019). *Whitechurch Flood Alleviation Scheme - Screening for Appropriate Assessment*. Report prepared on behalf of SDCC in support of planning submission.

RPS (2020b). *Whitechurch Flood Alleviation Scheme - Landscape and Visual Assessment*. Report prepared on behalf of SDCC in support of planning submission.

SEPA (2014) *Land-use Planning System SEPA Guidance Note 4. Planning guidance on on-shore windfarm developments*. Scottish Environmental Protection Agency.

Smit, C. J., & Visser, G. J. (1993) *Effects of disturbance on shorebirds: a summary of existing knowledge from the Dutch Wadden Sea and Delta*. Wader Study Group Bulletin: 68: 6-19.

Walls, R.L. (2010). *Hybridization and Plasticity Contribute to Divergence Among Coastal and Wetland Populations of Invasive Hybrid Japanese Knotweed s.l. (Fallopia spp.)* Estuaries and Coasts Vol 33. No 4. Special features: Genetic Structure and Adaptation in coastal ecosystems. Pp. 902-918 Springer.

Whitfield, D. P., Ruddock, M., & Bullman, R. (2008) *Expert opinion as a tool for quantifying bird tolerance to human disturbance*. Biological Conservation, 141(11), 2708-2717.

Zimmermann, K., Fric, Z., Jiskra, P., Kopeckova, M., Vlasanek, P., Zapletal, M., & Konvicka, M. (2011) *Mark-recapture on large spatial scale reveals long distance dispersal in the Marsh Fritillary, Euphydryas aurinia*. Ecological Entomology, 36(4), 499-510.

Appendix A
Project Drawings



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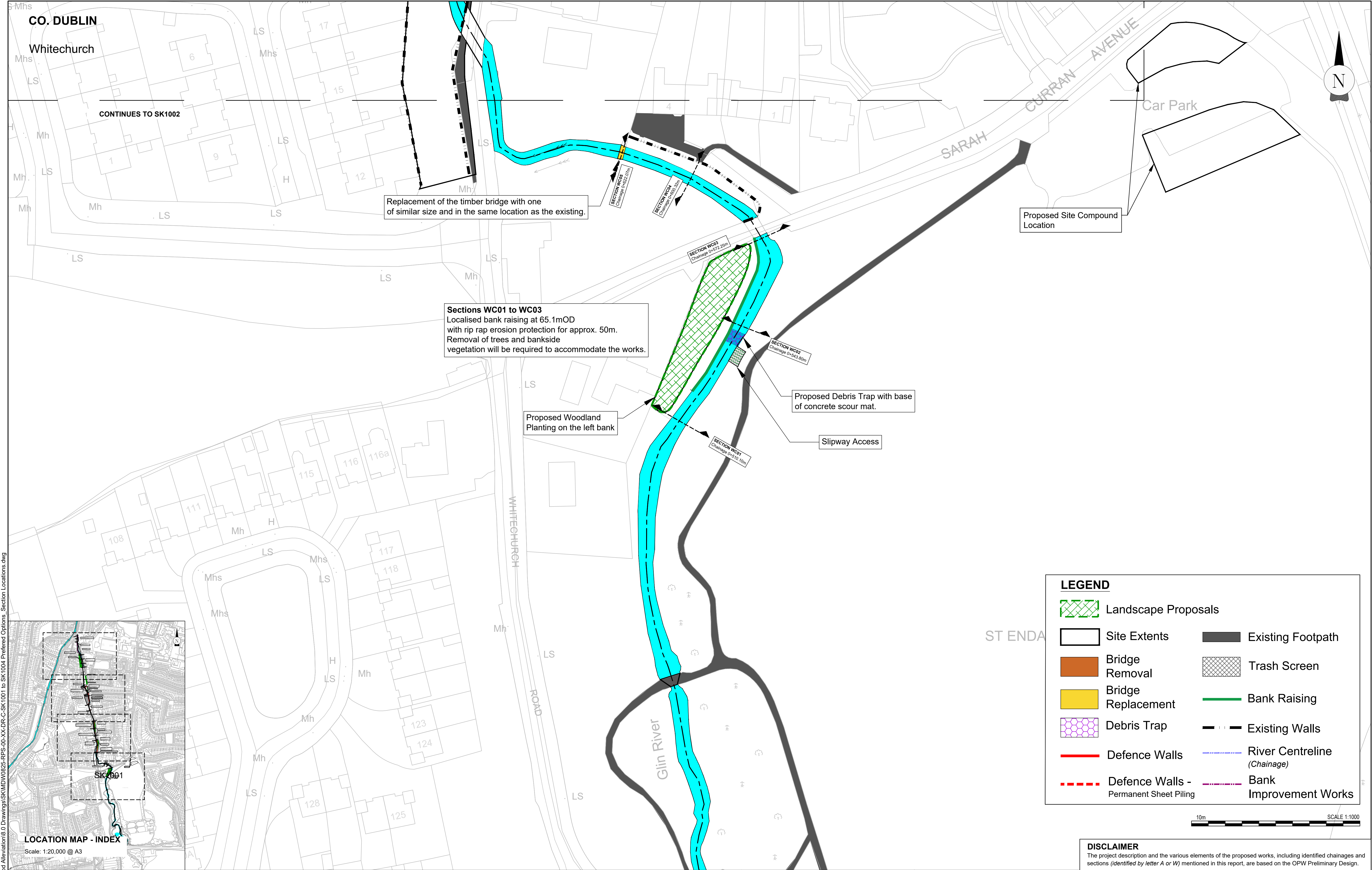
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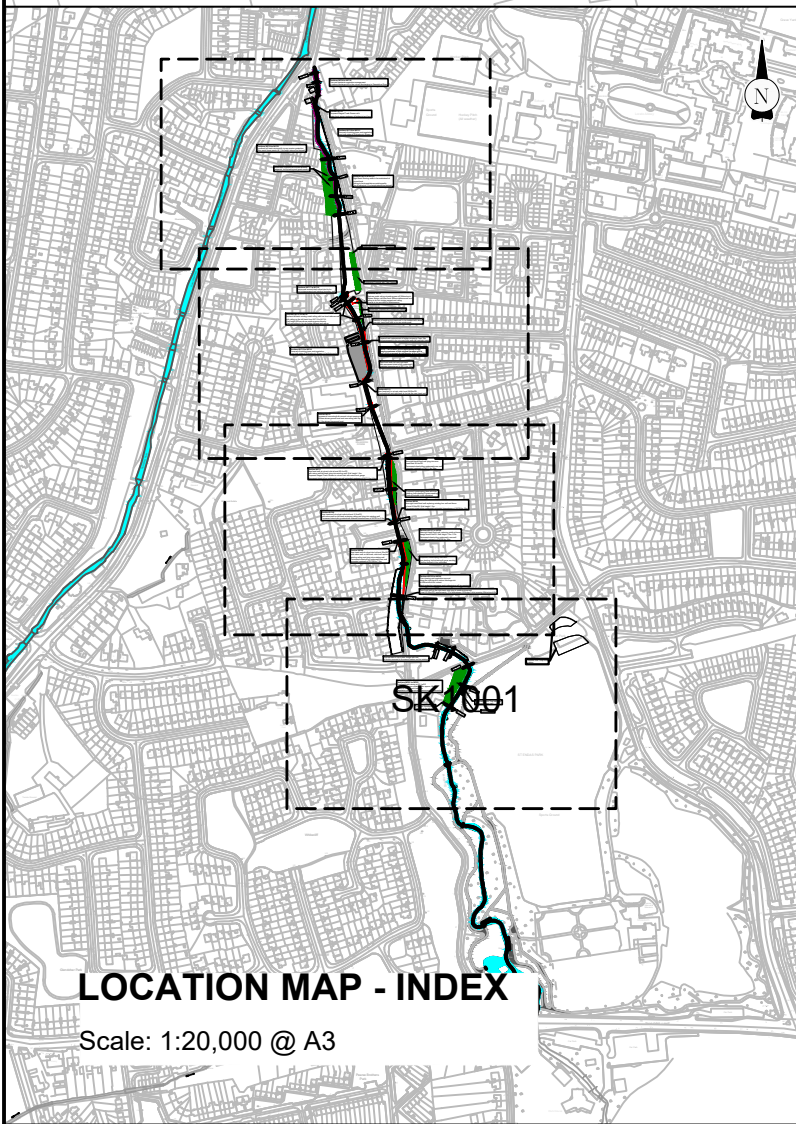
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Created on	11/10/19	Title Preferred Option - Full Location			
Sheets	01 of 01				
File Identifier	MDW0825-RPS-00-XX-DR-C-SK1000 Preferred Option Full Location	Drawing No.	Status	Rev	
		SK1000	S2	P02	



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LEGEND

Landscape Proposals

Site Extents

Bridge Removal

Bridge Replacement

Debris Trap

Defence Walls

Defence Walls - Permanent Sheet Piling

Existing Footpath

Trash Screen

Bank Raising

Existing Walls

River Centreline (Chainage)

Bank Improvement Works

10m SCALE 1:1000

DISCLAIMER
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Scale 1:500 @ A1 1:1,000 @ A3	Project WHITECHURCH STREAM FLOOD ALLEVIATION SCHEME		
Created on 04/09/19	Title PREFERRED OPTION - Measures: WC01 to WC05		
Sheets 01 of 04			
File Identifier MDW0825-RPS-00-XX-DR-C-SK1001 to SK1004	Drawing No. SK1001	Status S2	Rev P02

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Whitechurch

CONTINUES TO SK1003

Section WC11
New head wall at culvert inlet at level 60.4 mOD
with return wall left bank tying into existing wall; Wall height 1.9m.
Proposed Staged Trash Screen to culvert inlet with water level gauge.
Permanent sheet piling underneath new wall extended upstream of WC11 for 4.6m.

SECTION WC10
Chainage 0+872.57m

Sections WC10 to WC11
New right bank flood wall tying into new head level 60.4mOD.
Permanent sheet piling underneath new wall extended upstream of WC11 for 30m.

Proposed Landscaping Area with tree planting, bulb planting & grass seeding.
Existing footpath to be reinstated.

Section WC09
New right bank flood wall replacing existing low wall and fence.
at level 61.8mOD. Wall height 1.2m.
Permanent sheet piling underneath extended downstream of WC09 for 30m.

Section WC09
New head wall at culvert outlet at level 61.8mOD,
with return wall on left bank replacing railing and tying into existing wall.
Permanent sheet piling underneath extended downstream of WC09 for 5.5m.

SECTION WC09
Chainage 0+828.07m

Sections WC07 to WC08
New right bank flood wall replacing existing fence;
design level 62mOD. Wall height 1.2m-1.3m.
Permanent sheet piling underneath new wall extended upstream of WC08 for 30m.

Section WC08
New head wall at culvert inlet at level 62mOD,
with return wall on left bank, which will replace existing railing and tying into existing wall.
Permanent sheet piling underneath new wall extended upstream of WC08 for 7.5m.

SECTION WC08
Chainage 0+803.03m

Proposed Landscaping Area with tree planting, bulb planting & grass seeding.
Existing footpath to be reinstated.

Sections WC03 to WC08
Tree clearing and vegetation removal along the right bank to reduce blockage risk at Whitechurch Rd. culvert.
Bank protection measures and underpinning will be required.

New flood wall on the right bank side tying to existing stone wall (Level 62.95mOD) approximately 27m downstream of Bridge Outlet crossing Whitechurch Rd.

SECTION WC08
Chainage 0+728.07m

CONTINUES TO SK1001

LEGEND

- Landscape Proposals
- Site Extents
- Bridge Removal
- Bridge Replacement
- Debris Trap
- Defence Walls
- Defence Walls - Permanent Sheet Piling
- Existing Footpath
- Trash Screen
- Bank Raising
- Existing Walls
- River Centreline (Chainage)
- Bank Improvement Works

LOCATION MAP - INDEX

Scale: 1:20,000 @ A3

10m SCALE 1:1000

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Sheets 02 of 04	
File Identifier MDW0825-RPS-00-XX-DR-C-SK1001 to SK1004	Drawing No. SK1002
Status S2	Rev P02

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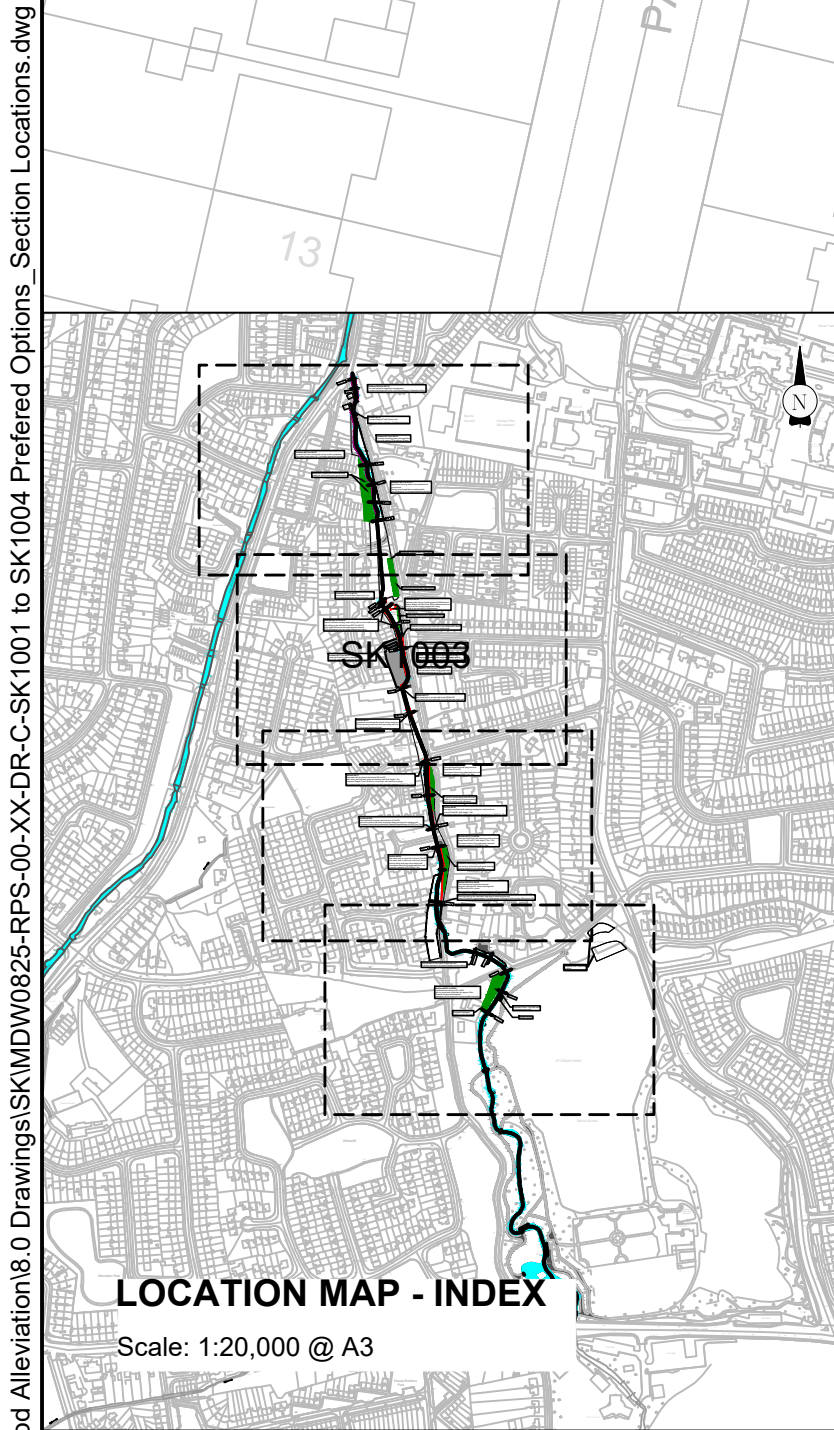
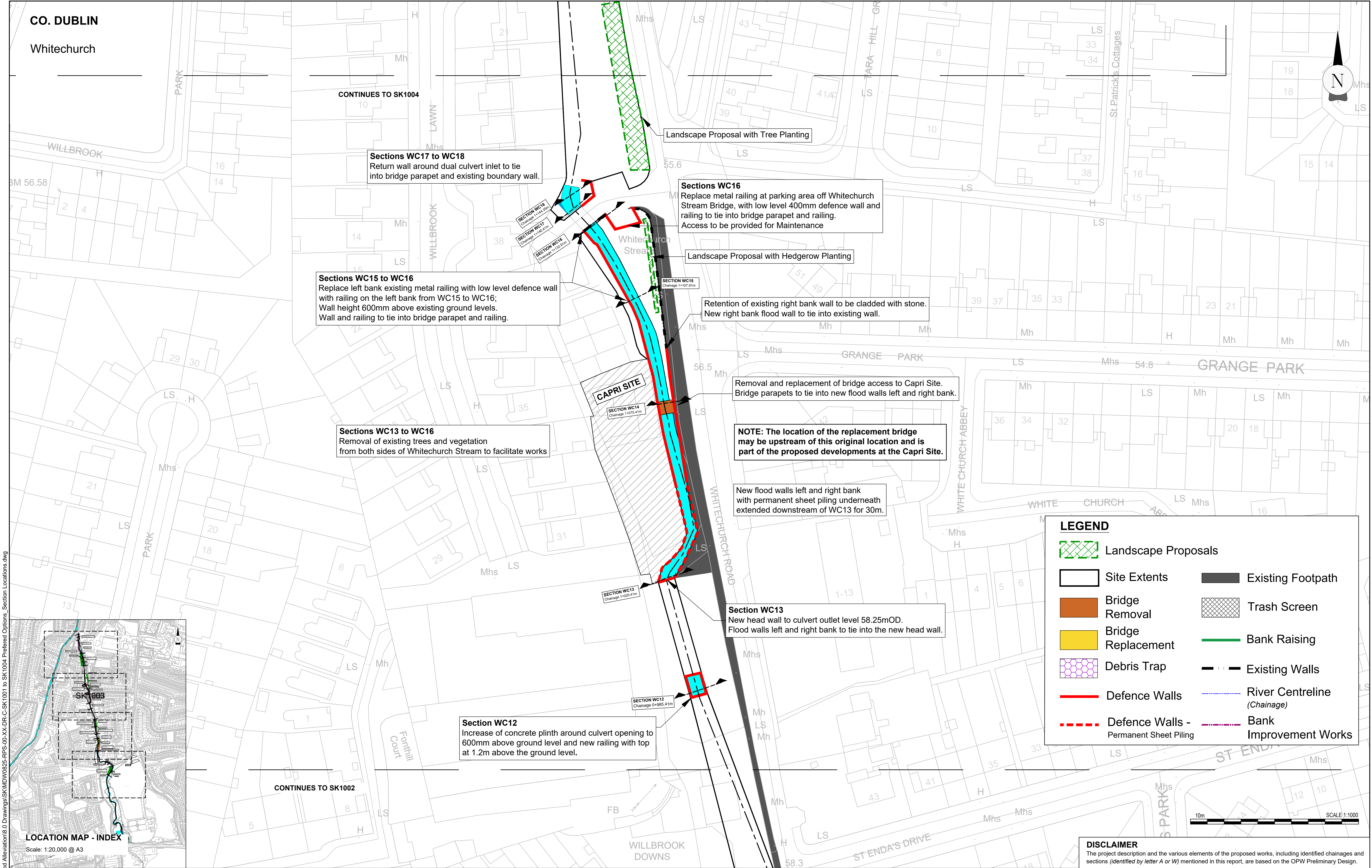
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CO. DUBLIN

Whitechurch



LEGEND

- Landscape Proposals
- Site Extents
- Bridge Removal
- Bridge Replacement
- Debris Trap
- Defence Walls
- Defence Walls - Permanent Sheet Piling
- Existing Footpath
- Trash Screen
- Bank Raising
- Existing Walls
- River Centreline (Chainage)
- Bank Improvement Works

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Scale 1:500 @ A1 1:1,000 @ A3	Project WHITECHURCH STREAM FLOOD ALLEVIATION SCHEME
Created on 04/09/19	Title PREFERRED OPTION - Measures: WC12 to WC18
Sheets 03 of 04	File Identifier MDW0825-RPS-00-XX-DR-C-SK1001 to SK1004
Drawing No. SK1003	Status S2
Rev P02	

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Whitechurch

LEGEND

- Landscape Proposals
- Site Extents
- Bridge Removal
- Bridge Replacement
- Debris Trap
- Defence Walls
- Defence Walls - Permanent Sheet Piling
- Existing Footpath
- Trash Screen
- Bank Raising
- Existing Walls
- River Centreline (Chainage)
- Bank Improvement Works

Sections WC19 to WC23
Localised left bank raising with rip rap erosion protection.
Wire mesh fence panels at 1.2m height above the footpath.

Landscape Proposal with mixed species
hedgerow, bulb planting and grass seeding

Sections WC24 to WC26
Tree and bankside vegetation management
to reduce blockage risk to the culvert discharging to Owendoher River.

Section WC23
Proposed Staged Trash Screen with
water level gauge upstream of bridge/culvert face.

Sections WC19 to WC23
Removal of existing trees and vegetation
from both sides of Whitechurch Stream.

Sections WC19 to WC23
Right Bank Existing walls to be maintained at
current level;
Railing to be placed above existing walls.
Top of railing at 1.2 m height above the footpath.

Landscape Proposal with Tree Planting

LOCATION MAP - INDEX

Scale: 1:20,000 @ A3

CONTINUES TO SK1003

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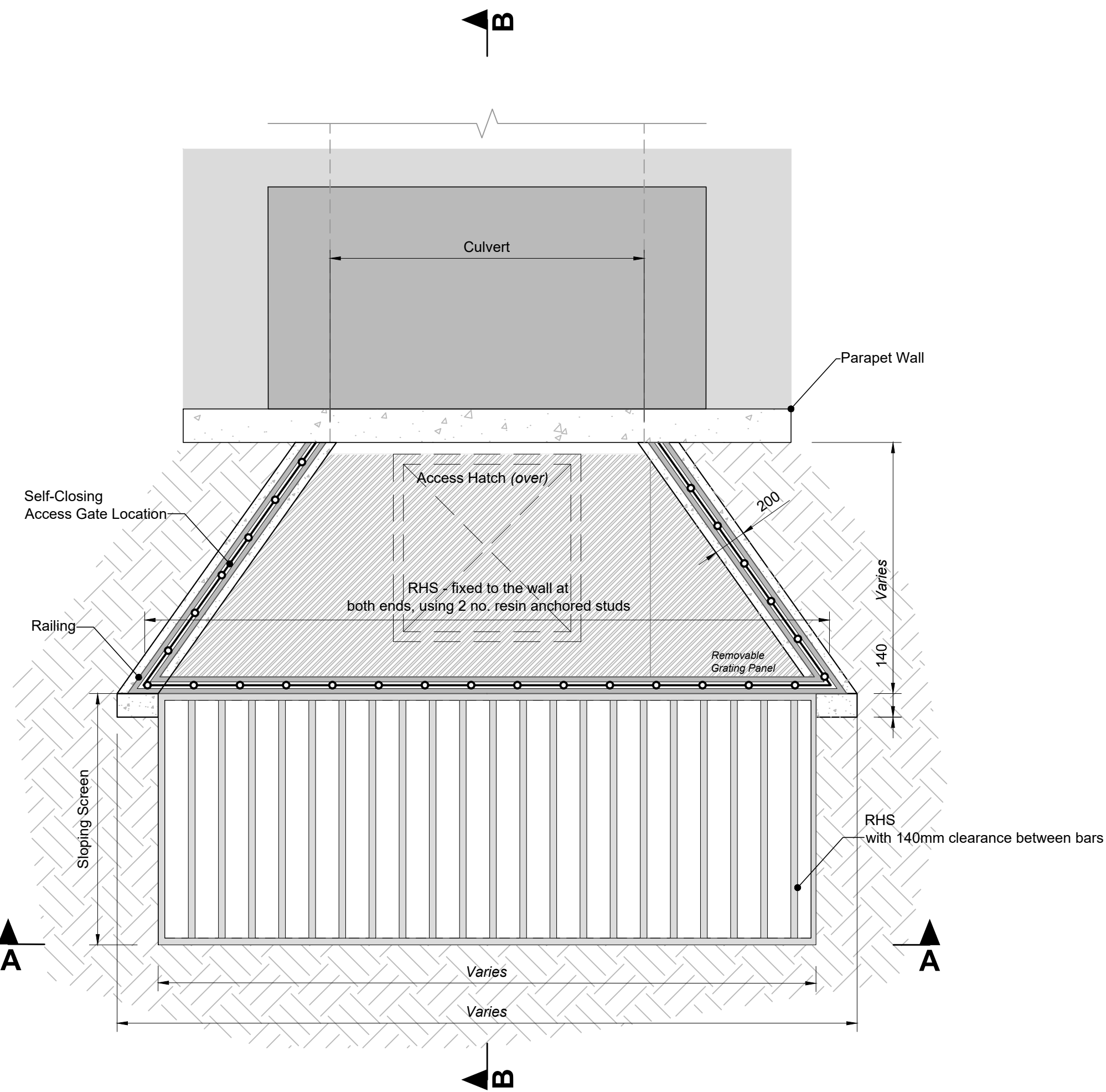
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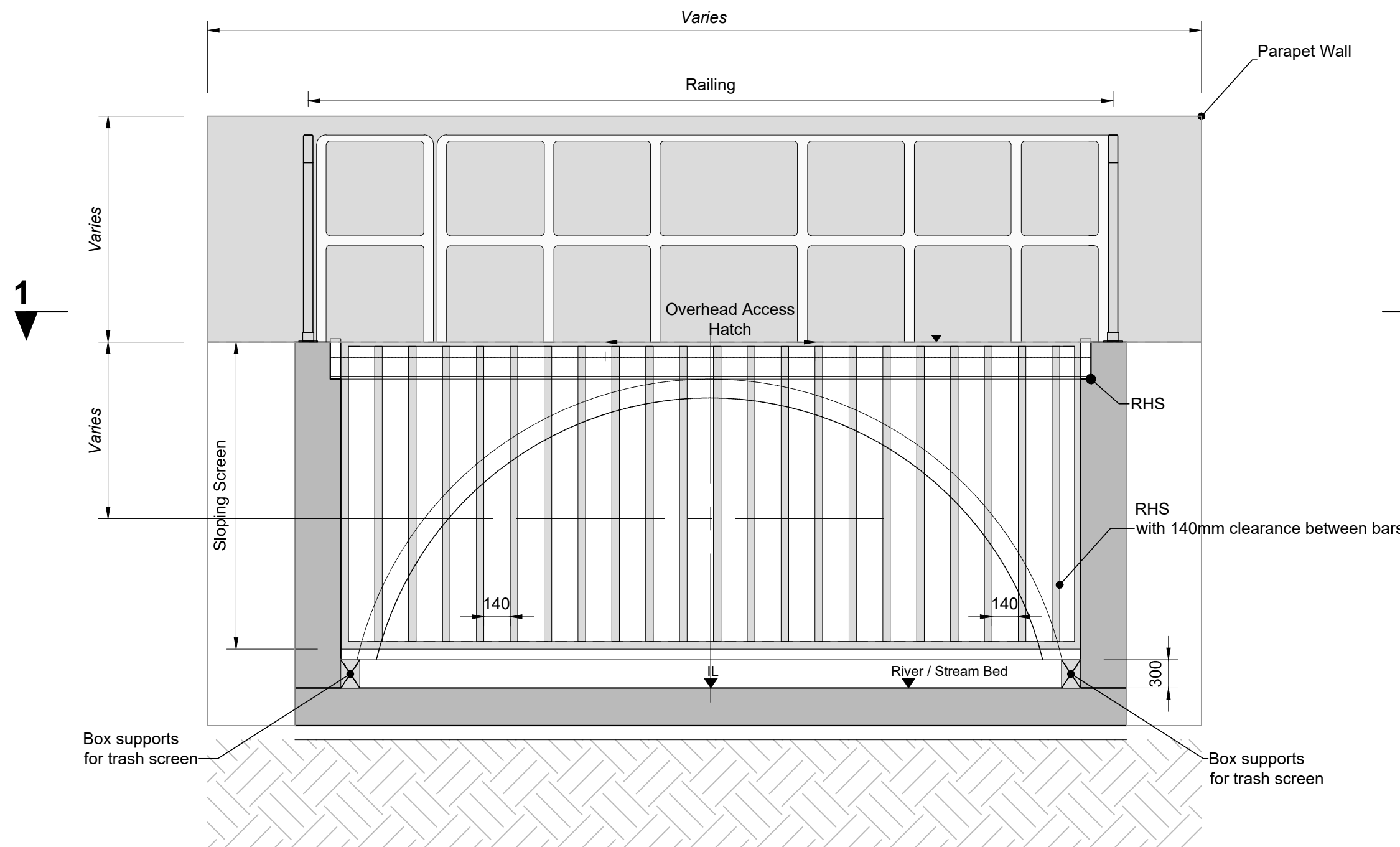
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Sheets 04 of 04	File Identifier MDW0825-RPS-00-XX-DR-C-SK1001 to SK1004
Drawing No. SK1004	Status S2
Rev P02	

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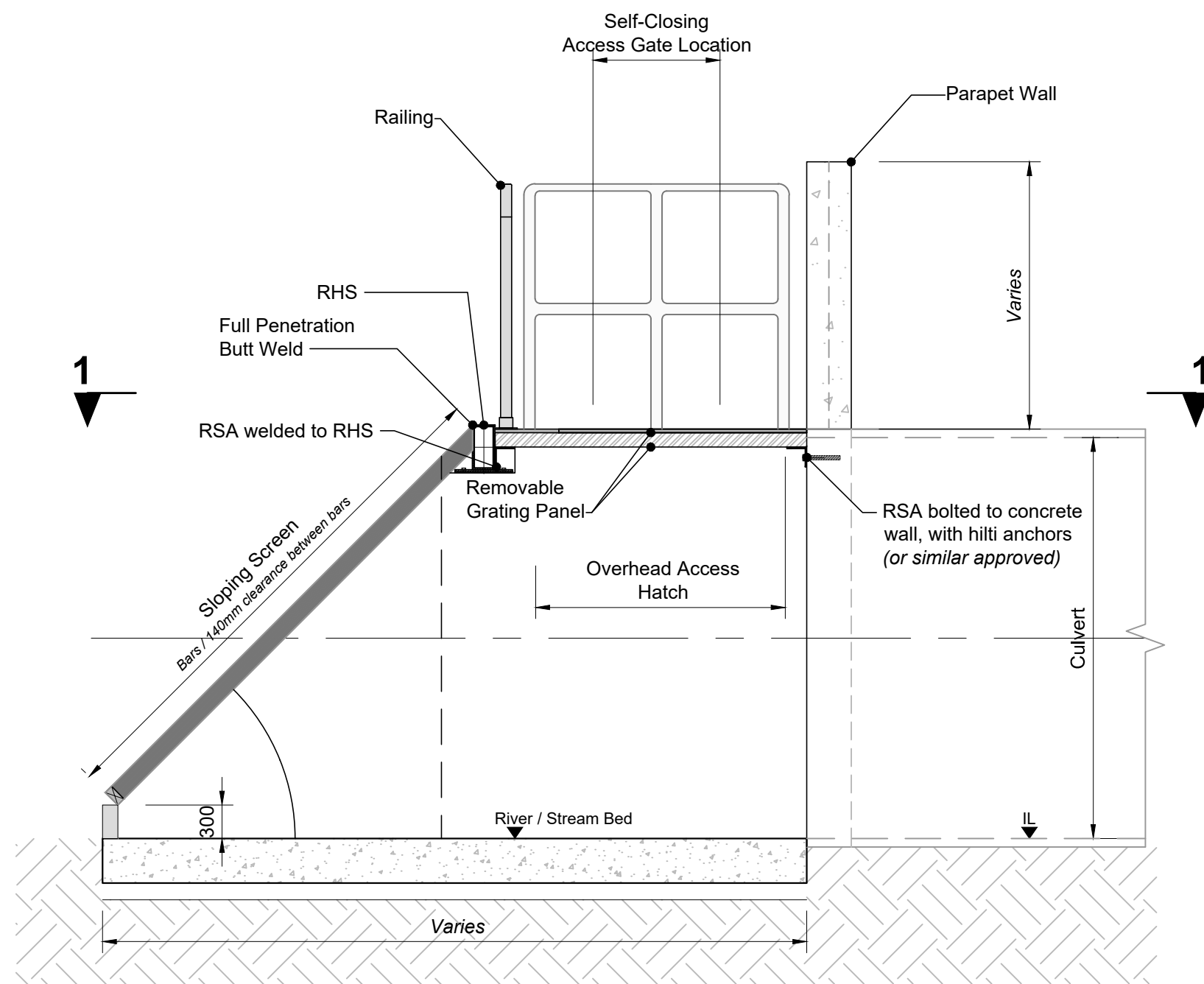
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PLAN 1-1



SECTION AT A-A



SECTIONAL DETAIL B-B

1m SCALE 1:50

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P01.01	09/04/20	DB	Issue for Stage Approval	MD



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Project WHITECHURCH FLOOD ALLEVIATION SCHEME
Section 177AE of the Planning & Development Act 2000 (as amended)

Title PLANNING APPLICATION DRAWINGS
Trash Screen Detail

File Identifier	Drawing No.	Status	Rev
MDW0825-RPS-00-XX-DR-C-DR4002	DR4002	S4	P01.02

Appendix B

Consultation responses

MEMO

Date: 25 March 2019
To: Peter Maxwell
From: Tim Ryle
Pages: 2 inc. this page
Regarding: Whitechurch Flood Alleviation Scheme

Summary record of meeting between SDCC & RPS with IFI

Present:

Gretta Hannigan (GH) - Senior Fisheries Environmental Officer, Inland Fisheries Ireland
David Grant (DG) – Senior Project Engineer, South Dublin County Council
Chris Galvin - Senior Engineer, South Dublin County Council
Tim Ryle (RPS) – Senior Ecologist, RPS

Peter

The following is a summary of the observations and recommendations provided by Gretta Hannigan. They relate to the section of the meeting for which I was present (I was brought in half way through the meeting after SDCC had outlined the project requirements to IFI).

- Ideally, IFI would prefer no trash screens, but in relation to this project accepted their need.
- Similarly for “Totem Pole” in St. Enda’s
- Designers should be cognisant of recent guidance documents for screen design.
- IFI note that the Owendoher River is the “jewel” of the Dodder system in relation to aquatic potential. Water quality is good and brown trout nursery present (the Whitechurch stream should be considered similarly and that despite the physical impediments e.g. the very steep drop in watercourse in upper St Endas park, that distinct brown trout populations could be expected upstream of the project
- Discussion on the small section of realignment at Fort Garage – this is season dependant e.g. instream works only allowed with agreement of IFI between **July** and **September**. Discussion regarding potential to undertake some works offline in other months, but unlikely viable owing to land constraints.
- IFI reiterated that any temporary river crossings should preferably be by Bailey bridges but that given the nature of the project, that instream pipes (appropriately positioned with the pipe invert **below** river bed) could be considered if required and after sizing by flood designer. Their installation should ensure

Date: 25 March 2019
Regarding: Whitechurch Flood Alleviation Scheme

continuity of waterflow even in summer periods (IFI might consider permission to install in May, but typically only allowed to be installed and removed in the 4-month summer period or the following year.

- IFI also noted that haul roads if required should be away from watercourse
- Issues that IFI require is a robust CEMP that clearly specifies
 - Silt measures or runoff to ensure reduction of siltation in watercourses. The assessment can refer to generic features for the assessment, but the final CEMP must detail them.
 - Biosecurity measures – clean site, etc.
 - Clean soil importation – Agreed that a guarantee letter from suppliers confirming absence of Invasive plant species etc would be a requirement
 - Similarly for rubble/boulders, it should be washed and RPS understand this to mean free from fine material (as far as is practical)
 - Best practice measures regarding use of concrete near watercourses and protective measures to be implemented
 - Best practice measures regarding storage of excavated spoil etc away from watercourse and ensuring no runoff. DG explained that temporary storage area would likely be in St Enda's car park away from watercourse.
 - Gabions not preferred e.g. at Funeral Home – IFI prefer **large boulders** be emplaced and asked that designers are made aware of this, the base of which is sunk beneath the original river level. Smaller boulders can be stacked on top to provide additional protection against scour/undermining of the bank.
 - Silt protection measures need to be best standard practice measures that are robust and will ensure no runoff from
 - Regrassing of bared ground should be undertaken as soon as is practical to reduce risk of runoff
- In terms of Aquatic survey, IFI identified different licences that might be required. RPS confirmed in receipt of national Crayfish survey licence. RPS do not have a Section 14 survey licence from DMNR (e.g. electrofishing permit) nor the capability to undertake same. However, based on the level of survey planned and the nature of the project, IFI unlikely to seek one in respect of enumerating fisheries stock.
- RPS explained about the potential need to remove trees - mostly sycamores etc to facilitate works. Full extent not complete as terrestrial surveys outstanding. IFI was interested in the proposal to plant two areas of native trees along the route.
- GH indicated a willingness to walk the route with DG if required.

Tim Ryle
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RE: Whitechurch Stream FAS - Amended design drawings







Gretta Hannigan <Gretta.Hannigan@fisheriesireland.ie>

To: Tim Ryle

Cc: Mesfin Desta; Roisin O'Callaghan; Josie Mahon

 You replied to this message on 24/03/2020 15:08.

 Reply  Reply All  Forward 

Tue 24/03/2020 12:17

CAUTION: This email originated from outside of RPS.

Tim,

Thank you for the draft drawings for the Whitechurch stream Flood Alleviation Scheme.

I don't need to go into the merits of a well vegetated river bank in maintaining a healthy aquatic environment sufficient to say every effort should be made to maintain a diverse riparian zone of native species throughout. Only where all other options are exhausted should sheet piling be considered. We do not favour the installation of thrash screens on culverts particularly on a system as the Whitechurch where Brown trout move up and down continuously, debris traps will also require consideration and must not impact the unhindered passage of fish. Please keep us posted on progress on the design.

Kind regards,

Gretta

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Appendix C

Aquatic report

WHITECHURCH STREAM FLOOD ALLEVIATION SCHEME

Aquatic Ecology Survey



Whitechurch
Aquatic Ecology Survey
F01
06 Jul. 2020

REPORT

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
A01	Client Approval	CR LC	TR	MD	26/04/19
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Approval for issue

Mesfin Desta



6 July 2020

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1 INTRODUCTION

This report was prepared to investigate the macroinvertebrate community and habitat quality for the Whitechurch Stream and Owendoher River with regard to the following protected aquatic species; salmon (*Salmo salar*, Annex II,V), lamprey (*Lampetra fluviatilis* Annex II, V, *Lampetra planeri* Annex II, *Petromyzon marinus* Annex II) and white clawed crayfish (*Austropotamobius pallipes* Annex II,V). Visual signs and/or presence of otter (*Lutra lutra*), an Annex II and IV species, were noted during the aquatic survey but results are discussed in the Terrestrial Ecology report (RPS 2019). In addition, habitat was assessed to include a further salmonid species, e.g., brown trout (*Salmo trutta*) and is referred to as salmonid habitat.

The purpose of gathering the above baseline aquatic information is to help inform an Ecological Impact Assessment of a proposed flood alleviation works to be carried out within the Whitechurch Stream. The EPA name for this watercourse is the Kilmashogue, while it is also locally known as the Glynn/Glin River. For the purposes of this report, it shall be referred to as the Whitechurch Stream.

The proposed works encompass a 1.3km section of the Whitechurch Stream from the Southern end of St. Enda's Park to the confluence with the Owendoher River. Proposed works include; the removal and/or replacement of existing structures, bank improvement works, raising existing walls, inserting debris traps, construction of new bank hard defences and some conveyance improvement.

1.1 Existing Environment

1.1.1 Water Bodies

The site of the flood alleviation works is located within the Whitechurch Stream (EPA Code: 09K06, EPA River Waterbody Code IE_EA_09O011700). The EPA name for this watercourse is the Kilmashogue, it is also called the Glynn River but in this report it is referred to as the Whitechurch Stream. This stream rises from Kilmashogue and Tibbradden Mountains and flows in a northerly direction. It flows under the M50, through Marley Park, Grange Golf Club and Saint Enda's Park. It then runs parallel with the Whitechurch Road being diverted underground for short sections and then enters the Owendoher River (EPA Code: 09O01, EPA River Waterbody Code: 09O11700) at the Whitechurch/Ballyboden /Willowbrook roads junction. There are a number of weirs located along the length of Whitechurch Stream (4 weirs and 6 culvert/bridge structures). The Owendoher flows north for another 0.84km before flowing into the Dodder River and it too has a number of weirs along its length (10 weirs and 16 culverts) (RPS 2016).

Both the Whitechurch Stream and the Owendoher River become urbanised in their lower reaches and are spate rivers characterised by rapid increases in water levels. Both form part of the Dodder_SC_010 WFD sub-catchment.

1.1.2 Salmon (*Salmo salar*), Brown trout (*Salmo trutta*) and Lamprey (*Lampetra* spp.)

A review of Inland Fisheries Ireland records (www.wfdfish.ie) showed that there are no survey sites located on the Whitechurch Stream. Research in the 1980's was conducted within the Owendoher and Whitechurch Stream. It was concluded that both were important wild brown trout nursery streams. The Whitechurch was noted as being a very highly productive stream for juvenile brown trout (0+ to 2+) and recorded high densities of trout (maximum 1.29 fish/m² near Marley Park) (Kelly-Quinn 1986, Kelly-Quinn 1988).

Monitoring has been carried out by the IFI in the upper reaches of the Owendoher and along the length of the Dodder River.

Within the Owendoher an electric fishing survey was conducted in 2011 at Cruagh Bridge on the R116, approximately 1km southeast of Rockbrook near Edmondstown. Brown trout were the only species recorded ranging in two ages classes (1+ and 2+), younger fish accounted for 85% of the total brown trout catch.

The IFI's 2011 WFD assessment the Owendoher scored '*Poor Ecological Fish Status*' and recorded the lowest diversity within the ERBD catchment surveyed, the report named the presence of barriers to fish migration as primary impact on fish community, composition and population structure.

Within the Dodder, an electric fishing survey was carried out at the footbridge at Beaver Row, Donnybrook in 2008. Salmon and brown trout were the most abundant fish species recorded followed by eel, minnow, stone loach and sea trout. While salmon were found within the Dodder river, they can only travel upstream as far as Clonskeagh Weir which poses as a barrier to upstream migration. Further upstream the Dodder at Bushy Park where the Owendoher enters the Dodder, brown trout was the most abundant species identified followed by European eel, lamprey spp. minnow, stoneloach and three-spined stickleback in a 2014 IFI survey. Here the Dodder scored '*Good Ecological Fish Status*' in 2014.

The Owendoher River and Whitechurch Stream have been identified as waterbodies which are at risk of not meeting WFD objectives due to significant river hydro-morphological pressures (www.catchments.ie). Therefore, it is believed that salmon cannot access the upstream reaches of the Dodder past the Clonskeagh weir and therefore and not considered to be present within Owendoher River and Whitechurch Stream.

Fish populations are protected and supplemented through routine fisheries management measures, in addition to annual stocking by such organisations as the Dodder Anglers Club, a club with a membership of over 1,000 with a special interest in the river.

Lamprey spp. (either river or brook) have been recorded within the Dodder River from Beaver Row to Oldbawn during IFI surveys (IFI 2013, IFI 2014). Oldbawn is upstream of the Owendoher confluence with the Dodder. A desktop search did not reveal any records of sea lamprey within the Dodder and as with salmon the weir at Clonskeagh Bridge would act as a barrier to further upstream migration.

1.1.3 White-clawed crayfish (*Austropotamobius pallipes*)

A review of the National Biodiversity Data Centre maps indicates that there are no records of crayfish within the Dodder sub-catchment and the outer circle of the M50 appear to represent the most easterly distribution of crayfish. Crayfish have been identified within the adjoining sub-catchment (Liffey_SC_090) with records from the River Camac in 2007 (EPA Code: 09C02) at the Riversdale Estate Br (O 072 316, EPA 2013, EPA biologist). (www.biodiversityireland.ie).

1.1.4 Surface Water Quality and Risk Characterisation

Work for the Whitechurch Flood Alleviation scheme will be carried out within the Whitechurch Stream upstream of the Owendoher River confluence. The waterbody Owendoher_010 incorporates both the Whitechurch Stream and Owendoher River. The Owendoher_10 has been at Moderate WFD Status for the last two monitoring cycles (2010-2012 and 2010-2015) which represents an improvement from its previous Poor WFD status in 2007-2009 (**Table 1-1**). Both waterbodies are "At Risk" of not achieving WFD objectives and the Owendoher_010 is part of the Dodder Area for Action, which is a prioritised water body within the current River Basin Management Plan 2018-20121. One of the reasons it has been prioritised is because the Dodder is an important trout fishery, recruitment, salmon in the lower reach and ongoing work for removal of weirs to allow salmon to pass.

Table 1-1 Summary of WFD status for the Owendoher 010

EPA Waterbody Name	Code	Risk	WFD Status 2007-2009	WFD Status 2010-20012	WFD Status 2013-20015
Owendoher_10	IE_EA_09O011700	At Risk	Poor	Moderate	Moderate

2 METHODOLOGY

On the 9th April 2019, an RPS aquatic ecologists carried out a survey at three sites within the Whitechurch Stream and one site on the Owendoher River downstream of the Whitechurch Stream confluence. Q-value surveys (macroinvertebrates) were conducted at all four sites.

The suitability of habitat for the following Annex II protected species was also assessed; white-clawed crayfish, salmon and lamprey spp. In addition, habitat was assessed to include a further salmonid species, brown trout (*Salmo trutta*) and is referred to as salmonid habitat.

An electric fishing survey was not conducted. The surveyor walked the length of the Whitechurch Stream from the Owendoher to where it enters St. Enda's Park and any fish present were noted, in particular pools were investigated for resting fish. This encompassed the extent of the proposed works.

2.1 Macroinvertebrate Survey

Macroinvertebrates were collected using a two-minute kick sampling method with a standard hand net (0.5 mm mesh). Survey technique adhered to the ISO Standard (10870:2012) for kick sampling and utilised the Environmental Protection Agency (EPA) standard protocol and RPS recording sheets. Stone washing was also undertaken to ensure collection of species which cling to rock surfaces.

Q-values and water quality classes are assigned using a combination of habitat characteristics and the structure of the macroinvertebrate community within the waterbody. Individual macroinvertebrate taxa are ranked for their sensitivity to organic pollution and the Q-value is determined based on their relative abundance within a sample.

The macroinvertebrate survey was conducted in early April. The Q-value is usually applied in summer/autumn when anthropogenic pressures are greatest on macroinvertebrates due to lower flows and higher temperature. The number of sensitive species excepted in winter is higher due to a combination of flow and species life cycles and therefore the Q-value may be higher in winter compared to summer/autumn samples. This seasonal difference was taken into account when calculating the Q-value.

The Environmental Quality Ratio (EQR) represents the relationship between the values of the biological parameters observed for a body of surface water and the values for these parameters in the reference conditions applicable to that body. The ratio is expressed as a value between zero and one, with high ecological status represented by values close to one and bad ecological status by values close to zero. In Ireland it is calculated as Observed Q-value/Reference Q-value (i.e., Q5). The EQR allows comparison of water quality status across the European Union as each Member State has an EQR value for 'High'; 'Good' etc., based on an intercalibration of boundaries between water quality categories e.g., 'High-Good'; 'Good-Moderate'.

EPA indices, EPA water quality status and Water Framework Directive (WFD) status are interpreted in **Table 2-1**.

Table 2-1: EPA biotic index (Q-value) and equivalent WFD water quality status classes

Biotic Index	EQR ¹	EPA Quality Status	WFD ² Status
Q5	1.0	Unpolluted	High
Q4-5	0.9	Unpolluted	High
Q4	0.8	Unpolluted	Good
Q3-4	0.7	Slightly Polluted	Moderate
Q3	0.6	Moderately Polluted	Poor
Q2-3	0.5	Moderately Polluted	Poor
Q2	0.4	Seriously Polluted	Bad
Q1-2	0.3	Seriously Polluted	Bad
Q1	0.2	Seriously Polluted	Bad

(colour coding as employed under the WFD as specified in Schedule 3 of S.I. No 272 of 2009: High – blue, Good – green, Moderate – yellow, Poor – orange, and Bad – red)

2.2 Habitat Assessments

The habitat assessment included surveys for a general river habitat survey, crayfish/lamprey/salmonid habitat potential and invasive aquatic species. The general physical characteristics and hydromorphological features of each site were recorded including substrate, flow types and aquatic vegetation during surveys. All sites were assessed in terms of:

- Stream width and depth;
- Substrate type, listing substrate fractions in order of dominance;
- Flow type, listing prevalence of flow types in the area;
- Instream vegetation, listing plant species occurring and their percentage coverage of the stream bottom at the sampled area;
- Dominant bankside vegetation, listing the main species overhanging the watercourse;
- Estimated cover by bankside vegetation, and estimated shading of the sampling site, and
- The degree of siltation was recorded on a scale of clean, slight, moderate and heavy, prior to kick sampling.

The rating of habitat for salmonids, crayfish and lamprey is on a scale of *None/Poor/Fair/Good/Very Good/Excellent*. This rating assesses the physical suitability of the habitat; the presence/absence/density of

¹ EQR = Environmental Quality Ratio (Observed/Reference)

² WFD = Water Framework Directive (EPA, 2006)

the species in question will also depend on present and historical water quality and accessibility of the section to these species.

A rating of;

'None' indicates that the ecologist carrying out the assessment regards it as impossible that the watercourse could support the species in question in the relevant life stage.

'None – Poor' indicates that it is regarded as possible but extremely unlikely that the stream could support the species in the relevant life stage.

'Fair' indicates that it is possible that the stream section could support the species in question.

'Good' indicates that the ecologist considers it possible and likely that the stream could support the species in question.

'Very Good' indicates that the stream certainly could support the species.

'Excellent' indicates that the ecologist regards the stream as the ideal habitat for the species in question.

2.2.1 Criteria used for Assessment of White-clawed Crayfish Habitat Quality

Assessment of the quality of crayfish habitat is based on published information on the habitat criteria for crayfish (Holdich 2003, Peay 2002 and Peay 2003) as well as the surveyor's personal experience in aquatic sampling and research. The white-clawed crayfish occurs in areas with relatively hard, mineral-rich waters on calcareous and rapidly weathering rocks. Crayfish are found in a wide variety of environments, including canals, streams, rivers, lakes, reservoirs and water-filled quarries and are typically found in watercourses 0.75 m to 1.25 m deep, but the species may occur in very shallow streams (about 5 cm of water) and in deeper, slow-flowing rivers (2.5 m). They occupy cryptic habitats under rocks and submerged logs, among tree roots, algae and macrophytes, although they usually emerge to forage. Juveniles, in particular may also be found among cobbles and detritus such as leaf litter. Adults may burrow into suitable substrates, particularly in the winter months. The presence of juveniles and a varied size range of adults are indicative of a breeding population.

White-clawed crayfish may be found associated with:

- Undermined, overhanging banks;
- Sections exhibiting heterogeneous flow patterns with refuges;
- Under cobbles (juveniles) and rocks in riffles, and under larger rocks in pools;
- Among roots of woody vegetation, accumulations of fallen leaves and boulder weirs;
- Under water-saturated logs;
- Slow-flowing glides and pools (provided there are refuges), localised velocity of 0.1m/s or less;
- Loose boulders (>25cm) or other similarly sized material;
- Boulders or large cobbles in groups with crevices between them;
- Deep crevices in bedrock;
- Underlying substrate of fine gravel/sand with some pebbles;
- Submerged refuges in stable banks (e.g. natural crevices, stone block reinforcement or stable slightly undercut banks with overhanging vegetation, large tree roots, etc);
- Unmortared stone revetting which protects banks from erosion; and
- Stands of submerged and emergent aquatic plants.

2.2.2 Criteria used for assessment of lamprey habitat quality

Each surveyed location was rated for its quality to support lamprey. Assessment of the quality of lamprey habitat is based on published information on the habitat criteria for lamprey (Maitland 2003) as well as the surveyor's personal experience in lamprey sampling. General habitat requirements are discussed for the three lamprey species that occur in Ireland (river, brook and sea lamprey). Lamprey habitat preferences change with the stages of their life cycle. They show a preference for gravel-dominated substratum for spawning similar to salmonids. After hatching, lamprey larvae (ammocoetes) swim or are washed downstream by the current to areas of sandy silt in still or slow flowing water where they burrow and spend the next few years in tunnels. Lampreys therefore require mainly silt and sand dominated substratum for nursery habitat. Other important environmental characteristics for optimal ammocoete habitat are shallow waters with low velocity, and the presence of organic detritus

Suboptimal habitat supporting only a few individuals may consist of a few square centimetres of suitable silt in an open, comparatively high-velocity, boulder-strewn streambed.

The following summarises the ecological requirements of lamprey;

- Spawning habitat is broadly similar to that favoured by salmonids. Usually occurs at the tails of pools where the gravels have been deposited from upstream and the scouring of pools but the current is still reasonably fast with some water flow through the substrate;
- Larval nursery beds are at the edges of streams and rivers, well away from the main current, and that the current over them is often not only very slow, but is actually a backwater in reverse of the main current;
- Water depth in nursery areas is typically 0.1 to 0.5 m with silty/sandy substrate;
- Channelization can be damaging to lampreys, mainly through destruction of their habitat. The removal of areas of riffle and associated spawning gravels, and the dredging of essential nursery silt beds, may entirely eliminate lampreys from a river; and
- Dams/weirs can be obstacles to upstream migration of sea lamprey.

2.2.3 Criteria used for assessment of salmonid habitat quality

Assessment of the quality of salmonid (salmon and trout) spawning, nursery and adult habitat is based on published information on the habitat criteria of salmonids (Bjorn & Reiser 1991, Hendry & Cragg-Hine 2003), water quality criteria listed in the Salmonid Regulations and the surveyor's personal experience in fish sampling and research. Habitat features important to the lifecycle of salmonids include; stream width, depth, flow type, substrate type, vegetation cover, gradient and altitude. These habitat requirements can vary during the life stages of salmonids and the proximity of juvenile habitat to spawning gravels may be significant to their utilisation. The more diverse the stream habitat in terms of substrate, flow rate, depth, riparian vegetation, light conditions etc., the richer the biological community is likely to be, and the more suitable it is likely to be for salmonids.

The presence of overturned gravels lighter in colour compared to the rest of surrounding substrate is used to indicate the presence of salmonid redds. Excessive fine sediment can be detrimental to the survival of eggs by limiting the amount of dissolved oxygen to diffuse across the egg membrane. The presence of 10% fine sediment can reduce egg survival to hatching to 43% (Cocchiglia *et al.*, 2012) Fine sediment content of substrate is assessed visually and high levels present indicate reduce spawning habitat quality.

Permanent stream structures such as culverts, dams, bridge abutments, perched aprons and weirs can present an obstacle to upstream migration to spawning sites. Salmon can surmount obstacles 2–3 m high,

providing there is an adequate pool in front of the obstruction. The presence of obstacles is also considered during a habitat survey as well as cumulative impact of many small obstacles.

The following summarises ecological requirement of salmonids;

- Salmon spawning is likely to occur where the gradient of a river is 3% or less;
- Typical spawning sites are the transitional areas between pool and riffle where flow is accelerating and depth decreasing, where gravel of suitable coarseness is present and interstices are kept clean by upwelling flow;
- Salmon fry and parr occupy shallow, fast-flowing water with a moderately coarse substrate with cover;
- Deep or slow-moving water, particularly when associated with a sand or silt substrate, does not support resident juvenile salmonids;
- Suitable cover for juveniles includes areas of deep water, surface turbulence, loose substrate, large rocks and other submerged obstructions, undercut banks, overhanging vegetation, woody debris lodged in the channel, and aquatic vegetation;
- Adults require holding pools immediately downstream of spawning gravels in which they can congregate prior to spawning;
- Cover for adult salmon waiting to migrate or spawn can be provided by overhanging vegetation, undercut banks, submerged vegetation, submerged objects such as logs and rocks, floating debris, deep water and surface turbulence; and
- EPA Q-value of Q4 or higher.

Water Quality Criteria within the Salmonid Regulations S.I. 293/1988.

- pH $\geq 6 \leq 9$;
- Dissolved Oxygen ≥ 9 mg/l (50% off the time);
- Temperature downstream of point thermal discharge not exceed (a) 21.5°C or (b) 10°C from 1st Nov to 30th Apr during reproductive season;
- Sediment ≤ 25 mg/l (annual average).

2.2.4 Compliance with the Water Framework Directive (2000/60/EC)

The potential for the proposed development to impact upon water quality is assessed in the context of the EU WFD (Directive 2000/60/EC). The WFD established a framework for the management of water resources throughout the EU. The WFD overarching goal is to achieve at least good ecological status and good chemical status for all surface waters by 2015, or by 2021/2027 via extended deadlines. The WFD aims are specified in Article 1:

- Prevent further deterioration and protect and enhance the status of aquatic ecosystems and associated wetlands;
- Promote the sustainable consumption of water;
- Reduce pollution of waters from priority substances and phasing out of priority hazardous substances;
- Prevent the deterioration in the status and to progressively reduce pollution of groundwater; and
- Contribute to mitigating the effects of floods and droughts.

The WFD established four core environmental objectives to be achieved for surface waters which include rivers, lakes, transitional and coastal waters (out to 1 nautical mile):

- Prevent deterioration;
- Protect, enhance and restore good status by 2015;
- Protect and enhance artificial and heavily modified water bodies (aim to achieve Good Ecological Potential and good surface water chemical status); and
- Progressively reducing pollution from priority substances and ceasing or phasing out emissions, discharges and losses of priority hazardous substances.

Environmental objectives are set for each water body in the River Basin Management Plan for Ireland 2018 – 2021 and are based on scientific evidence, extensive surface water quality monitoring, and risk characterisation undertaken by the EPA. The target in most cases is for a river to be of at least good status (Q4).

Figure 2.1: Aquatic survey locations



3 FIELD SURVEY RESULTS

3.1 Site 1 Owendoher River.

At this location the Owendoher is a 10m wide, widened, straightened modified River which has been reinforced with a high wall and is approximately 0.15m deep (ITM 714147 728368). The flow was normal with moderate velocity and the river composed mostly of riffle and glide habitat (50/50%). The river had no turbidity and no colour, there was light shading with no cattle access with predominantly suburban land use. The substrate was made up of mostly cobble and coarse gravel, with low siltation and low levels of plumes when disturbed.

Bank side vegetation mostly comprised of butterfly bush (*Buddleja davidii*), sycamore (*Acer pseudoplatanus*), snowberry (*Symphoricarpos albus*), ivy (*Hedera hibernica*) and butterbur (*Petasites hybridus*). Low levels of filamentous algae (*Cladophora* sp.) were present and instream boulders were dominated with bryophytes. Macroinvertebrate diversity was low with mainly Group C taxa. More class A species were expected given habitat conditions however no group C species were found in excessive numbers. *Rhithrogenia semicolorata* were numerous however this was the only class A species and given the time of the year (early April) more Class A species would be expected. A Q-value of 3-4 (Moderate) was therefore assigned. A Q4 (Good) was assigned to this river during EPA 2016 survey.

Salmonid and lamprey spawning habitat was rated as *Good* due to the presence of cobble substrate with riffle and glide habitats dominant, resting pools for adults present, and low amounts of siltation present. Levels of dissolved oxygen were found to be 11.5mg/l, a range of cover is provided by overhanging vegetation, instream woody debris making *Very Good* habitat for juvenile brown trout. (Salmon cannot access this river due to barriers in the Dodder)

There were no signs of recent dredging or channelisation of the river however it has been straightened historically. Lamprey nursery habitat was rated as *Fair* due to the presence of some sandy/mud areas available in the margins of the river however the lack of slow flow/backwater areas limited juvenile lamprey habitat.

Good crayfish habitat is present, with detritus/leaf litter providing cover and food sources along with suitable boulder habitat present. Otter spraint was found in a culvert within the Whitechurch Stream just before the confluence with the Owendoher, no crayfish remains were recorded in the spraint. It must be noted that while crayfish habitat was assessed as *Good*, there are no records within the Dodder sub-catchment for crayfish and the outer ring of the M50 represents the most easterly extent for records.

3.2 Site 2, Whitechurch Stream

This site is located downstream of the conveyance improvement works (ITM 714230 727996). Here the stream has been heavily modified through straightening, widening and reinforcement of the stream banks. The stream is 3m in width and 20cm in depth. The substrate was found to be a cobble, gravel and fine gravel mixture with low siltation. The velocity was moderate with no turbidity or no colour and light shading. The habitat composition of the river is riffle/glide. Bank side vegetation was composed of sycamore (*Acer pseudoplatanus*), willow (*Salix* spp.), nettles (*Urtica dioica*), dock (*Rumex* spp.), butterbur (*Petasites hybridus*), ivy (*Hedera hibernica*), bramble (*Rubus fruticosus* agg.) and cleavers (*Galium aparine*). The invasive species, Butterfly bush (*Buddleja davidii*) and Japanese knotweed (*Fallopia japonica*) were also recorded along the bank. Fool's-water-cress (*Apium nodiflorum*), brooklime (*Veronica beccabunga*), low levels of filamentous algae (*Cladophora*) and red alga (*Hildenbrandia*) made up the aquatic vegetation at Site 2.

Within the macroinvertebrate sample there was one A class 'numerous' (21-50%) and one 'few' (1-5%). Diversity was not reduced and no one species was dominant. A Q-value of Q4 (*Good*) was assigned.

There was *Poor-None* salmonid spawning habitat present with dominant cobble substrate, with mostly glide and some riffle habitat present and no pools.

The habitat most common in the reach was glide with a modified bank and channel. No holding pools were found d/s for resting salmonid adults. A series of small weirs plus a large weir within the reach was recorded downstream of the sample site. The stream is diverted underground for short sections (<100m) both up and downstream of the sampling site.

Fair juvenile salmonid habitat was recorded with shallow moderate flowing sections and coarse substrate. Instream cover was limited in the form of overhanging trees and 1 %boulders. River has been straightened with artificial banks.

Poor-None lamprey spawning and *Fair* nursery habitat was assigned with limit areas of slow flow, silty margins and undercutting. Adult lamprey habitat was rated as *None* due to the historic dredging and channelisation, barriers to access downstream and low percentage of boulder substrate.

Crayfish habitat was *None* with limited leaf litter, low percentage of channel boulder material. Furthermore, at this point the stream was heavily modified with reinforced banks.

3.3 Site 3, Whitechurch Stream

This sample site is located at the north-west of Saint Enda's Park upstream of a weir (ITM 714365 727522). The stream is 4m in width and 0.15 cm deep. The stream has been straightened historically. The stream has been modified with low concrete banks. The substrate composition is mostly coarse gravel and followed by cobble. The surrounding land use is parkland with access to the stream utilised by dogs noted. The velocity was moderate with no turbidity or colour present, shading was moderate. The river habitat was made up of glide (70%) and riffle (30%). Bank side vegetation comprised of native hogweed (*Heracleum sphondylium*), butterbur (*Petasites hybridus*), sycamore (*Acer pseudoplatanus*), conifer spp, holly (*Ilex aquifolium*) and ash (*Fraxinus excelsior*). Cherry laurel (*Prunus laurocerasus*) and flowering currant (*Ribes sanguineum*) were two invasive plants species found. Hildenbrandia coated the instream cobbles and low levels of Cladophora were present instream. Three-spined stickleback (*Gasterosteidae* sp.) were seen in a deep pool under the bridge upstream of the sample site.

Macroinvertebrate species at this site were diverse with 16 taxa present. One class A, *Rhithrogenia semicolorata* were numerous (21-50%) and *Amphinemura* sp. were common (6-20%) The sample site scored Q4 'Good'. There were no single taxa dominating the sample and a Q4 was assigned.

Good spawning habitat for salmonid and lamprey was found with coarse gravel and riffle/glide/pool habitat present, holding pools were also present for resting adults. However, there was slight siltation within the gravel substrate and a long weir (60cm high and 3m wide) presenting a barrier to any upward migrating adults.

There was also *Very Good* juvenile salmonid habitat with shallow fast flowing water, coarse substrate and submerged cover present. Although salmon cannot access the Whitechurch Stream this represents optimal habitat for brown trout.

Lamprey nursery habitat was *Fair* with limited areas of slow flow and mud silty margins.

Crayfish habitat was assessed as '*Fair*' with limited boulders and quite shallow flow but overhanging banks, submerged tree roots were recorded.

3.4 Site 4, Whitechurch Stream

Located at the south-west of St Enda's Park. The stream measure 3.5 in width and 0.15m deep (ITM 714444 727131). Both the channel and banks have been modified via widening and straightening, artificial bank walls (1.5m) were recorded. The substrate comprised of mostly cobble, coarse gravel and fine gravel. Parkland was the surrounding land use. The stream had moderate velocity with no turbidity or colour. The stream habitat was made up of 50% riffle and 50% glide with pools present. Willow, alder, dock, ivy and nettle made up the bankside vegetation. Invasive species present were snowberry (*Symphoricarpos albus*) and butterfly bush (*Buddleja davidii*). Aquatic vegetation included Fool's-water-ress (*Apium nodiflorum*), brooklime (*Veronica beccabunga*) low levels of filamentous algae (*Cladophora*). Three-spined stickleback was the only fish recorded.

The macroinvertebrate community showed good diversity with 21 taxa recorded. Five class A species were present with numerous *Rhithrogenia semicolorata* common *Ecdyonurus* spp. and *Amphinemura* spp. and few *Isoperla* spp. and *Chloroperla* spp. The stream was assigned Q4-5 (High) at this location.

Good salmonid and lamprey spawning habitat was available with suitable substrate present albeit slight siltation, the main habitat is riffle and glide with some pools present and Q4-5 assigned. The presence of a large 3 meter vertical weir immediately downstream forms another barrier on the Whitechurch Stream to any upstream migrating adults.

Juvenile salmonid habitat was *Fair*, with coarse substrate and moderately flowing shallow water. However, instream cover in the form of boulders, vegetation or debris was very limited. Banks have been reinforced with concrete wall and boulders.

The was *Good* lamprey nursery habitat present with sandy substrates and slow flows present in the margins

Crayfish habitat was rated as *None* due to the heavily modified banks, leaving no soft banks for burrowing, no undercut banks, limited leaf litter and suitable boulder substrate.

The results of the aquatic survey are summarised in **Tables 3-1 to 3-4** below.

Table 3-1: Site 1 Owendoher River

Site Name	Q-value	Invasive sp.	Land use	ITM
Site 1 Owendoher River	Q3-4 Moderate	Butterfly bush Snowberry	Suburban	714147 ,728368



Salmonids	Spawning: <i>Good</i> , suitable spawning substrate available with low amounts of silt present, riffle/glide/pool sequence present. Q3-4 indicating moderate water quality condition which is tolerated by brown trout but below requirements for salmon and low levels of <i>Cladophora</i> present. Salmon access to the Owendoher stream is not possible.
	Juveniles: <i>Very Good</i> conditions for brown trout with a range of instream cover provided, areas of fast shallow flow and pools present.
Lamprey	Spawning: <i>Good</i> , suitable spawning substrate available with low amounts of silt present, riffle/glide/pool sequence present. Q3-4 indicating moderate water quality condition and low levels of <i>Cladophora</i> present.
	Nursery habitat: <i>Fair</i> , silt/sandy areas and slow flowing/backwater areas available in margins but limited.
Crayfish	Habitat: <i>Good</i> , detritus/leaf litter providing a cover and food sources and suitable boulder habitat present there was no soft or overhanging banks for burrowing. Crayfish have not been recorded within the Dodder sub catchment.
Comment	Otter spraint in culvert in Whitechurch Stream just before confluence with Owendoher, fish remains in spraint.

REPORT

Table 3-2: Site 2 Whitechurch Stream


Site Name	Q-value	Invasive sp.	Land use	ITM
Site 2 Whitechurch Stream along Whitechurch road	Q4 Good	Butterfly-bush Japanese knotweed stand	Suburban	714230 727996
				
Salmonids	Spawning: <i>Poor-None</i> , dominant cobble substrate, however mostly glide and limited riffle habitat present. No pools present for resting adults and series of weirs downstream presents barrier for upstream migration. Would expect flashy conditions in high flows. Salmon access to the Whitechurch Stream is not possible.			
	Juveniles: <i>Fair</i> , Q4 assigned, shallow fast flowing water, coarse substrate present. However, Instream cover is limited with some overhanging vegetation. Stretch of stream straightened with artificial banks.			
Lamprey	Spawning: <i>Poor-None</i> , dominant cobble substrate, however mostly glide and limited riffle habitat present. No pools present for resting adults and series of weirs downstream presents barrier for upstream migration. Would expect flashy conditions in high flows			
	Nursery habitat: <i>Fair</i> , silt/sandy areas and slow flowing/backwater areas available in margins but limited.			
Crayfish	Habitat: <i>None</i> , No soft or overhanging banks for burrowing. Limited detritus instream, artificial banks, low percentage of channel boulder material. Crayfish have not been recorded within the Dodder sub catchment.			
Comment	Heron observed flying overhead.			

Table 3-3: Site 3 Whitechurch Stream

Site Name	Q-value	Invasive sp.	Land use	ITM
Site 3 Whitechurch Stream, northern end of St Endas park	Q4 Good	Cherry laurel Flowering currant	Parkland	714353 727522



Salmonids	Spawning: <i>Good</i> , coarse gravel and riffle/glide/pool habitat present, holding pools present for resting adult salmonids. Q4, Slight siltation within the gravel substrate and a large weir (3m wide) which limits upstream access spawning habitat. Salmon access to the Whitechurch Stream is not possible
	Juveniles: <i>Very Good</i> , for brown trout with undercut banks and overhanging vegetation and boulders for cover. Shallow moderately flowing water. Large weir restricting movement upstream.
Lamprey	Spawning: <i>Good</i> , coarse gravel and riffle/glide/pool habitat present, holding pools present for resting adult salmonids. Slight siltation within the gravel substrate and a large weir (3m wide) which limits upstream access spawning habitat.
	Nursery habitat: <i>Fair</i> , silt/sandy areas and slow flowing/backwater areas available in margins but limited.
Crayfish	Habitat: <i>Fair</i> , with limited boulders and quite shallow flow but undercut banks, submerged tree roots and woody debris available instream. Crayfish have not been recorded within the Dodder sub catchment.
Comment	Three-spined stickleback in deep pool under bridge upstream. Recent bankside vegetation clearance upstream of survey site.

Table 3-4: Site 4 Whitechurch Stream

Site Name	Q-value	Invasive sp.	Land use	ITM
Site 4 Whitechurch Stream	Q4-5 High	Snowberry Butterfly-bush	Parkland	714444 727131



Salmonids	Spawning: <i>Good</i> , suitable spawning substrate, Q4-5. Habitat mainly riffle and glide with limited pools for resting adults. Slight siltation. Large weir downstream presents a barrier to upstream migration. Salmon access to the Whitechurch Stream is not possible
	Juveniles: <i>Fair</i> , moderately flowing water shallow water, suitable water quality but very limited amounts of cover.
Lamprey	Spawning: <i>Fair</i> , suitable spawning substrate, water quality present, slight siltation and a very large weir downstream limited the habitat.
	Nursery habitat: <i>Good</i> , lamprey nursery habitat present with sandy/silty substrates in margins and slow flows
Crayfish	Habitat: <i>None</i> , artificial banks, no soft banks for borrowing, no overhanging banks vegetation or trees for cover and limited leaf litter and suitable boulder substrate.
Comment	Three-spined stickleback and minnow noted in stream.

4 CONCLUSIONS

Water quality results (Q-values) at the sampled locations indicate *Moderate* ecological quality within the Owendoher River and *Good* (Q4) to *High* (Q4-5) ecological quality in parts of the Whitechurch Stream. The Q-value score improved as one travelled upstream from the Owendoher and up the Whitechurch Stream. Of particular note is the *High* ecological quality within St. Enda's Park which is indicative of the potential this urbanised stream can achieve.

Salmonid and lamprey spawning habitat varied from *Poor to None* to *Good* along the Whitechurch Stream and juvenile salmonid habitat also varied from *Poor to None* to *Very Good*. While there is potential habitat for salmon within the Whitechurch Stream it is noted that their upward migration is restricted to the lower reaches of the Dodder and salmon cannot access the Owendoher and Whitechurch Stream. There is suitable habitat (both spawning and juvenile) for brown trout within the stream, in particular within St. Enda's Park (Sites 3 and 4) with *Good* to *High* ecological quality and where the stream has not been as heavily modified and confined.

No brown trout were observed on the day of survey even in pools investigated. A series of large weirs within the Whitechurch Stream would make colonisation from the Owendoher unlikely. If these barriers were removed, then there would be suitable habitat available for trout to move into. An isolated resident population may be present within the upper reaches of the Whitechurch Stream and early research conducted in the 1980's highlighted the stream being an important brown trout nursery stream.

Brown trout are known to occur within the Owendoher with *Good* spawning and *Very good* juvenile habitat observed at Site 4. This river is seen to be important brown trout nursery. Lamprey spp. are also known to occur within the Owendoher with *Good* spawning habitat and *Fair* nursery habitat observed. As a result, works within the Whitechurch Stream for flood alleviation should be cognisant of Owendoher and any release of pollutants (e.g. sediment or chemicals) could impact brown trout and lamprey populations within the Owendoher. The following measures are recommended;

1. Works to facilitate flood alleviation would need to be conducted in accordance with IFI guidance and with plans and timing of works agreed.
2. Given the importance of brown trout in the Owendoher, any instream works should be avoided. If required this should be conducted outside of the spawning season (July to September) and with IFI approval.
3. Obligations under WFD should maintain the current status of the Whitechurch Stream and Owendoher river and degradation prevented. Therefore, the necessary measures to protect water quality should be incorporated into the implementation of the flood alleviation works.
4. If de-watering is necessary to allow works to proceed, water pumped from the contained area should be passed through a settlement pond or pre-fabricated settlement tanks with oil interceptor before being discharged to the river.
5. If required, areas which may be temporarily dammed and dewatered should be kept to the minimum required. Except where absolutely necessary, machinery should operate from the bankside and not instream.
6. If the removal of any structures within the stream is required, it should be first assessed whether large volumes of sediment have not accumulated behind the structure as this will be released downstream upon removal. If this is the case, then measures will be required to prevent this. The method should be agreed with IFI and sediment disposed of correctly.
7. Where possible precast concrete should be used.
8. Any wash down from trucks, machinery should be conducted away from the watercourse and trapped on site, allowed to settle and reach neutral pH before release.

9. For construction activities close to the river bank, eroded sediments should be retained on site with erosion and sediment control structures such as sediment traps, silt fences and sediment control ponds. Sediment ponds and grit/oil interceptors should be placed at the end of drainage channels.
10. No further obstructions to fish passage should be placed in the stream which is already suffering from a number of historical barriers.

While crayfish habitat was noted at Site 3, given the lack of recorded of crayfish within the Dodder sub-catchment and barriers to access it is extremely unlikely crayfish are located within the Whitechurch Stream. No further measures to protect crayfish are therefore deemed necessary.

5 REFERENCES

- Cocchiglia, L., Curran, S., Hannigan, E., Purcell, P.J., & Kelly-Quinn, M. (2012) *Evaluation of the effects of fine sediment inputs from stream culverts on brown trout egg survival through field and laboratory assessments*. Inland Waters, 2(1), 47-58.
- Hendry, K. and Cragg-Hine D. (2003). *Ecology of Atlantic Salmon*. Conserving Natura 2000 Rivers Ecology Series No. 7. English Nature, Peterborough.
- Holdich, D. (2003). *Ecology of the White-clawed Crayfish*. Conserving Natura 2000 Rivers Ecology Series No. 1. English Nature, Peterborough.
- Kelly-Quinn, M. (1986) *A Study of Brown Trout Populations in the River Dodder Catchment with Particular Reference to the Owendoher Stream*. Unpublished PhD University College Dublin.
- Kelly-Quinn M. and Bracken J.J. (1988). *Brown trout Salmo trutta L., production in an Irish coastal stream*. Aquaculture and Fisheries Management **19** 69-95.
- Kurz, I. and Costello M.J. (1999) An outline of the Biology, Distribution and Conservation of Lampreys in Ireland. Irish Wildlife Manuals No. 5.
- Maitland P.S. (2003). *Ecology of the River, Brook and Sea Lamprey*. Conserving Natura 2000 Rivers Ecology Series No. 5. English Nature, Peterborough.
- Peay, S. (2002). *Guidance on habitat for white-clawed crayfish and how to restore it*. R&D Technical Report W1-067/TR. Environment Agency, Bristol. 66 pp.
- Peay, S. (2003). *Monitoring the White-clawed Crayfish Austropotamobius pallipes*. Conserving Natura 2000 Rivers Monitoring Series No. 1, English Nature, Peterborough.
- RPS (2016). Dodder CFRAM Study – Flood Risk Management Plan. Available online at <http://www.dublincity.ie/main-menu-services-water-waste-and-environment-water-projects/river-dodder-catchment-flood-risk>

Appendix D

Preliminary Construction Environmental Management Plan

Introduction

The preferred option for flood alleviation within the study area will require a detailed Construction Environmental Management Plan (CEMP) which will be developed in Stage II of the project. The following chapters provide a high level overview of the preliminary construction methodology in order to inform the assessment of environmental impacts at the planning stage and inform the final CEMP. It may however be considered as a preliminary draft to the final CEMP at the preliminary design stage.

Description of Proposed Works

Two options have been presented in the Preliminary Design Report as possible flood alleviation schemes for Whitechurch Stream;

Option 1- Direct Hard defences

Option 2 – Direct Defences and Conveyance Improvement (Dredging)

The flood defence works will include;

- Site Compound and site set-up
- New Sections of flood defence wall
- Repair and or/replacement of existing walls
- Construction of a debris trap in St.Enda's Park
- Construction trash screens along Whitechurch Stream
- Site clearance of woody bankside vegetation along the stream which pose a significant blockage risk.
- Bank stabilisation along vulnerable reaches susceptible to scour.
- Removal/replacement of an access bridge.
- Ancillary works e.g. provision of non-return valves on drainage outfalls, diversion and sealing of utility services, demolition of existing structures, public lighting, river railings, footpath reinstatement etc.
- Specific to Option 2 – Dredging of the river bed with weir removal, underpinning of right bank walls and bank protection measures on the left bank

Sensitive Receptors

Sensitive receptors will be identified as a result of Environmental Surveys and detailed in the associated Environmental Reports produced as part of Stage I of this project.

Control of the Construction Process

Roles and Responsibilities

The anticipated roles and responsibilities are outlined below. It should be noted that all members of staff are responsible for ensuring the requirements of the construction methodology are followed.

South Dublin County Council (DCC) Project Resident Engineer

The Project Resident Engineer is responsible for the appointment and co-ordination of competent Project Ecologists around the agreed programme of construction works.

The principal duties and responsibilities of the SDCC Resident Engineer will include:

- Dealing with all queries and complaints from the public. The Site Manager will be responsible for commuting these with the OPW and responding to each of these. The Site Manager will also be responsible for maintaining a register of complaints together with details of follow up actions which have been undertaken.
- Appointment of competent environmental/ecological resources to provide advice and monitoring during the construction phase.

OPW Engineer (Site Manager)

The principal duties and responsibilities of the OPW Engineer in relation to the final CEMP will include:

- Implementing the CEMP, monitoring the performance of subcontractors and maintaining records to demonstrate compliance with and implementation of the Construction Method Statement;
- Routinely updating the CEMP
- Ensuring all site staff receive an induction prior to starting work on-site and are provided with the relevant information concerning environmental sensitivities and protection measures;
- Production of all method statements / risk assessments and PRA's and ensuring an appropriate programme of tool box talks are developed and effectively communicated;
- Working closely with the assigned Project Ecologists to ensure environmental monitoring programmes, inspections etc. are undertaken as required;
- Ensuring that all relevant permits and consents are in place in advance of works commencing and that their requirements are adhered to; and

Project Archaeologist

The Project Archaeologist if deemed necessary will report to SDCC and will be responsible for advising on all archaeological monitoring activities, supervising works and distributing information relevant to monitoring. Their responsibilities and duties will include the following:

- Liaison with the National Monuments Service of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs as required, including applying for a testing licence in sufficient time prior to the construction phase;
- Liaison with OPW Engineer / Foreman to note where there are sites located in close proximity to the proposed development that could be inadvertently impacted during the construction phase;
- Monitor all ground disturbance works associated with the construction phase; and
- Ensure appropriate course of action is taken in the event that archaeological material is discovered during the works.

Project Ecologist

The Project Ecologists will report to SDCC and is responsible for the protection of habitats and species encountered during the construction phase. The responsibilities and duties will include the following:

- Provision of specialist input and supervision of construction activities in relation to sensitive habitats and species;
- Provision of specialist advice on ecological monitoring, and conduct surveys (e.g. otter survey), monitoring and site inspections as set out in the Environmental Impact Statement;
- Liaise with the National Parks and Wildlife Services (NPWS) and Inland Fisheries Ireland as required.

All Staff and Subcontractors

All staff and subcontractors have the responsibility to:

- Work to agreed methods and procedures to eliminate and minimise environmental impacts;
 - Note areas of sensitive receptors;
 - Understand the importance of avoiding pollution on-site, including water, noise and dust, and how to respond to an event of an incident to avoid or limit environmental impact;
 - Report all incidents immediately to the OPW Engineer/Foreman; and
 - Co-operate as required with site inspections and audits.
-

Reporting

All environmental reporting completed by Project Ecologists will be submitted to SDCC and the OPW for their records and any relevant arising actions will be recorded at the SDCC chaired monthly progress meetings.

Monitoring, Continual Improvement and Review

To ensure the CEMP remains 'fit for purpose' for the duration of the construction phase it should be reviewed and updated where necessary to ensure that it remains suitable to facilitate efficient and effective delivery of the project environmental commitments.

Environmental Complaints and Incidents

The OPW Engineer will record any environmental complaints and/or incidents on the OPW incident reporting system. All such incidents will be discussed at the SDCC chaired monthly progress meetings where their status and any arising actions will also be discussed and recorded.

Construction Works Management

Construction Period and Programme

The approximate period from construction commencement to completion of the flood alleviation works is currently estimated at approximately 12 months. This period is subject to revision following detailed design and detailed site investigation. The construction period will be finalised by the Contractor on the project at detailed design stage through consultation and agreement on suitable construction methodologies and sequencing of works with the relevant project stakeholders. A works programme will be drawn up following same for the final project CEMP.

Construction Phasing

The following construction phasing is likely for the Whitechurch stream flood Alleviation Scheme subject to consultation with the relevant statutory authorities and stake holders to agree a works programme and minimise impacts.

- **Consultation:** Consultation with relevant statutory authorities (including Inland Fisheries Ireland) to agree a works programme and detailed design which minimises impacts to aquatic ecology.
- **Site Compound and Welfare Facilities:** Site storage, welfare compound are set up and secured with pad locked gates and perimeter fencing/hoarding within St. Enda's Park.
- **Site Inductions:** Site inductions are held on site at the commencement of construction works. Through site inductions, all site personnel will be made aware of the CEMP, project environmental issues/ sensitive receptors and environmental standards etc.
- **Vegetation management:** Removal of invasive species within the work zone. Tree cutting and removal of bankside vegetation which pose a blockage risk on Whitechurch Stream and removal of tress and bankside vegetation which cause an obstruction to works required for direct flood defences.
- **Sediment Control:** Implemented throughout.
- **Construction of debris trap** within St. Enda's Park including slip way, access works and bank protection.
- **Construction of new flood defence walls/remediation** of existing walls, widening and lower of river bed where required, construction of trash screens and ancillary works. Works to be phased in line with a suitably designed traffic management plan.
- **Removal of site welfare facilities** and compound including reinstatement works within St. Enda's Park.

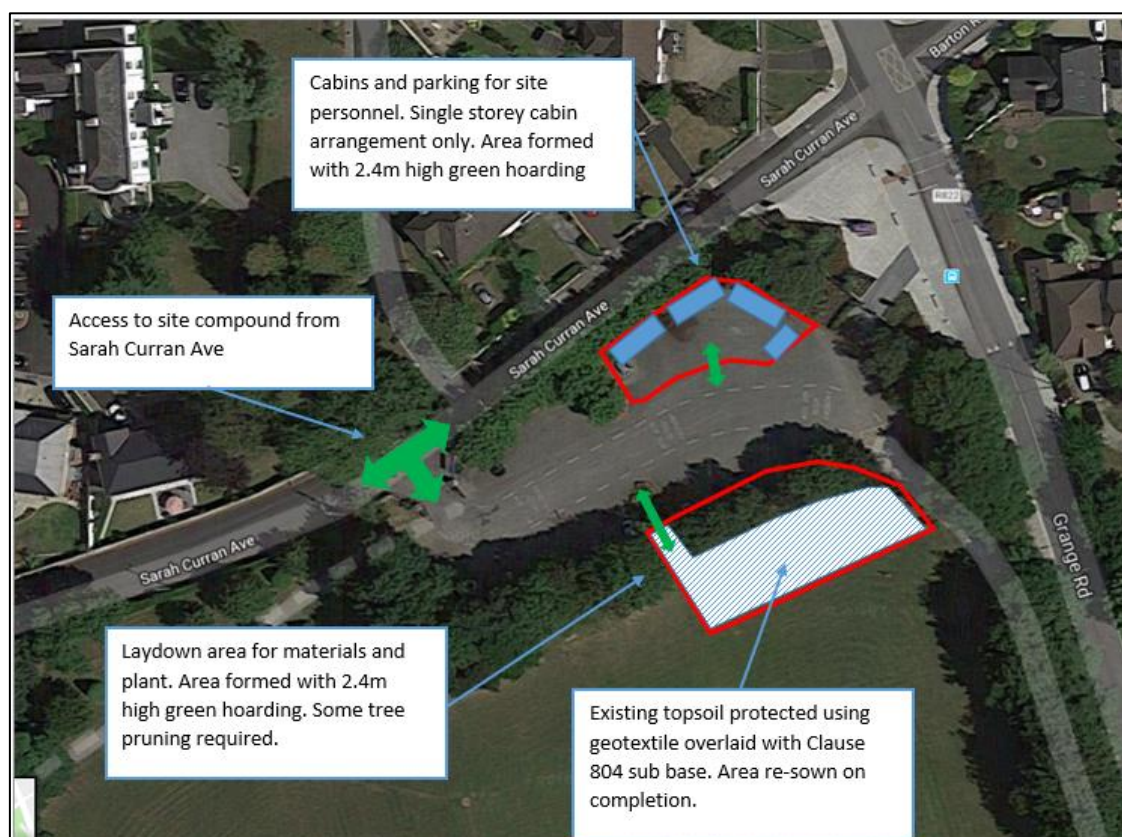
Working Hours

Construction work will be confined to the hours of 0730 to 1630 Monday to Friday. Works will not be permitted outside of these hours. In some instances, approval to vary the prescribed hours may be sought based on the following considerations:

- Nature, location and extent of work to limit potential nuisance;
- Location of the site in relation to 'sensitive' zones;
- The urgency or emergency nature of the works;
- Safety requirements such as risk to the public/workers;
- Sequential/timing issues;
- Traffic management considerations;
- Noise reduction measures;
- Measures taken to address any potential complaints;
- Requirements of other authorities (e.g. ESB, Eircom); and
- Public interest.

Site Compound and Facilities

A site compound and welfare facility will be set-up and will remain operational for the duration of the works. The compound is to be sited within St.Enda's Park with the agreement of Park Supervisor. The proposed location of the compound and welfare facilities can be seen in the Figure below.



Proposed Location of Site Compound and Welfare Facilities

Construction Equipment

During the construction programme, the following plant and equipment will be required on site for use or as contingency.

Plant Equipment	Activity
Excavators, rock breaking and piling attachments (for excavators), mobile crane, pumps, well pointing equipment (for dewatering if required), roller, compacting plates, mats (for excavators), lorries, low loader, dump trucks, dumpers, tractors and trailers, signage and traffic lights, hand held equipment and tools, scaffolding, shuttering and formwork, lighting, generators, concrete mixers, power washers, fencing equipment, road saw, asphalt paver, road sweeper	<p>Construction of reinforced concrete walls</p> <p>Installation of temporary haul roads in the channel or compound areas.</p> <p>Installation of temporary works cofferdams</p> <p>Construction of flood walls</p> <p>Reinstatement works to road pavements and pedestrian paths</p> <p>Demolition of existing redundant structures and general site clearance activities including clearing of vegetation</p> <p>Creation of new access tracks.</p> <p>Temporary traffic controls.</p> <p>Fencing for health and safety maintenance.</p>

Site Security arrangements and public health and safety

The following section details plans to ensure the general public is adequately protected from activities occurring within the site during construction. The OPW will implement documented strategies in compliance with Safety and Health Regulations to provide a safe and secure site. The works area will be maintained in such condition so as to ensure public safety.

Permits / Approvals

Permits / approvals which may be applicable to the works include:

- Permits for openings to public roads, footpaths and grassed areas; and
- Permits for abnormal loads.

The requirement of these permits will be reviewed by the OPW Engineer with the SDCC Resident Engineer prior to construction and regularly thereafter to ensure that the programme is achieved and any new consent requirements are identified as early as possible.

Safety and Security

Only authorised persons will be allowed on site. The site areas will be secured by suitable fencing or hoarding complete with appropriate signage which will advise against unauthorised entry. Before and during construction work, all excavations will be fenced so they do not pose a danger to life or property.

- Adequate lighting, safety signage and traffic controls will be provided at all times. Traffic controls and the Traffic Management Plan will comply with Chapter 8 of the "Traffic Signs

Manual” published by the Department of the Environment, Heritage and Local Government (DoEHLG) and/ and specific SDCC requirements.

- Security measures will be in place at all times when the site is not in operation. Security measures will be provided to safeguard site materials and equipment. The site compounds will be under the remote surveillance of Netwatch.
- All chemicals will be properly stored in secure areas. Required quantities of chemicals will be nominated and procedures will be put in place for the location of storage facilities, secure access and spillage procedures.

General Site Management and Upkeep

All works and potential impacts of construction will largely be contained within the confines of the works area. All precautions for public protection within the street/public domain will comply with the Building Regulations, local law and Safety, Health and Welfare requirements. Raw materials stored on the site will be adequately secured to prevent unnecessary and unsightly dispersal of the materials around the site and public areas. Trees/vegetation that is to remain will be protected where they are near the proposed demolition, excavation and construction works.

Trucks leaving the site will be adequately cleaned to ensure soil, mud and other site debris is prevented from spilling onto adjoining roads and footpaths. Roads and footpaths will be cleaned on a regular basis as required.

Emergency Plan

The project Emergency Response Plan will be included in the Health & Safety Plan and relevant details will be communicated to all site personnel as part of the induction process. This emergency plan has been prepared in compliance with relevant Safety and Health in Construction Regulations. The Emergency Plan will be activated in the event of flood events, fire, chemical spillage, cement spillage, collapse of structures, failure of equipment etc. The Emergency Plan must include contact names and telephone numbers for; Ambulance; Fire Brigade and the Garda Authorities.

Site Access and Egress

The various site road types will be constructed in accordance with the following specifications:

- If required temporary access/haul roads will be designed and constructed to accommodate the existing ground conditions. This will reduce consolidation and avoid any permanent damage to the land;
 - On completion of the construction activities, all temporary access roads will be removed and the land and/or channel reinstated.
-

Note: Temporary haul roads are unlikely to be needed due to the restricted nature of the works, however some improvement works may be required within St. Enda's Park where existing walking tracks are required to accommodate construction traffic. In addition access improvement works may be required in the Capri Site to enable access to the left bank of the river along the site.

Material Disposal / Reuse

Material will be reused as far as possible. Excavated material is to be incorporated into the embankments and final landscaping of the works area or spread locally. This will depend however on the suitability of the excavated material, and unsuitable material will be removed off site for disposal in permitted facilities.

Any material requiring disposal offsite will be disposed of at an appropriate permitted or licensed facility based on Waste Management Acts 1996 as amended. If low levels of contamination are encountered during the construction works, soil testing and a risk assessment of material shall be undertaken to assess its potential for use. In the event that disposal offsite is required, the material shall be tested for disposal at an appropriate waste management facility in accordance with the Waste management Act 1996 as amended.

Construction Restoration

The commitments to restoration and aftercare are as follows:

- During all stages of construction within the site, all reasonable measures will be adopted to confine workings to within as defined a construction corridor as possible, so as to minimise impacts on the surrounding environment;
- The excavation programme will be designed to take cognisance of the ground conditions existing within parts of the site;
- The construction programme and measures will also take account of the environmental sensitivities existing within the site;
- On cessation of works, the lands within the works footprint will be landscaped, sympathetic to the surrounding landscape character;
- All exposed soil surfaces will be seeded; and
- If required the OPW will implement a package of fishery rehabilitation works in the channel on the completion of sections of flood defence.

Environmental Control Measures

Noise and Vibration

Objectives

The following section details plans to minimise the impact of noise on the immediate environs due to construction activities associated with the Whitechurch Stream Flood Alleviation Scheme.

Operating Hours

It is proposed that working hours during the construction phase will be confined to the day time period, between at 0730 and 1630, Monday to Friday. No work shall be planned for outside these hours including weekends or Public Holidays. It should be noted that in some instances, approval to vary the prescribed hours may be sought based on the following considerations:

- Nature, location and extent of work to limit potential nuisance;
- Location of the site in relation to ‘sensitive’ zones;
- The urgency or emergency nature of the works;
- Safety requirements such as risk to the public/workers;
- Sequential/timing issues;
- Traffic management considerations;
- Noise reduction measures;
- Measures taken to address any potential complaints;
- Requirements of other authorities (e.g. ESB, Eircom); and
- Public interest.
- Emergency flood response/forecast activities.

Noise Controls

Measures will be implemented to minimise the impact of noise emissions at sensitive locations during the construction phase. Such measures will include the following:

- The OPW and their subcontractors will be required to comply with the requirements of the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations and the Safety, Health and Welfare at Work (Control of Noise at Work) Regulations;
 - All plant items used during the construction phase should comply with standards outlined in the ‘Safety, Health and Welfare at Work (Control of Noise at Work) Regulations’ and the ‘European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations’. Reference will be made to BS 5228: Part 1: 2009 (Noise Control on Construction
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and Open Sites - Part 1. Code of Practice for Basic Information and Procedures for Noise Control) and will include the following mitigation measures:

- Training of site staff in the proper use and maintenance of tools and equipment;
 - The positioning of machinery on site to reduce the emission of noise and to site personnel;
 - Sources of significant noise will be enclosed where practicable;
 - Machines that could be in intermittent use will be shut down between work periods or will be throttled down to a minimum;
 - Plant known to emit noise strongly in one direction will, when possible, be orientated so that the noise is directed away from noise sensitive areas; and
 - Plant and/or methods of work causing significant levels of vibration at sensitive premises will be replaced by other less intrusive plant and/or methods of working where practicable.
- Inherently quiet plant will be selected where appropriate particularly in the case of pump sets which will invariably be required to run continuously throughout the working shift.
 - Screening and enclosures will be utilised in areas where construction works are continuing in one area for a long period of time or around items such as generators or high duty compressors. For maximum effectiveness, a screen will be positioned as close as possible to either the noise source or receiver. The screen will be constructed of material with a mass of $>7\text{kg/m}^2$ and should have no gaps or joints in the barrier material. This can be used to limit noise impact to any noise sensitive receptors;
 - Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery and mobile equipment will be throttled down or switched off when not in use;
 - Accordingly, where possible all construction traffic to be used on site will have effective well-maintained silencers; and
 - All mobile plant will be maintained to a high standard to reduce any tonal or impulsive sounds.

Vibration Controls

Any construction works that have the potential to cause vibration at sensitive receptors will be carried out in accordance with the below limit values at the various residential and business properties. Monitoring using a Vibrock vibration monitor will be implemented prior to and throughout the works so as to obtain baseline and construction stage results.

(NRA recommended figures) 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
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8mm/s	12.5mm/s	20mm/s
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Management of Dust during construction

Objectives

The following section details plans to ensure that air quality (airborne dust and pollutants) within the environs of the Whitechurch Stream Flood Alleviation Scheme are maintained at acceptable levels throughout the construction period.

Identification of Dust Sources

The main activities that may give rise to dust emissions during construction include the following:

- Materials handling and storage; and
- Movement of vehicles (particularly Heavy Goods Vehicles) and mobile plant.
- Cutting of masonry elements

Dust Mitigation Measures

The following mitigation measures will be implemented on site during the construction phase, as required:

- Site roads shall be regularly cleaned and maintained as appropriate;
- Hard surface roads shall be swept to remove mud and aggregate materials from their surface as a result of the development works;
- Any un-surfaced roads shall be restricted to essential site traffic only;
- Any road that has the potential to give rise to fugitive dust may be regularly watered, as appropriate, during extended dry and/or windy conditions;
- On-site speed limits will be stipulated to prevent unnecessary generation of fugitive dust emissions;
- Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to wind;
- A complaints register will be maintained on-site and any complaints relating to dust emissions will be immediately dealt with;
- In periods of dry weather when dust emissions would be greatest, a road sweeper, which would also dampen the road, will be employed in order to prevent the generation of dust;
- Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods; and

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- If appropriate, dust monitoring will be carried out during the construction phase of the scheme. If the level of dust is found to exceed 350mg/m²day in the vicinity of the site, further mitigation measures will be incorporated into the construction of the proposed flood relief scheme.

Soils and Water Management

Objectives

The following section details measures to ensure soil and water resources are protected during the construction of the proposed flood relief scheme.

Soil Management Controls

- Works will be undertaken in accordance with CIRIA 650 'Environmental good practice on site'.
- To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within specially constructed dedicated temporary bunded areas.
- Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area, away from surface water gullies or drains. Plant used on haul roads within the channel shall be moved to the top of bank to a designated refuelling location.
- Spill kits and hydrocarbon adsorbent packs will be stored in a designated area and operators will be fully trained in the use of this equipment.
- Biodegradable hydraulic fluid will be used on all OPW owned and hired plant.
- Where excavation are undertaken <5m from existing structures, the design may require a number of measures to provide stability of the excavations including sheet piling or propping to existing structures. In some cases, it may be necessary to underpin the foundations of existing structures where excavations are in close proximity and to a level which is lower than that of the existing foundation. A detailed condition survey should be conducted on properties within 5m of the works prior to and post construction.

Water Management Controls

- Any raw materials, fuels and chemicals, will be stored within bunded areas to guard against potential accidental spills or leakages.
 - All equipment and machinery will have regular checking for leakages and quality of performance and will also be maintained in accordance with the manufacturer's instructions (including preventative maintenance)..
 - Biodegradable hydraulic fluid will be used in all OPW owned and hired plant.
 - Measures to be used to protect the water environment during the construction works will follow the relevant section of the NRA's documents 'Guidelines for the Crossing of
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Watercourses during the Construction of National Road Schemes' (NRA, 2005). The fisheries board documents "Maintenance and protection of the inland fisheries resource during road construction and improvement works. Requirements of the Southern Regional Fisheries Board" (Kilfeather, 2007) and 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites' (Murphy, 2004) and Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI, 2016) would also be followed where relevant.

- The river in-channel works will be carried out during dry weather and halted during heavy rainfall events to reduce suspended solids in the river. Equally, works will not be carried out on submerged haul roads during times of elevated river levels/flows.
- Spoil and removed vegetation material from the river is to be stored no less than 5m back from the river and vegetation within this 5m buffer zone is to be retained, in order to reduce the run-off of suspended solids back into the watercourse. Where this is not practicable due to space constraints, suitable bunding shall be put in place.
- All in-stream works must be carried out in accordance with an approved method statement and under the direction of Inland Fisheries Ireland personnel.

Relevant OPW Environmental Procedures

- EP10 Silt Management Procedure
- EP16 Machinery related Procedure

Web link for these provided: <https://www.opw.ie/en/media/environmental-guidance-drainage-maintenance-and-construction-2019.pdf>

Waste and materials reuse management

Objectives

The following section details plans to maximise the re-use and/or recycling of construction materials throughout the construction of the proposed flood relief scheme.

Permits/Approvals

In relation to waste and materials reuse management, only approved waste collection permit holders will be contracted for the collection of waste from the site during the construction phase of the Whitechurch Stream Flood Alleviation Scheme.

General Waste Management

To effectively manage waste on site, the following measures will be adopted:

Waste Minimisation

- Reduce waste or surplus materials on site by avoiding over-estimation of purchasing requirements, minimising packaging materials and buying environmentally approved and recycled content products;
- Ensure materials are not delivered to site damaged and unusable;
- Where possible, establish a 'take back' system with suppliers;
- Where possible, purchase environmentally approved and recycled content products; and
- Limit the amount waste going to landfill by reusing and recycling where possible.

Waste Storage & Segregation

- Ensure all wastes are handled and stored correctly;
- All wastes will be segregated and labelled appropriately;
- Provisions will be made for collection of rubbish from canteens, offices etc.;
- Waste will be stored in appropriate containers which take into consideration the physical properties, chemical composition, quantities and hazardous nature of the waste;
- Waste containers will be secure to prevent the uncontrolled release of waste and stored in designated areas, with necessary containment and protection measures to prevent uncontrolled releases; and
- Storage and collection provisions will be made for recyclable materials including cardboard, glass, metal, plastic, green waste and other materials.

Reuse & Recycling

- Provisions will be made for the re-use or recycling of any timber, paper, cardboard, glass and other materials, where appropriate.

Waste Removal & Disposal

- All waste (materials that cannot be reused or recycled) from the site will be removed off site by a suitably approved and licensed waste contractor to a licensed waste disposal facility.

Traffic management

Objectives

The following section details plans during the construction phase to ensure that the impacts to the public road network during the construction phase of the project are minimised and that transport

related activities are carried out as safely as possible and with the minimum disruption to other road users.

Traffic Management Plan

The Principal Contractor shall prepare a Traffic Management Plan for approval by the OPW and South Dublin County Council once detailed project designs are available and in advance of any construction works commencing.

Road network/ Site Access

The Whitechurch Stream Flood Alleviation scheme is accessible by several major routes. All deliveries to site should be co-ordinated via the above major routes and this will be briefed to the OPW's own delivery/transport operators as well as the supply chain.

Training and Awareness

All construction personnel, subcontractors and consultants will receive training during the site induction and toolbox talks. This will include a traffic management component to reinforce the importance of traffic management issues and the measures that will be implemented to protect the environment and community.

Site inductions and toolbox talks will highlight the specific environmental requirements for activities being undertaken at each worksite, which will include relevant traffic management matters. All drivers associated with the project are to abide by the relevant driver behaviour requirements and laws including speed restrictions, observation, fatigue management, vehicle maintenance and the onsite drugs and alcohol policy.

Matters for consideration

The below listed construction activities will impact on local traffic within the area.

- Access to and from the site compounds and satellite construction sites.
- Works along Whitechurch Road.

Deliveries to and from the site

There will be deliveries required to and from site throughout the programme of works which will include construction plant, ready mixed concrete, reinforcement steel, granular material and the removal of waste materials from the site.

Construction of the proposed scheme will require the delivery to site of significant quantities of construction materials. The bulk of these materials will be engineering fill for concrete for retaining walls. Material will be excavated and disposed off-site to permitted licensed disposal sites. Material will

be removed by heavy goods vehicles (HGV) with a capacity of approximately 10m³ capacity. HGV movements will normally be scheduled for between the hours of 1000 and 1530hrs to avoid impacting on times of peak traffic.

Traffic Management Signage

All signage shall be provided in accordance with the Department of Transport's Traffic Signs Manual, November 2010 – Chapter 8- Temporary Traffic Measures and Signs for Roadworks.

Traffic Speed Limits

Adherence to posted/legal speed limited will be emphasised to all staff and contractors during the induction training.

Road Cleaning

Regular visual cleaning surveys of the road network in the vicinity of the site will also be carried out. Where identified/ required, the OPW will carry out road sweeping operations, employing a suction sweeper, to remove any project related dirt and material deposited on the road network by construction related vehicles.

Traffic Management Mitigation Measures

The OPW will ensure that traffic management mitigation measures detailed within the Environmental Report are considered, including those listed below.

- The deliveries to and from site will be undertaken to minimise disruption to the roads network particularly during times of peak traffic flow.
- Where possible, measures will be adopted to ensure that construction traffic travels minimal distances along sensitive routes (residential or congested roads) and those vehicles will be kept clean when on public highways.
- The OPW will liaise with SDCC with sufficient advanced notice before any road closures take place.

Flora and fauna

Objectives

The following section details plans to manage the impact on the terrestrial and aquatic ecology during the construction of the proposed flood relief scheme.

Matters for consideration

Several ecological receptors may be present within the study area. Matters, with regards to flora and fauna that are to be considered during the construction phase are as follows:

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- In-channel works;
 - Bankside Works
 - Birds
 - Bat Protection
 - Invasive Species

In-Channel Works

The following mitigation measures will be implemented on site during the construction phase, as required:

- Construction method statements to include details of all constraints and mitigation measures which are to be implemented during the course of the works. All such method statements should be reviewed and accepted by IFI prior to the associated works commencing.
 - To protect salmon and trout it will be necessary to time works which require access into the channel (excludes haul roads) outside the window of October to May. The appropriate season for in-channel works for Whitechurch Stream will be determined in consultation with Inland Fisheries Ireland.
 - During pumping operations, all pumped water is to pass through suitably sized settlement tank(s) and a silt removal bag. The system is to be regularly reviewed during the working shift to monitor its effectiveness.
 - Works to be carried out off haul roads constructed from imported granular material free from contamination such as building waste. Therefore all material must be crushed virgin material and suitable for supporting heavy construction plant.
 - If it is necessary to construct a damned area within the channel, the area should be kept to a minimum and the plant should be positioned on a suitable platform or on the riverbank. Prior to dewatering a damned section of the channel, prior approval of IFI must be sought as well as advice and attendance requirements for fish rescue operations. Before any area is dewatered, suitable juvenile lamprey habitat, and suitable salmonid nursery habitat in adjacent areas of river should be identified in consultation with IFI. Following installation of dams, the enclosed waters should be electrofished by an operator (licensed by NPWS and Department of the Marine). It should be noted that the optimum period for electrofishing is July – August. All lamprey and salmonids captured should be transferred to the selected nearby habitat. All other fish should be released to the river.
 - Dedicated wash out stations shall be set up at each satellite site where it is planned to delivered ready mixed concrete. All such washout station shall be clearly signed and delivery drivers briefed.
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- The timing of the works will be agreed in advance with the National Parks and Wildlife Service and Inland Fisheries Ireland.
 - Measures to be used to protect aquatic ecology during the construction works will follow the relevant section of the NRA's documents 'Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes' (NRA, 2005)¹ and 'Guidelines for the treatment of otters during the Construction of National Road Schemes' (NRA, 2006)².
 - Brook lampreys spawn in the spring and early summer months and the timing of works will also take this species into account.
 - All necessary measures will be taken to prevent the release of oil, fuels or other pollutants into the River Dodder.
 - The OPW will ensure that measures to be used to protect aquatic ecology during construction works will follow the relevant section of the NRA's documents 'Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes' (NRA, 2005). The fisheries board documents "Maintenance and protection of the inland fisheries resource during road construction and improvement works. Requirements of the Southern Regional Fisheries Board" (Kilfeather, 2007) and 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites' (Murphy, 2004), and Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (IFI, 2016) will also be followed where relevant.
 - The works will be carried out during low river flows off temporary haul roads and existing roads to reduce suspended solids in the river.
 - If required a programme of Fishery Rehabilitation Works will be carried out following completion of flood defence works in a section of the channel.

Bankside Works

The following mitigation measures will be implemented on site during the construction phase, as required:

- Measures to be used to protect aquatic ecology during the construction works will follow the relevant section of the NRA's documents 'Guidelines for the Crossing of Watercourses during

¹ NRA (2005) Guidelines for the crossing of watercourses during the construction of national road schemes. National Roads Authority.

¹ NRA (2006b) Guidelines for the treatment of otters during the Construction of National Road Schemes. National Roads Authority.

the Construction of National Road Schemes' (NRA, 2005)³ and 'Guidelines for the treatment of otters during the Construction of National Road Schemes' (NRA, 2006)⁴.

- Refuelling of machinery will not take place at the river side.
- Runoff from wall or embankment will be prevented from entering the channel.
- Works will be carried out on a phased basis, disturbing only one river cell between bridges. This will give flora and fauna a better chance for recovery.
- River banks will be left intact where possible. Where it is necessary to disturb the bankside material, all practicable measures will be taken to prevent disturbed sediments from entering the river.

Birds

The following mitigation measures will be implemented on site during the construction phase, as required:

- An experienced Ecologist will be on site when required during construction works to provide ecological advice to avoid and/or minimize ecological impacts.
- It is recommended that woody vegetation removal be undertaken outside of the main bird nesting period which begins on March 1st and continues until August 31st. A licence is required from the National Parks and Wildlife Service under the Wildlife Acts 1976 and 2000 if any habitat (e.g. scrub, trees, hedgerows) to be removed is known to contain nesting birds. If this work is undertaken outside the breeding season (i.e. 1st March to 31st August), then such a licence would not be required and would ensure compliance with the Wildlife Act 1976 and Wildlife (Amendment) Act 2000.

Bat Protection

The following mitigation measures will be implemented on site during the construction phase, as required:

- An experienced Ecologist will be on site when required during construction works and site clearance of mature trees to provide ecological advice to avoid and/or minimize ecological impacts.

³ NRA (2005) Guidelines for the crossing of watercourses during the construction of national road schemes. National Roads Authority.

⁴ NRA (2006b) Guidelines for the treatment of otters during the Construction of National Road Schemes. National Roads Authority.

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- The OPW shall liaise with SDCC regarding the requirement for an Ecologist to attend site for tree felling / site clearance works to facilitate the proposed permanent works on the Whitechurch Stream FAS.
 - Trees and treelines should be retained where possible. Retained trees should be protected from root damage by machinery by an exclusion zone of at least equivalent to canopy cover. The storage of plant or materials within 5m of mature trees shall be prohibited.
 - Mature trees, which are to be removed, should be felled in the period late August to late October, or early November, in order to avoid the disturbance of any roosting bats as per National Roads Authority Guidelines (NRA 2006a and 2006b). Tree felling should be completed by Mid-November at the latest because bats roosting in trees are very vulnerable to disturbance during their hibernation period (November – April). Ivy-covered trees, once felled, shall be left intact onsite for 24 hours prior to disposal to allow any bats beneath the foliage to escape overnight.

Invasive Species

The following mitigation measures will be implemented on site during the construction phase, as required:

- Japanese Knotweed is known to be found along the banks of the Whitechurch Stream and exist within the proposed construction zone.
 - Pre-construction surveys of working areas will set out to identify any invasive species in the area. The timing of these surveys needs to be schedule at specific times of the year and therefore emphasises the need for forward planning of the works. The OPW will liaise with SDCC regarding pre-works surveys which need to be carried out by a competent Ecologist.
 - In the case of Japanese Knotweed, should the OPW and / or Ecologist observe this specie in a proposed work zone the following actions will be taken.
 - The issue will be reported to SDCC and to RPS Consulting and the area fenced off and appropriately signed to prohibit unauthorised access.
 - Advice sought from the Ecologist regarding the options for managing the plant.
 - The OPW will prepare a detailed method statement and submit it to the Ecologist to support a License application.
 - Where practicable, The OPW will pursue the option of pesticide treatment by a competent company. However, due to programme constraints this option may not always be feasible.
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- Burial or on site treatment of Japanese Knotweed will not normally be considered due to the space available and to avoid legacy issues.
 - The OPW will engage the services of a waste management company licensed and experienced to transport, handle, treat and dispose of the excavated arising's.
 - Where disturbance is required of material potentially contaminated with Japanese Knotweed, the material will be removed under License and the supervision of the Ecologist.
 - All staff will be briefed using tool box talks regarding the rules and protocols around handling Japanese Knotweed.
- All tracked plant used on site shall be thoroughly cleaned prior to leaving site regardless of whether there was a known issue of an Invasive Species in the works area.

Relevant OPW Environmental Procedures

- EP7 Fishery Enhancement Procedure
- EP9 Tree Management Procedure
- EP10 Silt Management Procedure
- EP16 Machinery related Procedure
- EP 17A Spread of Invasive Plant (Low Biosecurity) Procedure
- EP 17B Spread of Invasive Plant (High Biosecurity) Procedure
- EP 17D Invasive Plants Treatment Procedure
- EP 18 Salmonid Procedure
- EP19 Otter Procedure
- EP20 Lamprey Procedure
- EP22 Badger Procedure
- EP24 Birds Procedure
- EP25 Bats Procedure

<https://www.opw.ie/en/media/environmental-guidance-drainage-maintenance-and-construction-2019.pdf>

LANDSCAPE MANGEMENT

Objectives

The following section details plans to manage the impact on the local landscape during the construction of the proposed flood relief scheme.

Matters for consideration

The impact of the works on the Landscape will be considered in terms of Character and Visual impact. The impacts of both of these can be mitigated to some extent during the construction phase of the

Whitechurch Stream Flood Alleviation Scheme. The impact on character, which is concerned with alterations to physical structure of landscape or townscape that may give rise to changes in how it is experienced or perceived. Visual impact is concerned with changes that arise in existing views and the overall effects on the visual amenity of the area. The proposed construction works are likely to have some short and long term impacts on the landscape and therefore the following mitigation works are proposed.

Landscape Mitigation Measures

The following mitigation measures will be implemented on site during the construction phase, as required:

- Works will proceed only on the basis of agreed Construction Method statements for each element of the proposed works.
- Vegetation removal (particularly mature trees and tree-lines) will be the minimum required for the construction works – but shall also include for the safe removal of trees where there removal has been recommended on safety grounds.
- Retained trees should be protected by fencing prior to other works commencing ideally to an exclusion zone of at least equivalent to canopy cover – elsewhere to the maximum possible.
- Trees in the vicinity of works (i.e. within root protection area (RPA) as per BS5837) shall be subject of a detailed pre-construction tree survey carried out a qualified Arborist. Any works recommended – including crown reduction/remediation measures – shall be undertaken and the survey shall be made available to the Client.
- Disturbance to private boundaries, gardens, etc. shall be avoided wherever possible and where impacted shall be reinstated prior to completion of the works.
- Machinery shall not enter the river unnecessarily unless it is on a purposely constructed haul road above the river level.
- River banks will be left intact and vegetated wherever possible. Coppicing and/or selective removal of trees may be considered where required in preference to total vegetation removal.
- Existing characteristic features shall be removed prior to other works commencing and set aside for reuse and / or alternative use.
- All landscape, footpath, roads etc., disturbed during the course of the works shall be fully reinstated prior to the completion of the construction works.
- Japanese Knotweed is particularly common along many stretches of the river. Works on river banks should seek to control/eradicate such invasive species. The OPW shall ensure that sufficient controls are in place to prevent the spread of such species within the works area.

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- Restoration and improvement of river channel on completion of the works by implementing a package of enhancement works.

Relevant OPW Environmental Procedures

- EP7 Fishery Enhancement Procedure
- EP9 Tree Management Procedure
- EP 17A Spread of Invasive Plant (Low Biosecurity) Procedure
- EP 17B Spread of Invasive Plant (High Biosecurity) Procedure
- EP 17D Invasive Plants Treatment Procedure

<https://www.opw.ie/en/media/environmental-guidance-drainage-maintenance-and-construction-2019.pdf>

Inspection and Monitoring

Objectives

Inspection and monitoring of the environmental effects of construction activities will enable the effectiveness of environmental mitigation to be evaluated. It will also allow environmental problems to be identified and responded to an early stage. The following section outlines the monitoring activities proposed for implementation on site to optimise environmental performance during the construction phase of the development.

Matters for Consideration

Archaeological Monitoring

An experienced Project Archaeologist will be appointed by SDCC if required, prior to the commencement of works. Archaeological monitoring will be carried out in areas of moderate archaeological potential including all excavation locations associated with construction works and within the existing river channel.

All construction related excavation and ground disturbance works will be monitored in full by the appointed Project Archaeologist.

The OPW will be responsible for communicating a schedule of ground disturbance / excavation works with the appointed Project Archaeologist in a timely manner, such that monitoring may be coordinated with development works.

If archaeological features or potential archaeological features are found during the course of works, site personnel are required to stop work immediately and contact the OPW Foreman / Engineer and Project Archaeologist for instruction. The appointed Project Archaeologist has the authority to immediately

stop works in the area. All instructions/advice provided by the appointed Project Archaeologist must be adhered to unless there are overriding health and safety matters.

If newly recorded sites are detected they will be fenced off and excluded from construction works. In accordance with the requirements of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, satisfactory arrangements will be provided for the recording and removal of any archaeological material, which may be considered appropriate to remove in consultation with the relevant authorities.

Upon completion of works, the appointed Project Archaeologist will submit a written monitoring report to the OPW and the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. This report will comment on the degree to which works associated with the proposed flood relief scheme will affect any archaeological remains.

Archaeological Testing

Archaeological testing will be undertaken where required to ensure that any archaeological deposits are identified as early as possible, thereby ensuring that any loss from the archaeological record is minimised.

Under licence to the National Monuments Service of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, the Project Archaeologist will observe normal construction works in this area. Construction works in this area are to be undertaken using toothless grading bucket, thereby ensuring the early identification of archaeological deposits and minimal loss to the archaeological record.

If possible this testing should be undertaken preconstruction, to ensure that sufficient time can be allowed within the construction schedule for the excavation of any archaeological deposits discovered.

Ecological Monitoring/ Inspection

An experienced Ecologist will be appointed for the construction phase to ensure the ecological mitigation measures identified within the Environmental Report(s) are implemented.

In consultation with the OPW, authority will be given to the Project Ecologist to authorise, oversee and identify actions, including any temporary stoppage of works, to ensure satisfactory construction arrangements and any necessary mitigation for the protection of site ecology (terrestrial and aquatic). It is proposed that the Project Ecologist will also carry out or supervise the monitoring programmes relating to the protection of site habitats and species.

Site monitoring by the assigned Project Ecologist is required so as to advise the site staff regarding pollution controls, fish management, minimising localised tree clearance impacts, habitat reinstatement

(replanting) and conducting updated pre works otter, badger and bird surveys. Specific ecological monitoring required is discussed below.

Retained hedgerows/trees/woodland

The Project Ecologist will inspect works in areas where adjacent hedgerows, trees and woodland habitats are to be retained to ensure they are marked/ fenced off. This is to avoid indirect damage to these habitats. No materials should be stored within 5m of retained hedgerows/trees/woodland. Materials, especially soil and stones, can prevent air and water circulating to the roots of trees/shrubs.

Otter survey

Preconstruction survey may be required if a year has passed between grant of permission and commencement of works. During vegetation clearance along the Whitechurch Stream, the Project Ecologist will resurvey this area. If a holt is found, appropriate mitigation following NRA *Guidelines for treatment of otters prior to construction of road schemes* (NRA 2006) will be implemented. These surveys will include assessing breeding activity within the site and submission of a license application to the National Parks and Wildlife Service, if required.

Birds

If vegetation removal works are to be undertaken between the 1st March and 31st August (i.e. the bird breeding season), the Project Ecologist will inspect these habitats (trees/scrub/hedgerows) to determine if any nest sites are present. If a nest is present within any habitat to be removed, then a licence application to the National Parks and Wildlife Service will need to be submitted.

Translocation of fish

If necessary and in consultation with Inland Fisheries Ireland, the translocation of fish from the existing channel to the new channel will be undertaken using a specialist contractor engaged to do this work. This work will be supervised by an IFI representative to ensure approved methods, as per the provided and approved contractor method statement, are being used.

Water quality controls

The Project Ecologist / IFI representative will periodically inspect the silt removal system during the construction stage to ensure they are working effectively. The Project Ecologist / IFI representative will also carry out inspections on site to ensure that spoil and removed vegetation material from the river is to be stored no less than 5m back from the river and vegetation within this 5m buffer zone is to be retained. This is to reduce the run-off of suspended solids back into the water course.

Dust Monitoring

During long periods of construction work activity dust monitoring is recommended near site boundaries/sensitive receptors. The TA Luft/VDI 2119/Bergerhoff Method of dust emission monitoring will be employed. It is recommended that the TA Luft total dust deposition limit value (soluble and insoluble) of 350 milligram per square metre per day be adopted. If dust levels are found to be higher than 350 milligram per square metre per day, further mitigation measures will be required.

Traffic

Continuous monitoring by the OPW will be required to ensure that the Traffic Management Plan does not result in unnecessary delays to traffic using the surrounding road network. This will be done by visual inspection of traffic queues during peak times and then an adjustment of the plan if required.

Environmental Site Auditing/Inspections

The OPW will be required to demonstrate how the requirements of this CEMP are being complied with.

Environmental audits will be undertaken on site on a regular basis, to ensure that the mitigation measures proposed in the CEMP are implemented. The topics for environmental inspection and monitoring during and, where appropriate, following construction will include, but not limited to, the following:

- Sediment control and water quality;
- Construction traffic management;
- Construction waste management;
- Construction noise management;
- Construction Air & Dust;
- Protection of Site Ecology;
- Protection of Site Archaeology;
- Material and plant storage areas;
- Fuel storage and handling;
- Site Reinstatement; and
- Complaints Management.

All audits will be completed by a suitably qualified person. Written records of environmental site audits reports are to be maintained on site and any required corrective actions or recommendations will be circulated to all the Project Team, including the OPW for implementation.

In addition to Environmental Site Audits correction actions, any additional monitoring or maintenance requirements specified by regulatory authorities will be fully complied with.

Conclusions

The preferred option for flood alleviation within the study area will require a detailed Construction Environmental Management Plan (CEMP) which will be developed in Stage II of the project. This construction methodology/preliminary CEMP has been developed to demonstrate the commitment to Environmental Management. It may be considered as a preliminary draft to the final CEMP at Stage I of this project.

The construction methodology/preliminary provides a high level overview of the preliminary construction methodology in order to inform the assessment of environmental impacts at the planning stage and inform the final CEMP. It considers possible environmental measures that are to be implemented and the procedures to be followed for the scope of construction works to ensure that potential environmental impacts are effectively managed, minimised and / or eliminated.

This preliminary CEMP details the roles and responsibilities of the OPW, Engineer and other staff and how these controls are to be implemented. The final CEMP is an overarching document with a Construction Method Statement to be provided prior to commencement of each stage which will be required to accord with the requirements of the CEMP.

The final CEMP will require regular monitoring prior to the commencement of each stage of works and through the construction period to ensure potential risks are adequately managed throughout the construction works phase.
