

Jacobs

Cork Line Level Crossings

Natura Impact Statement

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Iarnród Éireann



Cork Line Level Crossings

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Executive Summary

Córas Iompair Éireann (CIÉ) is proposing to eliminate/upgrade seven public road level crossings on the Dublin-Cork Railway Line. The application is being made by CIÉ it is Iarnród Éireann (IÉ), a wholly owned subsidiary of CIÉ, who has developed the proposed Project from concept to application stage.

A Screening for Appropriate Assessment (AA) was undertaken to assess the potentially affected European sites (Special Area Conservations and Special Protection Areas) (SAC and SPA) within the vicinity of the proposed Project sites. A desktop study and field surveys were undertaken to inform the AA process.

The Screening for AA for the proposed Project concluded that there was potential for Likely Significant Effects on European sites, namely the Blackwater River (Cork/Waterford) SAC and Kilcolman Bog SPA. Therefore, an AA of the proposed Project is required. The scientific assessment to inform the AA is documented within this Natura Impact Statement (NIS).

The Blackwater River (Cork/Waterford) SAC is designated for a number of water dependant qualifying interest (QI) species and habitats, including freshwater pearl mussel, Atlantic salmon, lamprey spp. and otter. This SAC was identified as being hydrologically linked to the proposed Project and therefore required additional assessment. The proposed Project is also within 4.3km of Kilcolman Bog of which whooper swan are a qualifying interest. This species has been recorded in close proximity to the proposed crossings and therefore it was necessary that this European site was also progressed to AA.

The Screening assessment identified that in the absence of mitigation the proposed Project had the potential to undermine the conservation objectives of QI species of the Blackwater River (Cork/Waterford) SAC. Water dependant habitats and species were identified as being particularly at risk from effects associated with pollution, sedimentation and a reduction in water quality. Mitigation measures including surface water management have been prescribed to prevent sediment and pollution run-off from the proposed Project site during construction. Mitigation measures will be implemented by the contractor through their inclusion in the Construction Environmental Management Plan. These mitigation measures will ensure that there are no adverse effects on the integrity of the Blackwater River (Cork/Waterford) SAC.

In relation to Kilcolman Bog SPA, where works cannot be completed outside the critical period of October – March, the period when whooper swans are present in Ireland, there is potential for visual disturbance to this species. Mitigation measures including screening of the works area have been prescribed to avoid impacts to whooper swan from visual disturbance during construction.

The conclusion of this NIS is that with the application of mitigation it is considered that there will be no adverse effects on the integrity of the Blackwater River (Cork/Waterford) SAC and Kilcolman Bog SPA, either alone or in-combination with other plans or projects in light of the site's conservation objectives.

1. Introduction

1.1 Project Background

Córas Iompair Éireann (hereafter referred to as (CIÉ) or ‘the Applicant’, is applying to An Bord Pleanála (ABP) for a Railway Order under the Transport (Railway Infrastructure) Act 2001 (as amended and substituted) to eliminate/upgrade seven public road level crossings on the Dublin-Cork Railway Line (hereafter referred to as the proposed Project) (Figure 1.1). The application is being made by CIÉ it is Iarnród Éireann (IÉ), a wholly owned subsidiary of CIÉ, who has developed the proposed Project from concept to application stage.

The options considered include straight closure, provision of alternative access/overbridge and the upgrade to a Closed Circuit Television (CCTV) level crossing.

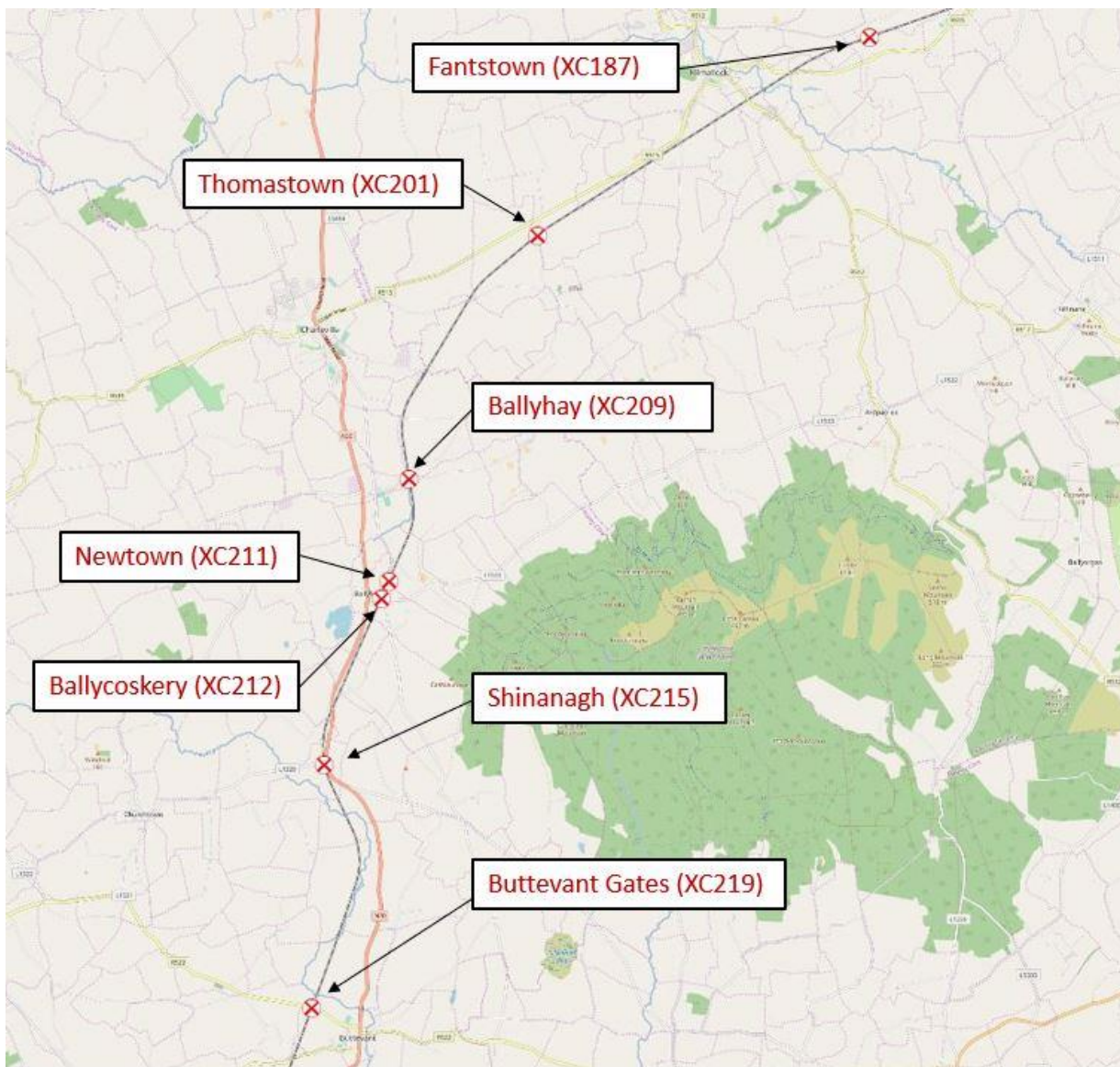


Figure 1.1: Overview of the 7no. public road level crossing sites.

1.2 Project Rational

The National Development Plan (2018-2027) sets out that the Dublin-Belfast, Dublin-Limerick and Dublin-Cork lines will be "subject to an examination to move to higher speeds leading to improved connectivity to regional cities through improved rail journey times".

The Cork Line Level Crossings Project is an improvement to Ireland's railway network infrastructure and is principally driven by the need to improve safety. In the first six months of 2019, Iarnród Éireann reported 51 incidents at level crossings across the network, an increase of 82% on the same period in 2018. This figure includes cars and HGVs colliding with barriers and near-misses between vehicles and trains. The 2030 Rail Network Strategy Review sets out that a broad strategic goal for the rail network is to provide safe accessible and integrated rail services that contribute to the sustainable economic and regional development in an efficient manner. A major part of this goal is the closure or upgrading of level crossings as train collisions with vehicles at level crossing remains one of the single biggest accident types that contribute to overall risk on the rail network.

Proposed works at each crossing are as follows:

- XC187 Fantstown: to be closed and road users diverted to the east to an existing overbridge.
- XC201 Thomastown: to be closed and alternative access to be provided through new road alignment and construction of a new road-over-rail bridge.
- XC209 Ballyhay: to be upgraded to a CCTV public road level crossing.
- XC211 Newtown: to be closed and traffic to be diverted via new road alignment.
- XC212 Ballycoskery: to be closed and alternative access to be provided through new road alignment and construction of a new road-over-rail bridge.
- XC215 Shinanagh: to be closed and alternative access to be provided via new road alignment to existing bridge.
- XC219 Buttevant: to be closed and alternative access to be provided through new road alignment and construction of a new road-over-rail bridge.
- CCTV is proposed at Ballyhay only.

1.3 Legislative Context

Volume 2, Chapter 4 EIA Process and Methodology sets out the full legislative context for the proposed Project.

Articles 6(3) and 6(4) of the Habitats Directive (92/43/EEC) set out the decision-making tests for plans and projects likely to affect European sites. Article 6(3) establishes the requirement for Appropriate Assessment (AA):

"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to Appropriate Assessment of its implications for the site in view of the site's conservation objectives. In the 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 [Natura 2000] 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."

The Habitats Directive has been transposed into Irish law by the Planning and Development Act 2000 (as amended) and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011). The first step of the AA process is to carry out a screening to establish whether, in relation to a particular plan or project, there is potential for LSEs to any European site(s).

Natura 2000 is an ecological network of protected areas, set up to ensure the survival of Europe's most valuable species and habitats. Sites within the Natura 2000 Network are referred to as European sites and include Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). SACs are designated for the conservation of Qualifying Interests (Qis), Annex I habitats and Annex II species (other than birds). SPAs are designated for the conservation of Special Conservation Interest (SCI) Annex I birds and other regularly occurring migratory birds and their habitats. A number of Natura 2000 sites in Ireland are candidate sites. However, candidate Natura 2000 sites are afforded the same protection under Habitat the Habitats Directive. The term SAC/SPA will be used, in conformance with nomenclature used in National Parks and Wildlife Services (NPWS) databases.

A Ramsar site is a wetland site designated to be of international importance under the Ramsar Convention. In Ireland, a policy for the protection of Ramsar does not exist. A Marine Protection Area (MPA) is defined by the International Union for the Conservation of Nature as *"any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.* Both Ramsar sites and MPAs in the Republic of Ireland are either contained within the boundaries of or overlap with Natura 2000 sites; as such, they are indirectly considered in assessments under SACs/SPAs.

1.4 Purpose and Structure of this Report

1.4.1 Purpose of this Report

This report provides information to support An Bord Pleanála (ABP), as the relevant competent authority, making an AA determination for the proposed Project, as required under the Habitats Regulations, 2011.

1.4.2 Structure of this Report

The structure of the report is as follows;

- Section 1: Introduction and legislative context.
- Section 2: Overview of the AA methodology including the guidance used in compiling this report
- Section 3: Description of the proposed works and the baseline/receiving environment.
- Section 4: Screening for AA.
- Section 5: Information informing the AA including potential impacts, in-combination effects and mitigation measures, where required.
- Section 6: Assessment of in-combination effects with other plans and projects.
- Section 7: Conclusion in relation to adverse effects on site integrity.
- Section 8: References.

2. Methodology

2.1 Appropriate Assessment Methodology

2.1.1 Overview

The AA process is generally acknowledged to comprise four steps as follows:

Screening for AA/Test of Likely Significant Effects — Identification of the likely significant effects upon a European site from a project or plan, either alone or in-combination with other projects or plans, in light of the site's conservation objectives.

Appropriate Assessment — Determination of whether a plan or project could have adverse effects on the conservation objectives and therefore the integrity of the European site, either alone or in-combination with other projects or plans. Where adverse effects are identified mitigation is identified to avoid any potential adverse effects.

Assessment of Alternative Solutions — Examination of alternative ways of achieving the objectives of the project or plan that avoid adverse effects on the integrity of the European site.

Imperative Reasons of Overriding Public Interest (IROPI) — Assessment where no alternative solutions exist, and adverse effects remain. In this case the provisions of Article 6(3) cannot be met therefore, the provisions of Article 6(4) are used. Assessment of compensatory measures where, in the light of an assessment of imperative reasons of overriding public interest (IROPI), it is deemed that the project or plan should proceed.

This process is shown in **Figure 2.1** below.

CONSIDERATION OF A PLAN OR PROJECT (PP) AFFECTING A NATURA 2000 SITE

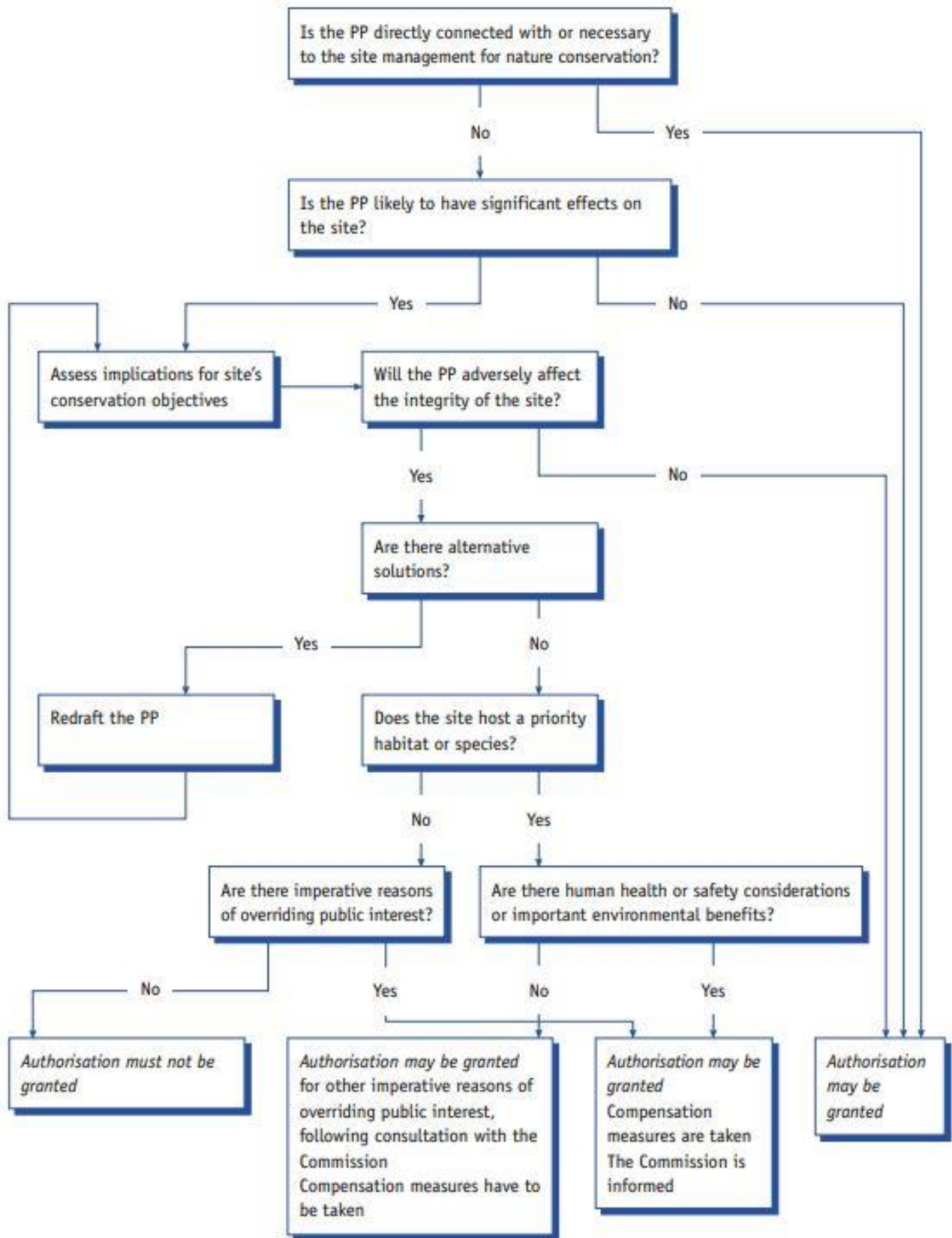


Figure 2.1: Flow chart of the Article 6(3) and (4) procedure in relation to the stages of the guidance (taken directly from "Assessment of Plans and Projects significantly affecting Natura 2000 sites" [EC, 2001]).

The information collected (both field and desk-based) and outlined in this Natura Impact Statement (NIS) aims to determine the potential for adverse effects on site integrity from the proposed Project by:

- describing the project proposals and other plans or projects that may have an in-combination effect on any European sites;
- giving an overview of the European sites identified at risk, including information on their conservation objectives and an understanding of current factors which either maintain or threaten those conservation objectives;
- assessing aspects of the project proposals which could undermine the conservation objectives and integrity of European sites; and
- where potential impacts are identified provide specific mitigation measures that will be implemented to ensure adverse effects on European sites can be avoided.

2.1.2 Appropriate Assessment

AA must provide a clear conclusion, based on objective information, regarding the absence of adverse effects on the integrity of European sites. For planning permission to be granted, the competent authority, must conclude, having conducted AA, that the proposed project or plan will not have an adverse effect on the integrity of the identified European site(s).

The proposed Project was considered to have the potential to have LSEs (see **Section 4.1**) and therefore AA of the proposed Project is required. The scientific assessment in support of the AA is documented within this NIS which contains the information required for the competent authority (ABP) to undertake an AA in respect of the proposed Project.

2.1.3 Guidance

This AA was undertaken taking cognisance of the following guidance:

- Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities (Department of Environment, Heritage and Local Government (DoEHLG, 2010a);
- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission (EC), 2001);
- Communication from the Commission on the Precautionary Principle (EC, 2000);
- 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); and
- Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2018).
- The following circulars also outline the AA requirements:
- AA under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPW 1/10 and PSSP 2/10 (DoEHLG, 2010b);
- AA of Land Use Plans. Circular Letter SEA 1/08 & NPWS 1/08 (DoEHLG, 2008a);
- Compliance Conditions in respect of Developments requiring (1) Environmental Impact Assessment (EIA); or (2) having potential impacts on Natura 2000 sites. Circular Letter PD 2/07 and NPWS 1/07 (DoEHLG, 2007a);
- Guidance on Compliance with Regulation 23 of the Habitats Directive. Circular Letter NPWS 2/07 (DoEHLG, 2007b); and
- Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments. Circular L8/08 (DoEHLG, 2008b).

Definitions of favourable conservation status, integrity and significance used in this assessment are defined in accordance with *Managing Natura 2000 sites* (European Commission, 2018);

- The term 'favourable conservation status' is defined in Article 1(e) and 1(i) [of the 'Habitats' Directive 92/43/EEC] and refers to the conservation status of the species or habitat types of Community interest across their natural range within the EU.
- The 'integrity' of the site can be usefully defined as the coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is designated.
- The 'significance' of effects should be determined in relation to the specific features and environmental conditions of the protected site concerned by the plan or project, taking particular account of the site's conservation objectives and ecological characteristics.

2.1.4 Zone of Influence and Source-pathway-receptor Model

When assessing the Zone of Influence (Zol) the "source-pathway-receptor" model is applied taking consideration of all potential impact pathways connecting elements of the proposed Project to European sites in view of their conservation objectives.

The Zol is the area over which effects could occur to ecological features from the proposed works/project. The determination of a Zol for a project should be identified on a case by case basis as there may be an effect on European sites that are at a distance from the works. For example, where there is a hydrological link between the development site and a European site.

Considerations key in determining the potential Zol include:

- ecological features within and in proximity to the proposed works;
- migratory/mobile species of the area;
- construction/operational activities that may cause a significant effect; and
- linkages to European sites or sensitive habitats connected to those sites.

2.1.5 Consultation

Stakeholders including the NPWS, Inland Fisheries Ireland (IFI), Birdwatch Ireland and the Environmental Protection Agency (EPS) were consulted at the project scoping stage.

The NPWS was consulted in November and December 2019 regarding the proposed Project and the scope of the NIS with reference to white-clawed crayfish (*Austropotamobius pallipes*) and whooper swan (*Cygnus cygnus*). NPWS indicated that the current state of knowledge regarding whooper swan is not sufficient to rule out impacts to this species (which is a qualifying interest of the Kilcolman Bog SPA) at the rail crossings (in particular XC219 Buttevant and XC215 Shinanagh crossing). It was agreed therefore that wintering bird surveys were necessary to inform the NIS.

Inland Fisheries Ireland were consulted on the project proposals with particular reference to the proposed box culvert at Buttevant and potential implications for fish passage. After discussions by telephone in December 2019 IFI were satisfied that fish passage will not be significantly affected by the proposed culvert.

2.2 Desktop Review and Field Surveys

2.2.1 Desk Study

Desktop data gathered to inform this NIS included maps and ecological data available online as follows:

- aerial imagery (ESRI);

- Irish Wetland Bird Survey (I-WeBS) data available on Birdwatch Ireland I-WeBS section at <https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/> (accessed January 2020);
- mapping of European site boundaries available online at www.npws.ie (accessed September 2020);
- protected and invasive species data from the National Biodiversity Data Centre (NBDC) online at <http://www.biodiversityireland.ie/> (accessed October 2020);
- online data available on Natura 2000 sites as held by the NPWS from www.npws.ie including: the Natura 2000 network Data Form; Site Synopsis; Generic Conservation Objective data;
- Environmental Protection Agency (EPA) rivers and water quality data Water Framework Directive (WFD) status) <https://gis.epa.ie/EPAMaps/> (accessed October 2020);
- other open source information available online regarding fisheries (e.g. www.salmonireland.com and www.fishingireland.info) (accessed September 2020);
- National Parks and Wildlife Service (2019a). The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill
- National Parks and Wildlife Service (2019b). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill; and
- National Parks and Wildlife Service (2019c). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.

2.2.2 Field Surveys

Surveys were conducted from 23 July to 25 July 2019, 14 August 2019 and 11 February 2020 to inform the overall environmental and ecological assessment. Habitats within the site were assessed for their potential to support rare, protected and invasive species. Non-invasive environmental DNA (eDNA) surveys were used to detect the presence/probable absence of white-clawed crayfish from Pepperhill River at XC219 Buttevant. The assessment of protected species and habitats and/or invasive species was undertaken in line with the following guidelines:

- CIEEM Guidelines for Preliminary Ecological Appraisal. Second Edition (CIEEM, 2017);
- A Guide to Habitats in Ireland. The Heritage Council (Fossitt, 2000); and
- National Roads Authority Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA, 2010).
- The Irish Vegetation Classification – An Overview of Concepts, Structure and Tools. In Practice, CIEEM, December 2018, pp 15-19 (Perrin et al., 2018).

Wintering bird surveys

Given the insufficient knowledge regarding whooper swan distribution around the rail crossings dedicated whooper swan surveys were undertaken in 2020. Surveys were carried out to determine the current usage (if any) of habitats surrounding the level crossings. To better understand the current distribution of whooper swan in the area Kilcolman Bog SPA was also surveyed during each visit to assess the presence/absence of swans. Surveys were undertaken on 15/16 January, 11/12 February and 03/04 March 2020 encompassing an area out to 500m from each of the level crossings sites (**Figures 2.1 – 2.5**) and comprised the following;

- Mapping and counting of whooper swan distributions.
- Gathering information on incidental records of other QI species.

Surveys were undertaken in accordance with the Wetland Bird Survey (WeBS), the International Swan Census, and standard methodologies for identifying concentrations of wintering waterfowl in Gilbert et al. (1998).

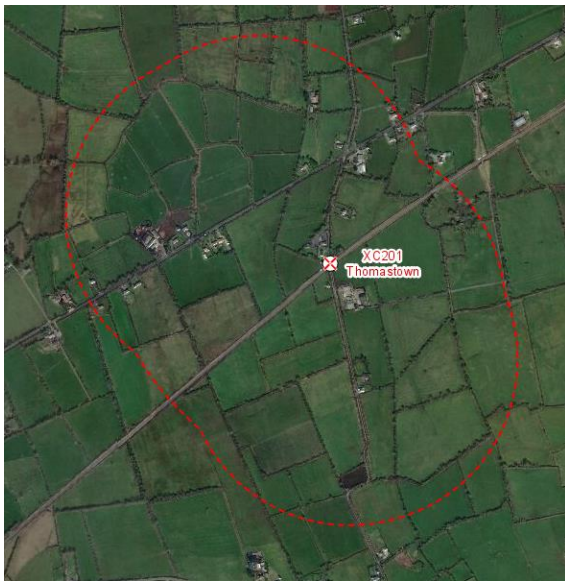


Figure 2.1: Thomastown survey area

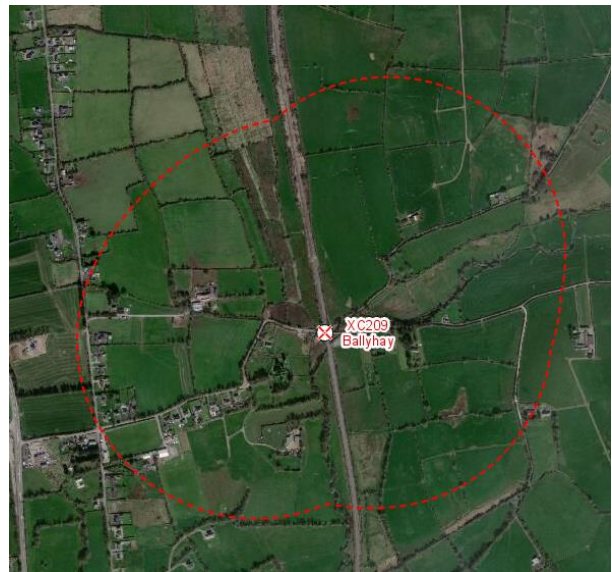


Figure 2.2: Ballyhay survey area



Figure 2.3: Newtown and Ballycoskery survey area

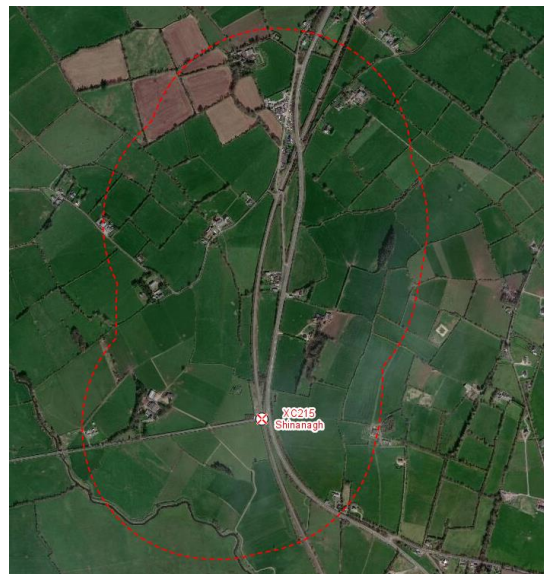


Figure 2.4: Shinanagh survey area



Figure 2.5: Buttevant survey area

3. Description of the Receiving Environment and Proposed Project

3.1 Receiving Environment

The results of the desk-based review and site surveys are presented in the following sections. Findings are presented in the present tense describing what was found on site during surveys. Photographs showing relevant supporting habitats or evidence of QI species taken during the site visit are presented in **Appendix A**.

3.1.1 European Sites

The proposed Project does not overlap with any European site. There are no Ramsar sites or Marine Protection Areas (MPAs) within the Zol of the proposed Project. The closest European site is the Blackwater River (Cork/Waterford) Special Area of Conservation (SAC) located approximately 240m from the proposed crossing at XC219 Buttevant. This next nearest site is Kilcolman Bog Special Protection Area (SPA) located approximately 4.3km from XC219 Buttevant.

The Blackwater River (Cork/Waterford) SAC is designated for a range of marine, freshwater and terrestrial habitats, freshwater pearl mussel (*Margaritifera margaritifera*), white-clawed crayfish, sea lamprey (*Petromyzon marinus*), brook lamprey (*Lampetra planeri*), river lamprey (*Lampetra fluviatilis*), twaite shad (*Alosa fallax fallax*), Atlantic salmon (*Salmo salar*), otter (*Lutra lutra*) and Killarney fern (*Trichomanes speciosum*). The specific conservation objectives for this site are detailed in **Section 5.1.5** (NPWS, 2012).

Kilcolman Bog SPA is designated for whooper swan, teal (*Anas crecca*), shoveler (*Anas clypeata*), wetland and waterbirds. Whooper swan have been recorded in close proximity to the proposed crossings at XC219 Buttevant and XC215 Shinanagh as such this European site is considered to be within the Zol for the proposed Project. Many sites in Ireland do not have specific conservation objectives but are covered by generic conservation objectives; Kilcolman Bog SPA is one of these sites. Generic conservation objectives for this site are detailed in **Section 5.2.3** (NPWS, 2018).

These two European sites (Blackwater River (Cork/Waterford) SAC and Kilcolman Bog SPA) encompass all European sites considered to be within the Zol of the proposed Project.

3.1.2 Habitats

The predominant habitat surrounding all of the crossing sites is improved agricultural grassland delineated by hedgerow and scrub. In the cases of Thomastown, Newtown and Ballycoskery, Shinanagh and Buttevant some field edges are delineated by treelines. Some sites, Ballyhay in particular, have areas of wet grassland. Pockets of broadleaved or mixed broadleaved/conifer woodland can also be found in proximity to the crossing at Ballyhay. At the XC212 Ballycoskery crossing a short stretch of tall herb swamp runs adjacent to the railway line. Hardstanding and buildings such as residential housing developments make up a proportion of the remainder of land use around the crossings.

3.1.3 Watercourses

Some of the sites have ditches or watercourses running in close proximity to the crossings. The crossing at XC219 Buttevant is hydrologically linked to the Blackwater SAC by the Pepperhill River and an unnamed ditch immediately west of this river; both will be crossed as part of the proposed Project. The Pepperhill River flows directly into the Awbeg River (Buttevant) 240m downstream (see **Photograph 1, Appendix A**). The Awbeg River is within the Blackwater River (Cork/Waterford) SAC. The Pepperhill River is ephemeral and heavily choked with terrestrial vegetation at the crossing location. The main Awbeg channel also supports abundant riverbank vegetation. The Pepperhill River and Awbeg River (Buttevant) have a current Water Framework Directive (WFD) status of Moderate and a risk rating of *At risk* (EPA, 2018). The risk rating looks at the current water quality and trends and is used to highlight waterbodies that are at risk of deteriorating or being at less than Good status in the future.

The proposed crossing at XC212 Ballycoskery is located 250m north of the Newton River which flows directly into the Awbeg (Buttevant East) River approximately 450m downstream which also forms part of the SAC. A ditch within the study area at Ballycoskery is hydrologically linked to the Newton River providing a direct link to the SAC. The level crossing at XC209 Ballyhay is approximately 19m from the Awbeg (Buttevant East) River, which joins the Blackwater River (Cork/Waterford) SAC approximately 1.5km downstream. The Newton River and the Awbeg (Buttevant East) River have been given a WFD status of Good and a risk rating of *At risk* (EPA, 2018).

There is no hydrological link to any SAC from the proposed crossings at XC187 Fantstown, XC201 Thomastown and XC215 Shinanagh.

3.1.4 Qualifying Interest Species or Habitats

The desktop study returned records for Atlantic salmon, white-clawed crayfish, and otter within 5km of the proposed project. These species are all listed as Qualifying Interests (QI's) for the Blackwater River (Cork/Waterford) SAC.

Field surveys identified otter prints under the existing road bridge over the ephemeral Pepperhill River which flows directly into the Awbeg River (**Photograph 2, Appendix A**). The Awbeg at this location is designated as part of the Blackwater River (Cork/Waterford) SAC. Given the ephemeral nature of the stream it is not considered suitable to support significant fish populations, however, consultation with IFI (Andrew Gillespie) confirmed the presence of small pockets of salmonid spawning in the Pepperhill River well upstream of the study area. The stream had suitable habitat to support white-clawed crayfish (see **Photograph 3, Appendix A**), and there are numerous records of crayfish from the downstream Awbeg. Non-invasive eDNA surveys for white-clawed crayfish were carried out at this location. This survey method did not detect the presence of white-clawed crayfish, however it should be noted that this data was collected outside of the optimal survey window and a negative result does not necessarily mean that they are absent from this location.

The Awbeg (Buttevant East) River is considered to have the potential to support salmonids, crayfish and lamprey spp. all of which are listed as QI's for the Blackwater River (Cork/Waterford) SAC. Juvenile lamprey silt beds were recorded within Awbeg (Buttevant East) River during field survey. Water-crowfoot (*Ranunculus sp.*) was recorded downstream of the railway bridge at the Ballyhay site. This habitat where this species was recorded is likely to be consistent with the QI habitat Water courses of plain to montane levels (with *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation).

Kilcolman Bog SPA is located within 5km from XC219 Buttevant level crossing. A search of the National Biodiversity Data Centre records did not identify any QI bird species within the footprint of any proposed works. However, there were several records of QI bird species within 2km of a number of level crossing sites. Teal was recorded within 2km from Buttevant and Ballycoskery, shoveler was recorded within 2km from Buttevant and whooper swan was recorded within 2km from Shinanagh and Buttevant.

Whooper swan have been previously recorded in fields immediately west of XC215 Shinanagh level crossing however this is not a regular foraging or roosting site. A mean peak of 32 birds was recorded from 1994 – 2001. However there have been no recent records of birds in this location. This reflects the declining population of swans utilising Kilcolman Bog which has occurred since the late 1990s.

Whooper swan arrive to their initial landfall sites in Ireland (i.e. Lough Swilly/ Lough Foyle) from October peaking from mid-October to mid-November. However, it may be November before large flocks of birds move towards the south of the country including Kilcolman (O' Halloran et al., 1993). The mobile and seasonal dynamic feeding patterns of whooper swan is common in Ireland as they respond to local foraging conditions i.e. stubbles and waste root crops for feeding from the autumn to the mid-winter, changing to feeding on winter cereals and improved grasslands until the spring (Brazil and Kirk, 1981; Colhoun, 1998). Foraging range of whooper swan can extend out to 5 – 10km from SPA sites. Therefore, given the potential foraging range of birds from Kilcolman Bog SPA suitable foraging habitat was identified around the proposed Project sites and surveyed.

The number and location of QI birds recorded during the survey is presented in **Table 3.1** below and shown in **Figure 3.1** below. Survey results are summarised below;

No suitable wintering bird foraging or roosting habitat was recorded at Fantstown or Ballyhay.

No whooper swans or any other qualifying interest species were recorded during surveys in January or February 2020 at any of the level crossing sites.

Sixteen whooper swans representing 12% of the SPA population (based on the I-WeBS baseline population) were recorded approximately 300m north of the proposed crossing alignment at XC219 Buttevant on 3 and 4 March 2020. All birds were recorded foraging in a flooded grassland field north of the Awbeg River (see **Photograph 4, Appendix A** for suitable whooper swan foraging habitat at Buttevant). This was the only record of whooper swan in close proximity to any of the proposed level crossings sites.

No other swans were recorded within the 500m buffer of any other site.

No whooper swans were recorded at Kilcolman Bog SPA during any of the surveys.

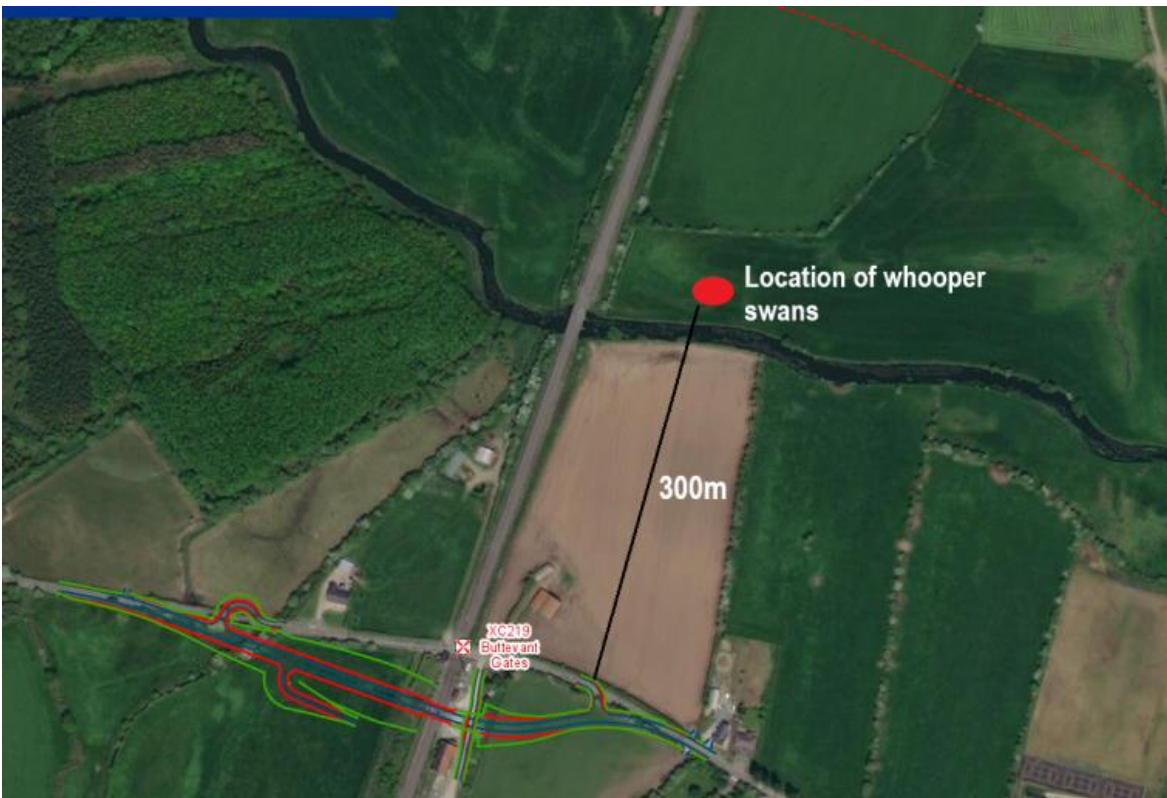


Figure 3.1: Location of foraging whooper swans at Buttevant in March 2020

Table 3.1: Total count of QI species from wintering bird surveys January – March 2020. VP = Vantage Point, SV = shoveler, T = teal, WS – whooper swan, FO = foraging, LO = loafing

Date	Site	Survey type	Species	Count	Activity
Visit 1					
16.01.2020	Kilcolman Bog SPA	VP	SV	8	FO
16.01.2020	Kilcolman Bog SPA	VP	T	16	FO
Visit 2					
12.02.2020	Kilcolman Bog SPA	VP	SV	6	FO
12.02.2020	Kilcolman Bog SPA	VP	T	12	LO
Visit 3					
03.03.2020	Buttevant	VP	WS	16	FO
03.03.2020	Kilcolman Bog SPA	VP	SV	25	FO/LO

03.03.2020	Kilcolman Bog SPA	VP	T	11	FO/LO
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3.1.5 Invasive Species

During screening, given that a precautionary approach was taken, it was identified that invasive species had the potential to undermine the conservation objectives of the Blackwater River (Cork/Waterford) SAC. Himalayan balsam (*Impatiens glandulifera*) and Japanese knotweed (*Reynoutria japonica*) grow along river banks in large stands shading out native plants. When these plants die back in autumn the soil is then left more exposed to weathering and erosion leading to increases in sediment in the water column, reducing water quality and negatively impacting fish species including salmon and lamprey. The desk study returned several records for Japanese knotweed within 2km of the project (towards the southern end). One of these records falls within the footprint of the proposed works at the XC215 Shinanagh crossing. The walkover survey at Shinanagh confirmed the presence of Japanese knotweed. Stands were identified that are undergoing treatment, however new growth was observed (**Photograph 5, Appendix A**).

3.2 Description of the Proposed Project

The proposed project involves works to the seven crossings between Limerick Junction and Mallow Stations. The planned works are summarised in **Table 3.2** below.

Table 3.2: List of level crossings, the proposed works and infrastructure at each crossing location.

Level Crossing	Proposed works	Infrastructure
XC187 Fantstown	Close – Alternative route along existing roads to existing overbridge approx. 3km to the north east.	N/A.
XC201 Thomastown	Close – New road-over-rail bridge to tie in to existing local road to south and new junction on Regional Road R515 to north.	1no. road-over-rail bridge.
XC209 Ballyhay	Replace the existing manned level crossing with a remote monitored CCTV solution.	CCTV solution.
XC211 Newtown	Close – New access road immediately east of the existing road-over-rail bridge to the north of XC211 Newtown; to tie in to existing Local road to the east of XC211 Newtown.	New access road.
XC212 Ballycoskery	Close – New road-over-rail bridge to tie in to existing Local Road to East and West, new carpark proposed for existing school. Tie in to Beechwood Housing Estate and Ballyhea National School to North and existing local road to the south.	1 no. road-over-rail bridge, 1no. parapet wall.
XC215 Shinanagh	Close – New access road to tie in to existing road-over-rail bridge approx. 1km to the north.	2no. retaining walls, upgrade of existing junction on N20
XC219 Buttevant	Close – New road-over-rail bridge to tie in to existing regional road to east and west.	1no. road-over-rail bridge, 1no. portal frame road over river bridge, 1no. ditch box culvert, 1no.access road box culvert, 2no. retaining walls.

3.3 Construction Programme, Sequencing and Methods

3.3.1 Construction Programme

Construction of the proposed Project is planned to take place over 18 no. months, commencing in the third quarter of 2021.

3.3.2 Construction Sequence and Methods

The general sequence of construction activities is broadly summarised below but further detail on the construction sequence is provided in Volume 2, Chapter 3 Project Description.

In order to protect water bodies from potential impacts such as increased flood risk, increased volumes of runoff, silty water and accidental spills, it is proposed to install the permanent drainage elements in at the outset, prior to full site clearance. See Volume 2, Chapter 9 Water for further detail on drainage.

For roadways, the footprint for the proposed swales would be excavated, the perforated pipes laid, soil back-filled and the topsoil seeded. These are positioned either side of the new highways and would then receive any runoff following the rest of the site clearance. The swales at this point would not be connected into local drainage systems, they would be blocked and a small inspection/pumping chamber or pit left open to allow for visual inspection and either the controlled release of clean water to the local drainage system or, if still slightly silty, pumping out to a settlement tank or silt-buster before being discharged. This also allows the rate of flow to be controlled to prevent any increase in flood risk during the construction phase.

Once the highways and bridge structures are almost completed, the swales will be accessed further from those highways to finish their construction and open up permanent connection to outfall points at each site. Then the roads will be finished. On this basis, and with this management plan in place, no operational effect is expected.

Phase 1

- establish site/ compound set up;
- site clearance and bulk earthworks including site levelling and temporary access roads;
 - soil stripping to be carried out during favourable conditions.
 - soil stored on site for reuse (as far as is practical) in landscaping following construction.
 - silt fences, straw barriers or cut-off ditches at the toe of stockpiles to manage runoff during rain events.
 - directing any runoff to the site drainage system and to the settlement tanks.
 - no trees or hedges to be removed during site preparation.
- deploy traffic management;
- strip/ excavate existing ground for new road formation;
- form temporary road access for residents (where required) and access to buildings / fields; and
- form temporary road access for new bridge location for plant access, including temporary works crane mat.

Phase 2

- install retaining walls;
- install piles and capping beam;
- install bridge support foundation; and
- install pre-cast bridge beams and concrete infill and apply new deck waterproofing.

Phase 3

- form new reinforced earth ramp approach sections on each side;
- complete new road surface, marking and signage;
- tie in new and existing roads;
- existing level crossing to be decommissioned; and
- decant from site and open road to public.

3.3.3 Construction Access

Temporary road access will be created for plant access at Thomastown, Ballycoskery and Buttevant sites.

3.3.4 Construction Compounds

Indicative locations for the site compounds are shown on the layout drawings (Volume 4, Figure 9). The main site compounds have been located, where practicable, away from residential properties to provide minimum disturbance. Access to/ from the nearest main road, such as the National Road N20 has been considered as the main transports routing for the sites so as not to create congestion on the narrower minor roads. The compounds would facilitate enabling works, site clearance, materials storage, welfare, structure installation and road surfacing.

The setups as a minimum would consist of:

- secure area;
- site Offices;
- welfare facilities;
- changing facilities;
- suitable parking for site vehicles;
- secure storage areas, including COSHH;
- delivery areas;
- material lay down area / inspection area; and
- plant storage and refuelling zones.

Additional smaller site storage areas may be required next to piling operations and the reinforced earth ramp face (including modular concrete panels) installation area. Site storage area would allow the Contractor to store materials next to the work face. For site compound and storage areas, vegetation and topsoil removal may be required and replaced with subbase stone to provide a level surface for facilities.

A section has been demarcated for potential mobile crane set up; like site compound areas, land would be cleared, and subbase laid and compacted. The Contractor should consult a temporary works engineer on the requirements for crane matting. It has been assumed an area of 10m by 10m would be sufficient to cater for a mobile crane.

A 'wheel washing' station at each site will be established as best practice to avoid unnecessarily soiling the local roads with mud/ detritus from the site vehicles. Also, daily road cleaning may be required.

Site Establishment

The topsoil, and upper level of subsoil, will be stripped and stockpiled over the Construction Working Width. Any existing land drains crossing the works area will be culverted. The Contractor will be required to provide a temporary geogrid mattress overlain in stone for trafficking within the Construction Compound. Other developments proposed to occur within the site include the laying of interceptor traps in a demarcated area for refuelling, and drainage works associated with plant cleaning and service areas.

Drainage

Generally, the Construction Compound site will be pervious as it is overlain in stone. Those areas with impervious pavement will be graded to a fuel/ oil separator for collection of any surface water runoff contaminants. Both the bunded refuelling and plant servicing areas will incorporate a forecourt separator for any potential spillages which may occur during vehicle refuelling and road tanker delivery. The retained contents of the separators will be collected for disposal by a licensed operator to a licensed waste disposal / recovery facility. Construction Compounds will be provided with a Sustainable Drainage System (SuDS) designed storage and soakaway system for storm water running directly off of site buildings, and pavement.

Construction Monitoring Measures

Continuous monitoring of water quality will take place at the outlets from attenuation areas along the pipeline and the settlement lagoons and surface water attenuation ponds at the Key Infrastructure Sites. If hydrocarbons are observed or other water quality parameters are exceeded, discharges will be suspended until the quality of the water is of a standard acceptable for discharge.

During the Construction Phase, the Contractor will monitor the levels of Total Suspended Solids (TSS), turbidity, pH, temperature, Dissolved Oxygen (DO) and hydrocarbons at the same locations up and down stream of watercourses in close proximity to the works, or at crossing points where relevant, once a week for the duration of the following works:

- site clearance works, earthworks movements and stockpiling;
- excavations including those associated with the provision of drainage works; and
- construction works within and adjacent to watercourses.

The Construction Phase monitoring results will be compared with those results established in pre-construction monitoring. In the event of an elevation above pre-construction levels an investigation will be undertaken by the Contractor and remediation measures will be put in place.

In addition, daily visual inspections of the surface drainage and sediment control measures and the watercourses will be undertaken by the Contractor. Indicators that water pollution may have occurred include the following:

- change in water colour;
- change in water transparency;
- increases in the level of silt in the water;
- oily sheen to water surface; and
- floating detritus, or scums and foams.

These inspections will be recorded. In the event that such indicators are observed, works will cease, and sampling will immediately be undertaken as described for the weekly monitoring, and an investigation of the potential cause will be undertaken by the Contractor.

Where the works are identified as the source causing the exceedance the following will apply:

- works capable of generating sediment and all discharges shall be stopped immediately; and
- the Contractor will be required to take immediate action to implement measures to ensure that such discharges do not re-occur.

This monitoring will alert the Contractor to any detrimental impacts that construction activities could have on water quality such that appropriate remedial action can be taken as quickly as possible. This will also allow the Contractor to demonstrate the success of the mitigation measures employed in maintaining any sediment release within the 'trigger' value established.

4. Screening for Appropriate Assessment

4.1 Screening for AA

This section details the first test for AA: Screening. The Screening process identifies the likely significant effects upon a European site from a project (or plan), either alone or in-combination with other projects or plans. If the risk of Likely Significant Effects (LSEs) cannot be discounted, an AA of the project is required.

The screening for AA concluded that in the absence of more detailed information and the application of mitigation measures, there was potential for LSEs on European sites from the proposed Project, either alone or in combination with other projects or plans.

European sites in the vicinity of the proposed Project are shown in **Figure C1, Appendix B**. Based on the description of the proposed Project outlined in **Section 3** it was considered that there was potential for Likely Significant Effects on the following European sites:

- Blackwater River (Cork/Waterford) SAC; and
- Kilcolman Bog SPA.

Detail on these European sites, their qualifying interest species/habitats and the potential for LSEs is provided in **Table 4.1** below.

Table 4.1: European sites with the LSEs from the proposed Project (grey text = site feature with no effect pathway identified) * identifies priority habitat

European site name and code	Distance of site from projects	Conservation Objectives and Qualifying Interests ¹ (*= priority habitat, [NPWS, 2019c]).	Pathway	Likely Significant Effects
<i>Special Area of Conservation (SAC)</i>				
<p>Blackwater River (Cork/Waterford) SAC (002170)</p>	<p>240m (from the crossing at XC219 Buttevant)</p>	<p>To maintain the favourable conservation condition of Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.</p> <p>Annex I habitats: <i>Estuaries [1130]</i> <i>Mudflats and sandflats not covered by seawater at low tide [1140]</i> <i>Perennial vegetation of stony banks [1220]</i> <i>Salicornia and other annuals colonizing mud and sand [1310]</i> <i>Atlantic salt meadows [1330]</i> <i>Mediterranean salt meadows [1410]</i> <i>Water courses of plain to montane levels [3260]</i> <i>Old sessile oak woods [91A0]</i> <i>Alluvial forests* [91E0]</i></p> <p>Annex II species: Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) [1029] Salmon (<i>Salmo salar</i>) [1106] Otter (<i>Lutra lutra</i>) [1355] Sea lamprey (<i>Petromyzon marinus</i>) [1095]</p>	<p>No QI (Annex I) habitats were recorded within the footprint of the proposed Project and therefore impacts associated with direct loss of Annex I habitats can be excluded. Killarney fern is a terrestrial QI species and its habitat will not be affected by the project. Killarney fern is therefore excluded. Twaite shad have been screened out from further assessment as the range of this species is limited to coastal and estuarine waters within the SAC which will not be impacted.</p> <p>The only QI habitat with potential to be impacted is water courses of plain to montane levels as this is the only freshwater QI habitat listed for this SAC. This habitat could be affected through a pollution event, compromising the water quality which may impact on species composition or habitat condition. All other QI habitats are associated with coastal and marine elements of the SAC and are at least 75km downstream from the proposed works; too distant for there to be a viable pathway for impacts.</p> <p>The proposed Project is hydrologically linked to the SAC via the Pepperhill River at Buttevant, a ditch at Buttevant and by a wet ditch draining into the Newton Stream at Ballycoskery. All flow directly into the Awbeg River which forms part of the SAC. The proposed works include the construction of a box culvert across the Pepperhill River and ditch at Buttevant, and a new road-over rail bridge at Ballycoskery. The culverts will be embedded and the natural beds of these waterbodies will be allowed to re-establish following installation. Therefore, there is potential for aquatic QI habitats and species (e.g. lamprey and salmon) to be impacted by a pollution event (mobilisation of sediment, chemical spill etc.) during the construction phase of the proposed Project. Pollution may impact these species through direct mortality, reduction in reproductive success or by acting as a barrier to migration. There</p>	<p>Yes. European site Screened in for the following QI features:</p> <ul style="list-style-type: none"> ▪ Water courses of plain to montane levels ▪ Freshwater pearl mussel ▪ Atlantic salmon ▪ Otter ▪ White-clawed crayfish ▪ Sea lamprey ▪ River lamprey ▪ Brook lamprey <p>There is no potential for direct impacts on any other QI habitat or QI species associated with the SAC. No mechanism has been identified (direct or indirect) via which it is considered LSEs might occur for the other Annex I habitats or Annex II species in this site acting alone or in combination with other plans and projects.</p>

¹ Qualifying Interests” for SACs and “Special Conservation Interests” for SPAs based on relevant Statutory Instruments for each SPA, and NPWS Conservation Objectives for SACs

		<p>River lamprey (<i>Lampetra fluviatilis</i>) [1099] Brook lamprey (<i>Lampetra planeri</i>) [1096] White-clawed crayfish (<i>Austropotamobius pallipes</i>) [1092] Twaite Shad (<i>Alosa fallax fallax</i>) [1103] Killarney Fern (<i>Trichomanes speciosum</i>) [1421]</p>	<p>is also potential for aquatic QI species to be impacted through habitat fragmentation during culvert construction.</p> <p>Freshwater pearl mussels are known to occur within the SAC approximately 24km downstream from the works (NPWS, 2012). A pollution event could impact on the conservation objectives for this species. Freshwater pearl mussels are highly sensitive to aquatic pollution which may impact their distribution, population structure and their habitat quality.</p> <p>Mobile QI species (otter and white-clawed crayfish) found in suitable supporting habitat (Pepperhill River) outside the SAC boundary, but within or adjacent to works areas could be directly impacted by the project, for example during the construction of culverts. White-clawed crayfish are known to inhabit the Awbeg River directly downstream (EPA, 2013) and so there is potential for white-clawed crayfish to be impacted through direct mortality and loss of supporting habitat from pollution. Otter could be impacted from a pollution event through a reduction in prey availability, which may also influence their distribution.</p> <p>The spread of invasive non-native species was considered as a potential pathway for habitat degradation through increased sedimentation of watercourses following die-back of bankside plants. Japanese knotweed was recorded at the site at Shinanagh only. The proposed works at Shinanagh do not have the potential to spread this species to the SAC which is 1.1km at its nearest point. Impacts upon QI habitats and species from the spread of Japanese knotweed are therefore excluded.</p>	
Special Protection Area (SPA)				
<p>Kilcolman Bog SPA (004095)</p>	<p>4.3km (from the crossing at Buttevant)</p>	<p>To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA, and, to maintain or restore the favourable conservation condition of the wetland habitat at Kilcolman Bog SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.</p>	<p>Suitable supporting habitat for whooper swan is present adjacent to the Shinanagh and Buttevant sites. The National Biodiversity Data Centre (NBDC) returned historical records of whooper swan in fields immediately west of XC215 Shinanagh level crossing. A mean peak of 32 birds was recorded from 1994–2001. Records for this species were also returned for the north and east of Buttevant with mean peaks of 97 birds recorded from 1996–2000 and 32 birds from 1994–1998 respectively. Wintering bird surveys recorded whooper swan approximately 300m from CX219 Buttevant level crossing foraging in flooded field north of the Awbeg River.</p>	<p>Yes. European site Screened in for for the following QI features:</p> <ul style="list-style-type: none"> ▪ Whooper Swan <p>There are no LSEs predicted for any other QI species or species assemblage associated with the SPA. No mechanism has been identified (direct or indirect) via which it is considered LSEs might occur for the other Annex II species or assemblages in this site acting alone or in combination with other plans and projects.</p>

		<p>Special Conservation Interests: Whooper Swan (<i>Cygnus cygnus</i>) [A038] Teal (<i>Anas crecca</i>) [A052] Shoveler (<i>Anas clypeata</i>) [A056] Wetland and Waterbirds [A999]</p>	<p>There is the potential for disturbance impacts to whooper swan at Buttevant which could lead to displacement of birds from their preferred foraging habitat and a subsequent reduction in fitness through increased energy expenditure and stress. This may lead to increased mortality, for example during periods of extreme weather conditions. Therefore, this species is screened in.</p> <p>No other SCI species or their supporting habitat have the potential to be impacted by the proposed project.</p>	
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4.1.1 Other European Sites Considered in the AA screening (screened out)

There are other SPAs and SACs in the vicinity of the proposed project. However, given the works outlined as part of the proposed Project and the QI for which these sites are designated, no potential effect pathways with potential for LSEs were identified. These include:

Ballyhoura Mountains SAC: Designated for several terrestrial habitats. Given that there is no hydrological link or other possible pathway for impacts from the proposed Project, this site has been screened out.

Carrigeenamronety Hill SAC: Designated for European dry heaths and Killarney fern there is no pathway for impacts between this site and its QI features.

Glen Bog SAC: Designated for alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* there is no pathway by which the proposed Project could have impacts upon this site.

4.2 Assessment of Likely Significant Effects

As the proposed Project is hydrologically connected to the Blackwater River (Cork/Waterford) SAC, in the absence of mitigation, LSEs have been identified from sediment laden run-off (oils, cement or pollutants) affecting the QIs of the SAC directly through reduction in water quality (freshwater pearl mussel, white-clawed crayfish, salmon, lamprey species) or indirectly via impacts to prey sources (otter).

Kilcolman Bog SPA could not be excluded on the basis that there is potential for LSEs as a result of human-induced disturbance during construction/ operation affecting foraging/ roosting QI bird species.

4.2.1 Potential In-combination Effects

In order to take account of in-combination, plans and projects that are completed, approved but uncompleted, or proposed (but not yet approved) should be considered in this context (European Commission, 2001).

The potential for effects on the Blackwater River and (Cork/Waterford) SAC and Kilcolman Bog SPA arising from the proposed Project 'alone' were examined and potential for LSE was identified. Therefore, an assessment of in-combination effects with other plans or projects is made as part of the next-stage of the assessment.

4.3 Screening Conclusion

Following an examination of the proposed Project against the site's conservation objectives and in view of the nature and location of works, it has been concluded that in the absence of mitigation there is potential for significant effects either alone, or in combination with other plans or projects on the following European sites:

- Blackwater River (Cork/Waterford) SAC
- Kilcolman Bog SPA

Therefore, it was established that the proposed Project should progress to more detailed examination of effects on the integrity of the European Sites through AA and the preparation of a Natura Impact Statement. In order for AA to comply with the criteria set out in the Habitats Directive and the Planning and Development Act 2000, an AA undertaken by the competent authority must include a detailed examination, analysis, evaluation, findings, conclusions and a final determination. The information to enable An Bord Pleanála to perform its statutory function in this regard is presented within subsequent sections of this NIS.

5. Information for Appropriate Assessment

The potential for adverse effects arising from the proposed Project on the integrity of Blackwater River (Cork/Waterford) SAC and Kilcolman Bog SPA in light of the site's conservation objectives, are examined in this section.

5.1 Blackwater River (Cork/Waterford) SAC

5.1.1 Summary of European Site

The Blackwater River (Cork/Waterford) SAC is designated for a range of marine, freshwater and terrestrial habitats, freshwater pearl mussel, white-clawed crayfish, three lamprey species, two fish species (twaité shad and Atlantic salmon), otter (*Lutra lutra*) and the Killarney.

5.1.2 Annex I Habitats

It was concluded at screening stage that likely significant effects could occur on the Annex I habitat water courses of plain to montane levels (with *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation), (see Table 4.1) and this QI habitat was therefore identified as requiring further assessment.

5.1.3 Annex II Species

The proposed Project is in close proximity to the boundary of the SAC and is hydrologically connected at multiple locations, therefore the following Annex II species are considered in the assessment:

- Freshwater Pearl Mussel
- Atlantic salmon
- Sea lamprey
- River lamprey
- Brook lamprey
- White-clawed crayfish
- Otter

5.1.4 Qualifying Interests potentially exposed to risk

5.1.4.1 Water courses of plain to montane levels with *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation

The full distribution of this habitat, its sub-types within the site are currently unknown and the typical species have not yet been defined (NPWS, 2019b). Floating river vegetation is however found within much of the freshwater sections within the SAC (NPWS, 2016). As well as *Ranunculus fluitans* and *Callitriche-Batrachion*, floating macrophyte species present within the SAC include pond water-crowfoot (*Ranunculus peltatus*) and broad-leaved pondweed (*Potamogeton natans*).

The current conservation status for this habitat is Inadequate and Deteriorating (NPWS, 2019b). It is noted by NPWS (2012) however, that no high conservation value sub-types of this habitat are currently known to occur in the SAC as research into this is currently lacking. It is also noted that the conservation objectives for freshwater pearl mussel, specifically with regards to the target of filamentous algae and macrophytes being absent or trace (<5%) take precedence over this habitat wherever there may be a conflict in terms of the management of the SAC (NPWS, 2012).

5.1.4.2 Atlantic Salmon

The freshwater stretch of the Blackwater River is a designated salmonid river. In addition, field surveys by Jacobs ecologists identified suitable salmonid habitat in the Awbeg River at Ballyhay. Whilst the Awbeg is not as well known for salmon fishing as the Blackwater, salmon ranging from 5cm to 13.6cm in length were caught on the Awbeg in 2009 (Central and Regional Fisheries Board, 2009) and therefore this tributary of the Blackwater also supports the species.

The overall national trend in conservation status for Atlantic salmon is Stable, however the current conservation status of salmon within the SAC is Inadequate (NPWS, 2019c). Salmon is considered to be endangered or locally threatened elsewhere in Europe and is listed on Annex II of the Habitats Directive. The site assessment for the SAC indicates that the abundance category of the salmon population within the SAC is 'common' and the value of the site for the species concerned is 'good' (NPWS, 2017a).

5.1.4.3 Sea Lamprey

Sea lamprey are the largest of the three species and migrate into fully marine environments to mature to adulthood before returning to fresh waters to spawn (Maitland, 2003). Although there are relatively few available data concerning the water quality requirements of lampreys, all Irish species are regarded as sensitive to pollution (Maitland, 2003). The current conservation status of sea lamprey is Bad and the overall trend is Stable (NPWS, 2019c).

Electrofishing surveys by King and Linnane (2004) at four locations on the Awbeg River caught a single juvenile sea lamprey. Whilst surveys for lamprey were not carried out by Jacobs, suitable silt bed habitat for juvenile lamprey was noted as being present within the Awbeg, adjacent to the XC209 Ballyhay crossing site. Sea lamprey are known to be present within the main Blackwater River and to have spawning sites on the Blackwater at several locations downstream of the Awbeg-Blackwater confluence (NPWS, 2012). Sea lamprey redds were identified by King and Linnane (2004) at numerous locations within the main channel of the Blackwater with several of these downstream of the Awbeg-Blackwater confluence. Hydrological connections therefore exist between the proposed project sites and known sea lamprey spawning sites.

5.1.4.4 River and Brook Lamprey

River lamprey migrate upstream into fresh waters to spawn in clean gravels but return to estuaries in their adult phase to grow to full size (Maitland, 2003). Brook lamprey is the smallest of the three species found in Ireland and is the only Irish species to complete its life-cycle entirely within fresh-waters. The current conservation status of river lamprey is unknown, while the current conservation status of brook lamprey is considered Favourable with a Stable trend (NPWS, 2019c).

Although two separate species, both river and brook lamprey follow a similar mode of behaviour, have a similar physiology and occupy similar habitats within the reaches of the SAC with LSEs from the proposed Project (NPWS, 2012). In addition, the juvenile life stages of river/ brook lamprey (*Lampetra sp.*) are impossible to distinguish in the field, therefore these two species are commonly grouped together in the reporting of surveys and have therefore been grouped and assessed together in this report.

Electrofishing surveys by King and Linnane (2004) at four locations on the Awbeg caught juveniles of *Lampetra sp.* at three of the four locations. Whilst surveys for lamprey were not carried out by Jacobs, suitable silt bed habitat for juvenile lamprey was noted as being present within the Awbeg adjacent to the XC209 Ballyhay crossing site. Juvenile *Lampetra sp.* have also been recorded at several locations in the Blackwater River. *Lampetra sp.* are therefore present within the ZOI of the proposed Project and are considered at risk of impact.

Surveys of the Blackwater River and tributaries undertaken in 2003 by King and Linnane (2004) only identified one spawning redd site for river/brook lamprey. This was within the Bride tributary which has no hydrological connection to the project site. There is therefore no information to suggest that spawning redds of either of the two *Lampetra* species are at risk of impact from the proposed project.

5.1.4.5 White-Clawed Crayfish

Within the SAC white-clawed crayfish are found on the Awbeg River (NPWS, 2012), and on the main Blackwater river as far upstream as Lombardstown and as far downstream as the Araglin-Blackwater confluence near Fermoy (DoEHLG, 2019). On the Awbeg, the crayfish is found along the whole length of the designated part of the river (NPWS, 2012) and the population inhabiting the Awbeg River is likely to make up a significant proportion of the total population of the species within the SAC. Large numbers of crayfish were found upstream of Buttevant on the Awbeg during river maintenance work in 2009 (NPWS, 2012). Non-invasive eDNA surveys for white-clawed crayfish were carried out on the Pepperhill River at Buttevant. This survey method did not detect the presence of white-clawed crayfish, however, it should be noted that this data was collected outside of the optimal survey window and a negative result does not necessarily mean that they are absent from this location.

In most of its range in Ireland this species is in decline, the greatest threat being presented by diseases such as crayfish plague caused by the pathogen *Aphanomyces astaci* (Demers and Reynolds, 2002). Crayfish plague has not yet been recorded within the Blackwater catchment, although it is of note that plague has been recorded in three neighbouring catchments to the north (Deel, Maigue and Suir). The current conservation status of white-clawed crayfish is considered Bad and Deteriorating (NPWS, 2019c).

White-clawed crayfish can inhabit a wide variety of aquatic environments so long as dissolved calcium levels are sufficiently high (usually $>5 \text{ mg l}^{-1}$), suitable refuges are available (which can take a number of different forms) and crayfish plague is absent (Holdich and Rogers, 2000). Populations of white clawed crayfish in poor water quality environments are not unknown but the species generally benefits from good water quality and there is the potential for pollution impacts from the proposed Project to have a negative effect on this conservation objective.

5.1.4.6 Freshwater Pearl Mussel

Freshwater pearl mussel is listed as Critically Endangered in Ireland under the IUCN threat status of Irish Molluscs (Kingston, 2012). The current conservation status of freshwater pearl mussel is considered Bad and Deteriorating (NPWS, 2019c). The conservation status of freshwater pearl mussel within the Munster Blackwater is currently unfavourable (NPWS, 2012).

There are no records of freshwater pearl mussel in the Awbeg River, the watercourse at highest risk of impacts from the project, there is however a record of a downstream population of this species within a hydrologically connected reach of the Blackwater River, approximately 30km downstream of the project site near Ballyhooly (DoEHLG, 2010c). This population was located approximately 5km downstream of the Awbeg-Blackwater confluence. Surface water body WFD status in the Blackwater River at this location is classified as Good. (EPA maps accessed). Although relatively distant from the proposed project works there is a hydrological connection and potential for impacts to this recorded population via this pathway.

The potential for effects to the freshwater pearl mussel is presented by the downstream transmission of sediment and pollutants. Therefore, attention has been focused on the likely presence of freshwater pearl mussel in and downstream of watercourses linking the proposed project sites to the Blackwater River (Cork/Waterford) SAC.

5.1.4.7 Otter

Records from NBDC maps indicate that otter are widespread throughout the SAC and within the Awbeg River. In addition, otter prints were identified at the banks of the Pepperhill River adjacent to the CX219 Buttevant crossing site during field surveys in 2019. No resting places were recorded during this survey.

Otter therefore have the potential to be impacted. The most recent distribution data shows that the otter continues to be widespread throughout Ireland and present nationwide in a wide variety of habitat types. Although recent studies on territory overlaps and animal movements suggest that refinements to the population estimation formula are needed, the otter population is considered to be stable and none of the threats or pressures identified is considered likely to impact significantly on the species. Overall, the species is assessed as Favourable and the

overall trend is Improving (NPWS, 2019c). The site level conservation status of otter is excellent within the SAC (NPWS, 2017a).

5.1.5 Conservation Objectives

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of annexed habitats and annexed species of community interest for which an SAC or SPA has been designated. To determine how the project would affect the SAC's qualifying interests (QIs), this assessment has focused on the effects that may possibly occur that could undermine the conservation objectives for the habitats and species.

The conservation objectives of the Blackwater River (Cork/Waterford) SAC are provided by the National Parks and Wildlife Service (NPWS, 2012) and aim to define the parameters for 'favourable conservation condition' for the habitats and species within the site. The overarching objectives for the site are to:

- To maintain/restore Annex I Habitats for which the SAC has been selected at favourable conservation status.
- To maintain/restore the Annex II species for which the SAC has been selected at favourable conservation status.

Table 5.1. Conservation objectives for Annex I habitats and Annex II species in the Blackwater River (Cork/Waterford) SAC for which LSEs from the proposed Project have been identified.

Qualifying Interest within the Blackwater River (Cork/Waterford) SAC	Attribute/Target
Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	Habitat distribution: no decline in distribution, subject to natural processes
	Habitat area: area stable or increasing, subject to natural processes.
	Hydrological regime: maintain appropriate hydrological regimes (river flow).
	Hydrological regime: maintain natural tidal regime.
	Substratum composition: particle size range. The substratum should be dominated by the particle size ranges, appropriate to the habitat sub-type (typically sands, gravels and cobbles).
	Water Quality: dissolved nutrients should be sufficiently low to prevent changes in species composition or habitat condition.
	Vegetation composition: Typical species of the relevant habitat sub-type should be present and in good condition.
	Floodplain connectivity: The area of active floodplain at and upstream of the habitat should be maintained.
Atlantic salmon	Distribution: 100% of river channels down to second order accessible from estuary.
	Adult spawning fish: conservation Limit (CL) for each system consistently exceeded.
	Fry abundance: maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling.
	Out-migrating smolt abundance: no significant decline.
	No decline in number and distribution of spawning redds due to anthropogenic causes.
	Water quality: at least Q4 at all sites sampled by EPA.
Sea lamprey	Distribution: greater than 75% of main stem length of rivers accessible from estuary.
	Population structure of juveniles: at least three age/size groups present.
	Juvenile density in fine sediment at least 1/m ² .

Qualifying Interest within the Blackwater River (Cork/Waterford) SAC	Attribute/Target
	No decline in extent and distribution of spawning beds.
	Availability of juvenile habitat: more than 50% of sample sites positive.
River/brook lamprey	Distribution: access to all water courses down to first order streams.
	Population structure of juveniles: at least three age/size groups present.
	Mean catchment juvenile density in fine sediment of brook/river lamprey at least 2/m ² .
	No decline in extent and distribution of spawning beds.
	Availability of juvenile habitat: More than 50% of sample sites positive.
White-clawed crayfish	Distribution: no reduction from baseline.
	Population structure: recruitment. juveniles and/or females with eggs in at least 50% of positive samples.
	No alien crayfish species.
	No instances of disease.
	Water quality: at least Q3-4 at all sites sampled by EPA.
Freshwater pearl mussel	Habitat quality: no decline in heterogeneity or habitat quality.
	Distribution: maintain at 161km.
	Population size: restore to 35,000 adult mussels.
	Population structure: recruitment. restore to least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length.
	Population structure: adult mortality. no more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution.
	Habitat extent: Restore suitable habitat in more than 35km and any additional stretches necessary for salmonid spawning.
	Restore water quality- macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93.
	Substratum quality: filamentous algae (macroalgae), macrophytes (rooted higher plants). restore substratum quality- filamentous algae: absent or trace (<5%).
	Substratum quality: sediment. Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment.
	Substratum quality: oxygen availability. Restore to no more than 20% decline from water column to 5cm depth in substrate.
	Restore appropriate hydrological regimes.
Host fish: maintain sufficient juvenile salmonids to host glochidial larvae.	
Otter	Distribution: no significant decline.
	Extent of terrestrial habitat: no significant decline.
	Extent of marine habitat: no significant decline.
	Extent of freshwater (river) habitat: no significant decline.
	Extent of freshwater (lake) habitat: no significant decline.

Qualifying Interest within the Blackwater River (Cork/Waterford) SAC	Attribute/Target
	Couching sites and holts: no significant decline.
	Fish biomass available: no significant decline.
	Barriers to connectivity: no significant increase.

5.2 Kilcolman Bog SPA

5.2.1 Summary of European site

Kilcolman Bog SPA is designated for whooper swan, teal (*Anas crecca*), shoveler (*Anas clypeata*), wetland and waterbirds.

5.2.2 Qualifying Interests Potentially Exposed to Risk

The only QI of Kilcolman Bog SPA potentially exposed to risk from the proposed Project is the Annex I species, whooper swan (see Screening Table in Section 4.1).

5.2.2.1 Whooper Swan

Whooper swan is a winter visitor to wetlands throughout Ireland from breeding grounds in Iceland. It is listed under Annex I of the EU Birds Directive due to Ireland hosting more than 20% of the European wintering population and is amber listed in Ireland (Colhoun and Cummins, 2013) due to the majority of whooper swans wintering at ten or less sites. The European population trend is increasing has been evaluated to be Secure and of Least Concern under the international union for conservation of nature (IUCN) (Birdlife International, 2015). Whooper swans arrive in Ireland from Iceland in early October and leave in late March/early April. They usually arrive and depart through Lough Foyle/ Lough Swilly with their numbers tending to peak in mid-winter. They feed on a variety of habitats, from improved pasture to callows, permanent lakes and turloughs to potato crops and roost on lakes at night. They move within sites and between sites during the winter. The Republic of Ireland supported 11,852 whooper swan during the 2015 census, 34.9% of the flyway population (Hall et al., 2016).

During the early part of the 20th century, whooper swan wintering in Britain and Ireland fed mainly on aquatic vegetation during the winter months. However, the use of agricultural land has become far more frequent since the 1960s, partly as a result of agricultural intensification in the wintering areas. The habitat preference of whooper swan has switched to cropped land (arable and agriculturally-improved pasture) particularly re-seeded grasslands, winter cereals, root crops and oil seed rape (Robinson et al., 2004).

Kilcolman Bog SPA is noted for its population of Annex I whooper swans. The mean population for the site (based on the most recent 5 year period 2010/11 – 2014/15 for site 0L020) is 56 birds (Birdwatch Ireland, 2019). Whooper swan first appeared at Kilcolman Bog in the 1940s and increased to wintering population of up to 120 birds in the 1980s (O' Halloran et al., 1993). There has been a varying although predominantly downward trend in site populations since 2006. Whooper swan can utilise non-wetland sites inland and suitable supporting habitat i.e. flooded fields and inundated flood plains is present near Shinanagh and Buttevant. There are historical records of the species occurring in fields immediately west of Shinanagh level crossing. A mean peak of 32 birds was recorded from 1994–2001. Whooper swan were also recorded north and east of Buttevant with mean peaks of 97 birds recorded from 1996-2000 and 32 birds from 1994-1998 respectively. However as noted from the bird surveys undertaken for the proposed Project, whooper swans were not recorded at Kilcolman Bog SPA and were recorded 300m from XC219 Buttevant level crossing during one survey.

5.2.3 Conservation Objectives

The overarching conservation objective for Kilcolman Bog SPA is to ensure that waterbird populations and their wetland habitats are maintained at, or restored to, favourable conservation condition. To determine how the project would affect Qis of Kilcolman Bog SPA this assessment has focused on the effects that may possibly occur that could undermine the conservation objectives.

Generic conservation objectives for QI of Kilcolman Bog SPA are provided by the National Parks and Wildlife Service (NPWS, 2018). Although only generic conservation objectives are available for Kilcolman Bog SPA, detailed conservation objectives for this species are available for Lough Swilly SPA (NPWS, 2011) and it is considered for the purpose of this AA that the conservation objectives for this site are applicable (**Table 5.2** below). The overarching objectives for the site are:

Objective 1: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

For the QI species (i.e. whooper swan) these can be summarised as the following;

- To be favourable, the long-term population trend for each waterbird Special Conservation Interest species should be stable or increasing. Waterbird populations are deemed to be unfavourable when they have declined by 25% or more, as assessed by the most recent population trend analysis.
- To be favourable, there should be no significant decrease in the distribution (range, timing or intensity of use of areas) by the waterbird species of Special Conservation Interest, other than that occurring from natural patterns of variation.

Objective 2: To maintain or restore the favourable conservation condition of the wetland habitat at Kilcolman Bog SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

5.2.4 Conservation Status of Qualifying Interests of Kilcolman Bog SPA

The conservation status of relevant QIs at national and site level, key conditions underpinning favourable conservation status and threats to key conditions are presented in **Table 5.2**. The current national conservation status of the QI species (i.e. "Green, "Amber or "Red") is sourced from Birds of Conservation Concern in Ireland 2014-2019 (Colhoun and Cummins, 2013). Birds on the Red-List are those of highest conservation concern, Amber-List birds are of medium conservation concern and the Green-List birds are not considered threatened. The site level status has been derived from Kilcolman Bog SPA Natura 2000 site synopsis form (NPWS, 2017).

Table 5.2: Kilcolman Bog SPA conservation status, key conditions and threats to relevant QI (NPWS, 2011; NPWS, 2017)

Relevant QI	National Conservation Status (BoCC ²)	Site-Level Status (NPWS, 2017)	Current site trend	Key conditions supporting favourable conservation status	Primary threats to key conditions*
Whooper swan	Amber	Good	Decreasing	Foraging/roosting sites Stopping/ staging sites	Changes in agricultural practices Urbanisation Habitat modification Disturbance

* Items in bold are of relevance to the proposed Project

² Colhoun K. & Cummins S. (2013).

5.3 Assessment of Adverse Effects on the Blackwater River (Cork/Waterford) SAC

5.3.1 Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation

Whilst the detailed distribution of this habitat type is unknown and the sub-types and typical species are not yet defined, there are adverse effects identified that could undermine the conservation objectives for this habitat. Floating vegetation communities are sensitive to changes in substratum particle size (typically requiring sands, gravels and cobbles) (NPWS, 2012). Construction activities during the proposed works such as earthworks present the risk of mobilisation and release of sediments into the Awbeg River. Once mobilised, suspended sediments comprising of fine silts or clays could settle out downstream within this QI habitat, smothering the substratum and rendering it unsuitable for the macrophyte species that make up this the habitat type, thus undermining the conservation objective for substratum composition.

A pollution event from construction would also be likely to result in elevated levels of dissolved nutrients such as phosphorous (typically the limiting nutrient in freshwater ecosystems) (NPWS, 2012) and nitrogen. Increased nutrients could be expected to lead to increased filamentous algal biomass and consequently, changes to the species composition of the vegetation. The conservation objective for water quality states that this attribute should reach a minimum of 'good status' in terms of nutrient and oxygenation standards and ecological quality ratios for macroinvertebrates and phytobenthos under Water Framework Directive classifications. A pollution event caused by the proposed works is likely to cause an increase in dissolved nutrients and the undermining of the conservation objective for water quality.

In the absence of mitigation, it is likely that construction impacts of the proposed project would undermine these conservation objectives and therefore the favourable conservation condition of this QI habitat.

5.3.2 Atlantic Salmon

As salmon are known to use the Awbeg River as well as run in the Blackwater River in most months of the year adverse effects to salmon were identified from a pollution event during the construction phase of the project. Salmon are known to be highly susceptible to degradation of water quality (Hendry and Cragg-Hine, 2003) and therefore would be among the species worst affected by pollution to watercourses. One mechanism of harm, noted by Bash et al. (2001), is the clogging of respiratory structures (i.e. gills) by elevated levels of suspended solids. Sediments released in large quantities could also smother any downstream spawning redds within the Awbeg River, causing a decline in number, thereby undermining the conservation objective target of no significant decline. Any fish-kills or sub lethal effects from other pollutants could also reduce the abundance of salmon fry to below the defined conservation limit downstream of the project sites. Mitigation measures are therefore required to avoid adverse effects from a pollution event which could impact on this QI species.

5.3.3 Sea Lamprey

Adverse effects to sea lamprey could result from a pollution event during construction or operation causing either a smothering effect by elevated levels of fine sediments, toxic effects from synthetic oils, high pH from concrete wash-out or other chemicals would be likely to result in a failure to meet conservation objectives for sea lamprey.

The closest known downstream sea lamprey spawning site is at Ballyhooly (approximately 28km downstream of the project site), (NPWS, 2012; King and Linnane, 2004) therefore a pollution event would likely have to be considerable in magnitude to significantly impact upon sea lamprey spawning redds in the Blackwater River (Cork/Waterford) SAC but a potential hydrological pathway exists nonetheless. A sediment release of sufficient magnitude could impact availability of spawning bed habitat through the deterioration of clean gravels at spawning grounds within the Blackwater, thereby affecting the ability of sea lamprey to reproduce.

In addition, pollution to watercourses can act as a barrier to migration of lamprey (Maitland, 2003) preventing or delaying up or downstream movement which could undermine the conservation objective target for distribution.

Both the population structure of juveniles and juvenile density in fine sediments could be impacted by a pollution event (e.g. smothering of silt beds).

Other forms of oil or industrial chemical pollution could have a range of lethal and sub-lethal effects on sea lamprey, any of which may result in failure to meet the conservation objectives relating to population structure of juveniles. An isolated incident, for example a release of high pH concrete washout to surface waters during construction, could, if it occurred during the lamprey migration season, kill or injure migrating adults and prevent successful spawning in a given year, thereby resulting in failure to meet the juvenile population structure conservation objective. There is therefore potential in the absence of mitigation for the conservation objectives for extent and distribution of spawning habitat, population structure of juveniles, juvenile density in fine sediment and availability of juvenile habitat for this species to be undermined. Mitigation measures are therefore required to prevent and manage the risk of a pollution event which could impact on this QI species.

5.3.4 River and Brook Lamprey

Like most aquatic animals all lamprey species are susceptible to pollution (Maitland, 2003). As with sea lamprey, potential adverse effects to river and brook lamprey could result from changes to their habitat associated with increased fine sediment inputs, industrial oils and chemicals and high pH washout water from concrete pouring works during construction of the proposed project. In addition to direct toxic effects, pollution can have a major impact on lamprey by smothering both spawning gravels and nursery silts and severe pollution events can prevent upstream migration (Maitland, 2003). There are however no known *Lampetra sp.* spawning grounds in the downstream pollution pathway from the proposed project site.

Pollution to watercourses can act as a barrier to migration of lamprey (Maitland, 2003) preventing or delaying up or downstream movement which could undermine the conservation objective target for distribution. Both the population structure of juveniles and juvenile density in fine sediments could be impacted by a pollution event (e.g. smothering of silt beds). Any juvenile lamprey utilising these silt beds would be at risk of impacts.

A pollution incident, could, if it occurred during the lamprey migration season, kill or injure adult lamprey and prevent successful spawning in a given year, thereby resulting in the undermining of the population structure conservation objective.

Given these potential impacts upon river and brook lamprey, mitigation measures are required to avoid adverse effects from a pollution event which could impact on these QI species.

5.3.5 White-Clawed crayfish

White-clawed crayfish are reliant on good water quality (Peay, 2003). A pollution incident involving an input of suspended sediments or other construction related pollutants such as industrial oils and chemicals and high pH washout water from concrete pouring could result in a decrease of water quality to below EPA Q3-4. This would result in a failure to meet the water quality conservation objective target for this species (NPWS, 2012). A reduction in water quality could, in turn, undermine the conservation objective targets for both population structure and distribution.

The conservation objective target in relation to disease is that of no incidence. The introduction of *Aphanomyces astaci* has had a catastrophic effect on populations of crayfish in other catchments in Ireland such as the Erne river in Co. Cavan (Arnscheidt et al., 2015). Due to the proximity of infected catchments there is a high risk of inadvertently spreading the disease on wet or muddy footwear or equipment from other sites.

Mitigation measures are therefore required to prevent and manage the risk of a pollution event or introduction of crayfish plague which could impact on this QI species and undermine its favourable conservation status.

5.3.6 Freshwater Pearl Mussel

Freshwater pearl mussel populations are highly susceptible to changes in hydrology, and particularly impacts from sedimentation and pollution. Given this susceptibility, any deterioration in water quality downstream of project sites due to an increase in suspended sediments and other pollutants could undermine the conservation objectives for the Blackwater freshwater pearl mussel populations.

Fine sediment can adversely affect juvenile pearl mussels buried in the sediment, which depend on a plentiful supply of oxygen to their habitat (Walsh et al., 2012). There is the potential for a release of sediments into watercourses connected to freshwater pearl mussel habitat during the construction phase of the proposed project which will involve earthworks within the vicinity of watercourses at multiple locations. In addition, toxic effects from a release of industrial oils, other chemicals or high pH washout water from concrete pouring works to watercourses during construction could have further lethal or sublethal effects on freshwater pearl mussel. A pollution event resulting from construction works could therefore have the effect of undermining a range of conservation objectives for this species including population size, population structure, water quality, substratum quality.

Furthermore, freshwater pearl mussel are reliant on salmonids as host fish during their reproductive cycle, so there is also the potential for indirect effects from pollution impacts to salmon (described in **Section 5.3.2**) which could result in the undermining of conservation objectives for population structure by a reduction in recruitment of juveniles due to a reduction in the availability of salmon and trout hosts in the same watercourses. Mitigation measures are therefore required to avoid adverse effects from a pollution event which could impact this QI species.

5.3.7 Otter

Otter are an apex predator in many Irish rivers and rely upon the QI species discussed above and other non-QI fish species as their main source of food and are therefore ultimately dependant on water quality. Pollution to surface waters and any consequent reduction of fish stocks on which otter depend could present a threat to the local otter population and has the potential to undermine the conservation objective targets for distribution of otter and available fish biomass as discussed below.

A reduction in the distribution of prey species, including salmon, lamprey and/or crayfish could, in marginal habitats, would not only reduce the available fish biomass available but may also lead to a reduction in the range of otter within the SAC. This would therefore impact on the conservation objective requiring no significant decline in their distribution. Mitigation measures are therefore required to adverse effects from a pollution event which could impact this QI species.

5.3.8 Mitigation Measures

A number of generic mitigation measures have been identified which will be applied across the proposed Project to avoid the impacts associated with pollution of watercourses. In addition to this, there are mitigation measures specific to the various proposed Project elements. For example, specific measures to control silt are planned to be implemented at each of the proposed Project infrastructure sites.

5.3.8.1 Generic Mitigation Measures

There will be a toolbox talk given to all site personnel to highlight any environmental sensitivities and the boundaries of sensitive habitats. During sensitive works e.g. instream works, an Ecological Clerk of Works (ECoW) will supervise the works. No sensitive works will be permitted until the ECoW has approved.

Measures set-out herein will be implemented to ensure that there will be no pollution of surface water during the Construction Phase of the proposed Project. These measures have been designed with reference to the following guidelines:

- Construction Industry Research and Information Association (CIRIA) C648 Control of Water Pollution from Linear Construction Projects: Technical Guide (Murnane et al., 2006a);

- CIRIA C649 Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane et al., 2006b);
- CIRIA C532: Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al., 2001); and
- Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (Inland Fisheries Ireland, 2016).

Control of Silt Laden Runoff

Surface water runoff at the construction sites will be managed to prevent flow of silt laden surface water flowing into surface water receptors.

The contractor shall be obliged to ensure no deleterious discharges are released from the sites to the nearby waterbodies during construction. If a discharge to a watercourse is necessary, the water will pass through a swale or silt buster prior to discharge. Levels of suspended solids in any discharge will be not greater than 25mg/l as per IFI guidance (2016) and flows will be controlled to levels appropriate to the receiving water. It is possible that such a discharge may require a licence under the Water Pollution Acts 1977 & 1990, as amended and the Arterial Drainage Act 1945 & 1995, as amended. The Contractor will liaise with the regulatory authorities at an early stage to determine the necessity for licences and include the appropriate application time required in any construction programme.

Silt fences will be erected along the boundary of water bodies to prevent any silt laden runoff from impermeable surfaces, temporary or permanent, as well as spoil heaps within the construction working width.

Reinstatement of any banks affected as a result of silt laden run off during construction will be reinstated back to pre-development conditions.

Stockpiling of Materials

During site set up, sites would be either cleared in stages to prevent bare earth being exposed for prolonged periods, or the bare earth would be immediately covered in a gravel/plastic covering to reduce the likelihood of sediment laden run-off following rainfall events. Stripped soil will be stockpiled more than 10m away from the surface interceptor drain described above. Stockpiles will be in a dry zone that is not subject to flooding. The following measures will be put in place by the Contractor with regard to stockpiling of material:

- temporary stockpiles will be located away from drains and watercourses. Stockpiles will be located more than 10m from a watercourse;
- for watercourse crossings, stockpiles will not be located anywhere within the crossing working area;
- management of stockpiles to prevent siltation of watercourse systems through runoff during rainstorms will be required with the final measures to be determined by the Contractor. These will include the following measures or equivalent measures:
- allowing the establishment of vegetation on the exposed soil;
- providing silt fences or straw barriers at the toe of the stockpile to mitigate runoff during rain events;
- surrounding stockpiles with cut-off ditches to contain runoff;
- directing any runoff to the site drainage system or filter drains along the Construction Working Width and to the settlement pond (or other) treatment systems; and
- providing bunds or another form of diversion to keep runoff from entering the stockpile area.

Storage of Materials

The following measures will be implemented across the site for the storage of materials:

- all oil and diesel storage facilities will be at least 30m from any watercourse including surface water drains;
- spill kits and drip trays will be provided for all equipment and at locations where any liquids are stored and dispensed;
- storage areas for solid materials, including waste soils, will be designed and managed to prevent deterioration of the materials and their escape (via surface runoff or wind blow);
- storage areas will be kept secure to prevent acts of vandalism that could result in leaks or spills; and
- all containers of any size will be correctly labelled indicating their contents and any hazard warning signs.

Fuel Tanks, Drums, Mobile Bowsers and Bunds

The following measures will be implemented across the site for the prevention of spills:

- fuel tanks, drums and mobile bowsers (and any other equipment that contains oil and other fuels) will have a secondary containment, for example, double skinned tanks;
- all tanks, drums and mobile bowsers will be located in a sealed impervious bund with sufficient capacity to contain at least 25% of the total volume of the containers or 110% of the largest container, whichever is the greatest;
- storage areas will be covered, wherever possible, to prevent rainwater filling the bunded areas;
- fuel fill pipes will not extend beyond the bund wall and will have a lockable cap secured with a chain;
- where fuel is delivered through a pipe permanently attached to a tank or bower:
 - the pipe will be fitted with a manually operated pump or a valve at the delivery end which closes automatically when not in use;
 - the pump or valve will be fitted with a lock;
 - the pipe will be fitted with a lockable valve at the end where it leaves the tank or bower;
 - the pipework will pass over and not through bund walls;
 - tanks and bunds will be protected from vehicle impact damage;
 - tanks will be labelled with contents; capacity information and hazard warnings; and
- all valves, pumps and trigger guns will be turned off and locked when not in use. All caps on fill pipes will be locked when not in use.
- suitable precautions will be taken to prevent spillages from equipment containing small quantities of hazardous substances (for example, chainsaws and jerry cans) including:
 - each container or piece of equipment will be stored in its own drip tray made of a material suitable for the substance being handled; and
 - containers and equipment will be stored on a firm, level surface.
- for deliveries and dispensing activities, the Contractor will ensure that:
 - site-specific procedures are in place for bulk deliveries;
 - delivery points and vehicle routes are clearly marked; and
 - emergency procedures are displayed, and a suitably sized spill kit is available at all delivery points, and staff are trained in these procedures and the use of spill kits.

Vehicles and Plant

The use of vehicles and plant poses similar risks to those posed by storage of liquids. Fuel and oil may leak from such equipment which may enter drains and/or watercourses, as well as contaminating the ground itself. The following measures will be implemented to reduce this risk:

- vehicles and plant provided for use on the site will be in good working order to ensure optimum fuel efficiency, and will be regularly inspected to ensure they are free from leaks;
- sufficient spill kits will be carried on all vehicles;
- vehicles and plant will be regularly maintained to ensure that they are working at optimum efficiency and are promptly repaired when not in good working order;
- vehicles and plant will not park near or over drains; and
- refuelling of vehicles and plant will be carried out on hard standing, using drip trays to ensure no fuel can contaminate the ground outside of the bunded areas.

Working in or Near Watercourses

The following control measures will be implemented during the construction of the proposed Project in or adjacent to a watercourse:

- works within and adjacent to watercourses will be conducted during forecast low flow periods where possible;
- in-stream works will not be carried out in watercourses frequented by salmon or trout during the Annual Close Season. The duration of the season varies regionally within the period from the beginning of October to the end of February inclusive (IFI, 2016). River and brook lamprey spawn during the period March-April; translocation and instream works should be undertaken outside of the spawning season. The timing of works will be considered on a site-specific basis and in agreement with the IFI;
- operation of machinery in-stream will be kept to an absolute minimum. All construction machinery operating in-stream will be mechanically sound to avoid leaks of oils, hydraulic fluid, etc. Machinery will be cleaned and checked prior to commencement of in-stream works;
- the design of temporary settlement ponds, the outfalls from these temporary ponds and the construction method statements for their installation will be agreed with IFI prior to construction;
- the area of disturbance of the watercourse bed and bank will be the absolute minimum required for the installation of outfalls/ culverts;
- any dewatering flows will be directed to the construction drainage system and to the settlement pond (or other) treatment system;
- sediment mats/ silt traps or similar will be located immediately downstream of the works within and adjacent to the watercourses. These will be inspected daily, maintained and cleaned regularly during the course of site works. Diversion of water to and from a temporary diversion channel will only take place during the period March to September (IFI, 2016) or as agreed with the IFI;
- small check dams will be constructed in the cut-off watercourse to trap any sediment, and a sediment trap will be provided immediately downstream of the diversion to the existing watercourse; and
- where in-stream bed material is to be removed, coarse aggregates, if present, will be stockpiled at least 10m away from the watercourse for replacement following reinstatement of a watercourse channel.
- Reinstatement of any banks affected during construction works near a watercourse will be reinstated back to pre-development conditions.

Use of Concrete

The use and management of concrete in or close to watercourses shall be carefully controlled to avoid spillage. Where the use of concrete near water cannot be avoided, the following control measures will be employed:

- when working in or near the surface water and the application of in-situ materials cannot be avoided, the use of alternative materials such as biodegradable oils shall be used;

- placing of concrete in or near watercourses will be carried out only under the supervision of the Ecological Clerk of Works (ECoW);
- there will be no hosing of concrete, cement, grout or similar material spills into surface water drains. Such spills shall be contained immediately, and runoff prevented from entering the watercourse;
- concrete waste and wash-down water will be contained and managed on-site to prevent pollution of all surface watercourses; and
- washout from concrete lorries will not be permitted on-site and will only take place at the batching plant (or other appropriate facility designated by the manufacturer).

5.3.8.2 Specific Mitigation Measures

Pollution Control

Pollution control measures detailed above will avoid a reduction in water quality in the Awbeg (Buttevant East) River, the Newton River and the Pepperhill River.

Specific control measures are required at Ballyhay to avoid a reduction in water quality in the Awbeg (Buttevant East). As part of the additional Ground Investigation proposed for prior to construction, groundwater samples will be taken. The groundwater quality samples will identify if there is any issue with groundwater quality. Based on the results, it may be possible to dewater and discharge to the Awbeg (Buttevant East) River following settlement; alternatively, if other contamination such as metals or hydrocarbons are detected, additional measures will be needed which could include additional treatment or disposal off site.

Specific control measures are required for the installation of the proposed culvert to the west of the railway at Ballycoskery. The culvert will be pre-fabricated and clean, so as to avoid concrete washings contamination. If the ditch is flowing, it will be dammed and pumped over the installation area to avoid the transportation sediment downstream. Additional in-stream measures will also be deployed, such as straw bales and oil booms to ensure there is no downstream impact as a result of the installation process.

No drainage works are proposed at XC187 Fantstown as no construction is proposed there; none is required either at XC209 Ballyhay as limited construction is proposed to take place there and the CCTV infrastructure does not require drainage or any alterations to existing drainage systems. For the remaining sites, in keeping with *NRA TB 13 – Revised Road Drainage Standards*, over the edge drainage is proposed in the design for all locations, supplemented with additional features to accommodate the presence of structures or site constraints where necessary (see **Table 5.2**). New swale ditches are proposed, located at the toe of the road embankment, that will then drain back to the low points to maximise attenuation and pollution control as part of a SuDS management chain.

The swale features will be grassed, with shallow side slopes and a long-wetted perimeter to reduce flow rates and velocities. Typically, they will be underlain by a filter material and perforated pipe to provide a second stage of treatment. The width of the swale varies between 3 and 7 metres depending on the site, and the depth (including 0.15 metres freeboard) is up to 0.75 metres and typically less than 0.5 metres. See TII Publication Number CC-SCD-00525 for typical details. Where agricultural or local access must be maintained, a short section of culvert will be constructed beneath the respective junction to ensure connectivity of the swale ditches either side of the access.

The swale ditches will outfall directly or indirectly into water bodies within the River Mague (the Fantstown and Thomastown crossings are located within this sub-catchment) or River Awbeg (all other crossings are located within this sub-catchment) sub-catchments respectively. The maximum outflow of the swales will be capped at greenfield runoff rates.

Table 5.2: Drainage strategy and control measures at each of the crossing locations. Fantstown is not included as no construction is proposed there and Ballyhay is not included as only limited construction is proposed to take place there that does not require drainage or any alterations to existing drainage systems.

Level Crossing	Drainage Strategy & Control Measures
XC201 Thomastown	There will be no new outfall to the stream; swales will discharge into the existing open ditch at the point of tie-in on the R515 at existing runoff rates. The open ditch at the tie-in will be culverted.
XC211 Newtown	Swales will discharge into the existing road drainage at existing runoff rates. There will be no pathway to the pond from the road
XC212 Ballycoskery	Swales will discharge into the existing road drainage at existing runoff rates.
XC215 Shinanagh	Swales will discharge to an outfall into the existing road drainage at existing runoff rates. There will be no discharge to the ditches and no proposed works to the ditches. There is no new outfall proposed.
XC219 Buttevant	Swales will discharge to the existing road drainage to the west of the bridge at existing runoff rates. There will be no discharges to ditches and no works to the ditches which outfall to the SAC. To the east, swales will discharge to a ditch which flows north to the SAC but no works are required to clear this ditch as runoff rates are set to existing.

Fish and white-clawed crayfish

Additional measures that will be undertaken at Buttevant to protect fish species and white-clawed crayfish:

- where culverts are to be installed the area will be dewatered to provide a dry working area. The Pepperhill River and the ditch at Buttevant will have culverts installed at separate times so that flows can be maintained downstream during the installation;
- the culverts will be pre-fabricated and clean, so as to avoid concrete washings contamination;
- netting, sandbags and/or dumpy-bags filled with rock will be installed upstream to prevent fish travelling downstream into the working area;
- fish will be removed from the working area through electrofishing and moved upstream of the dammed area;
- hand searches will be conducted and any crayfish found will be removed and moved upstream of the dammed area;
- water will then be over pumped continually to ensure a dry working area. This must be pumped through a silt buster to avoid sediment from becoming suspended within the watercourse;
- additional in-stream measures will also be deployed, such as straw bales and oil booms to ensure there is no downstream impact as a result of the installation process; and
- once construction is completed the watercourse will be re-wetted under the direction of an Ecological Clerk of Works (EcoW). Water will be released slowly and silt mats, sediment traps and haybales will be used to avoid a sudden influx of sediment to the system. A silt buster will be used where required.

5.3.9 Conclusions with respect to adverse effects on aquatic QI species

With the implementation of the above mitigation measures the potential for significant effects to aquatic QI species (e.g. salmon and lamprey) as result of pollution or habitat loss during construction and operation of the proposed Project can be ruled out. The potential for adverse effects on site integrity to arise as a result of the proposed Project by negatively impacting on the conservation objective targets for these species (e.g. distribution, population structure and water quality) can be excluded.

5.4 Assessment of Adverse Effects on Kilcolman Bog SPA

The appraisal of potential impacts (from construction and operation) detailed below is based on the wintering bird surveys undertaken in 2020. From the surveys undertaken 16 whooper swans were recorded foraging within the

500m survey buffer from the proposed Project during one survey. All birds were recorded in a flooded field immediately north of the Awbeg River. No whooper swans were recorded at Kilcolman Bog SPA during any of the surveys suggesting that distribution is widespread and the bog is not actively being utilised which would reflect the overall downward trend in whooper swan numbers at the site (Birdwatch Ireland, 2019).

Although a survey buffer of 500m was used this can be regarded as a precautionary distance depending on the disturbance activity. Waterbird responses to disturbances from a range of activities, including construction work, have been collated and summarised over time by the Institute of Estuarine and Coastal Studies (IECS) and are based on a range of research papers, but in particular those included in Davidson and Rothwell (1993). A generic threshold response to a visual disturbance of c.300m to waterbird roost/foraging sites, has been derived around the approach distance for sensitive bird species (Cutts et al., 2013). Therefore, as the whooper swan were recorded approximately 300m from the edge of the proposed Project it is likely that birds are within the outermost limit of their ZoI given the topography and existing environmental conditions.

Construction works at CX219 Buttevant level crossing would generate disturbance as a result of machinery operation/ operator movement. Although studies have shown that bird species have the ability to habituate quickly to regular noises and visual disturbances (Smit and Visser, 1993), potential long-term effects of disrupted foraging behaviour can lead to decreased body condition and a reduction in reproductive success and individual survival (NPWS, 2014). In terms of foraging habitat, displacement from feeding opportunities not only reduces a bird's energy intake but also leads to an increase in stress and energy expenditure as a result of the energetic costs of flying to alternative foraging areas (Johnson et. al., 2014). Displacement also has knock-on ecological effects such as increased competition (within and/or between different species) for a common food source. In areas subject to heavy or on-going disturbance, waterbirds may be disturbed so frequently that their displacement is equivalent to habitat loss (NPWS, 2014b). When disturbance effects reduce species fitness (reduced survival or reproductive success) consequences at population level may result. At certain times of year (i.e. during cold spells in the winter) the effect of this could be particularly severe, potentially resulting in bird mortality.

It is considered that construction activities associated with the proposed Project at Buttevant are likely to be more disruptive than operational activities in terms of noise level and frequency of movement. Any activity that causes disturbance or increased levels of disturbance can cause displacement of bird populations from the area. As such disturbance from the construction or operation of the proposed Project has potential to undermine the conservation objective targets for this species (i.e. distribution – no significant decrease in the range, timing or intensity of use of areas by whooper swan).

Background levels of disturbance already exist in the vicinity of the foraging site including vehicular and pedestrian traffic on the R522 road, operational noise from the level crossing (although of low level) and irregular excessive noise from passing trains on the main Dublin to Cork line including warning horns for safety purposes whilst passing through the level crossing. At 300m from a noise source noise levels required to create high level disturbance would need to be 117-122dB at source (Cutts et al., 2013). Noise levels from the proposed works will not exceed permissible levels for construction works (70dB(A) at source resulting in 18dB(A) at 300m) therefore noise impacts on whooper swan are not predicted to be significant.

It is unlikely that works will cause visual disturbance impacts to the birds given the rolling topography of the land and vegetative buffer either side of the river and existing road acting as a natural screen (**Plate 5.1**) along with the infrequent use of the site by whooper swan potentially influenced by recent flooding. The field boundary along the south of the R522 road comprises a dense, tall (5m) treeline dominated by hawthorn (*Crataegus monogyna*) and ash (*Fraxinus Excelsior*).

Therefore, given the given the distance (300m across the Awbeg River), the existing natural screening alongside the river and proposed works area acting as a visual screen and the existing noisy environment, impacts to whooper swan as a result of disturbance leading to displacement are considered low. However, it is considered that the works associated with the proposed Project could result in the displacement (visual disturbance) of foraging whooper swan if the treeline/scrub field boundary is removed and works are undertaken within the critical period (October – March). Therefore, in the absence of mitigation these works are at risk of displacing birds.

5.4.1 Mitigation Measures

5.4.1.1 Generic Mitigation Measures

No generic mitigation measures are proposed.

5.4.1.2 Specific Mitigation Measures

At Buttevant where timing of works cannot be completed outside the critical period (October – March) measures must be implemented to mitigate the disturbance impacts to whooper swan foraging in the vicinity of Xc219 Buttevant level crossing. The following measures would be required;

- The existing treeline along the R522 road at Buttevant must be retained in order to act as natural visual screen along the works area (Plate 5.1).
- If this treeline cannot be retained, then artificial screening must be in place. Non-transparent visual screening will be erected along the north of the works area to hide the construction works and the movement of machinery/ workforce to minimise disturbance to whooper swan (Plate 5.2).
- Screening must be installed in early September to ensure the site/works are screened before the main migration period (October). Erection of fencing later than this could potentially cause further disturbance to the birds.
- The fencing should be of adequate height to screen the works area (2 – 3m) or as advised by an experienced ecologist.
- This screening will remain in place for the duration of the works.

An Ecological Clerk of Works (EcoW) will supervise the erection of the screening (if natural screening cannot be retained) and provide guidance to the appointed contractor(s) through a toolbox talk ensuring these measures are effective. The ECoW will make regular checks of the screening throughout the works to ensure it is maintained in good condition and working order.



Plate 5.1: Existing treeline along the R522 at Buttevant to be retained



Plate 5.2: Example of visual screening used along flood defence works

5.4.2 Conclusions with respect to disturbance to foraging whooper swan

With the implementation of the above mitigation measures the potential for significant effects to whooper swan as result of disturbance (visual) during construction and operation of the proposed Project can be ruled out. The potential for adverse effects on site integrity to arise as a result of the proposed Project by negatively impacting on the conservation objective targets for the species (e.g. population trend and distribution) can be excluded.

6. In-Combination Assessment

6.1 Introduction

The following planning and policy resources were assessed as part of the in-combination assessment of the proposed Project:

- National Planning Application Database (DHPLG, 2020)
- N/M20 Cork to Limerick Road Improvement Scheme
- National Development Plan 2018 – 2027
- Project Ireland 2040 National Planning Framework
- South West Regional Planning Guidelines 2010-2022
- Cork County Development Plan 2022-2028
- Cork County Development Plan 2014
- Limerick Development Plan 2022-2028
- Draft Fermoy Municipal District Local Area Plan 2017
- Draft Kanturk Mallow Municipal District Local Area Plan
- Kilmallock Local Area Plan 2019-2025

A search of valid planning applications within 1km of the proposed Project followed by an assessment of the potential for in-combination effects with the proposed Project was undertaken. Other applications were either withdrawn, incomplete, or are sufficiently far away that there is no potential for in-combination effects with the proposed Project.

6.2 Plans or projects with the potential for in-combination effects

6.2.1 Plans with the potential for in-combination effects

National Development Plan and National Planning Framework

The National Development Plan 2018 - 2027 (NDP) sets out the investment priorities that will underpin the implementation of the National Planning Framework. The purpose of the long-term strategy is to provide a framework for the growth of Ireland's cities and towns over the next twenty years in an environmentally sustainable way. It is envisaged that the NPF will be detailed in Regional Spatial and Economic Strategies to ensure proper planning and sustainable development in the long term, at local, regional and nation levels. No in-combination effects are predicted.

South West Regional Planning Guidelines and County Development Plans

The Regional Planning Guidelines (RPG) sets out high level strategies and promotes the overall sustainability and growth of the region. The RPG policies inform and advise the Local Authorities in the preparation and review of their respective Development Plans. The Cork and Limerick County Development Plans includes policies and objectives to guide the future development of the county. These development plans will include environmental reports (Strategic Environmental Assessment/Habitats Directive Assessment/Strategic Flood Risk Assessment). Based on the objectives for these plans, and that mitigation measures will be put in place which will avoid any adverse effects, and given that the proposed Project will have mitigation measures to avoid any adverse effects it is anticipated that there will be no in-combination effects from these guidelines or development plans.

Local Area Plans

Local area plans must include policies and objectives which provide guidance on climate change and support the conservation of biodiversity which are essential components of sustainable development.

One of the key attributes of the Fermoy District and the Kanturk-Mallow District is the River Blackwater which is designated as a Special Area of Conservation under the Habitats Directive as it is a significant site containing important rare plants and species. In planning for the future development of the area the Council has a legally binding obligation to protect the favourable conservation status of the River Blackwater Special Area of Conservation. In practical terms the status of the site, and conservation objectives for it, means that significant improvements are required to water quality within the catchment to meet stringent water quality standards. It is likely that this plan will result in an improvement in water quality in the area, having a positive effect on watercourses and the River Blackwater (Cork/Waterford) SAC. There are therefore no predicted in-combination effects from these local area plans.

The Kilmallcok Local Area Plan covers the region surrounding the Fantstown and Thomastown level crossings and which are not hydrologically linked to the River Blackwater (Cork/Waterford) SAC. The Planning Authority carried out an Appropriate Assessment Screening and determined that there are no significant effects as a result of the Plan. There are therefore no predicted in-combination effects from this local area plan.

6.2.2 Projects with the potential for in-combination effects

A review of the National Planning Application Database (NPAD) identified 29 valid planning applications within the last five years within approximately 1km of the proposed Project (detailed below for each crossing location). Of these seven were deemed to have the potential for in-combination effects, as detailed below.

XC187 Fantstown

At Fantstown three planning applications were identified within the last five years within approximately 1km of the crossing (planning application references: 18679, 20237 and 16419). None of these planning applications were deemed to have potential for in-combination effects given that works at this crossing consist of an upgrade to a CCTV crossing only and that there are no European sites in the vicinity of this crossing.

XC201 Thomastown

At Thomastown six planning applications were identified within the last five years within approximately 1km of the crossing (planning application references: 20359, 20297, 18746, 19511, 17237 and 18982). None of these planning applications were deemed to have potential for in-combination effects given that there are no European sites in the vicinity of this crossing and there is no pathway for impact.

XC209 Ballyhay

At Ballyhay three planning applications were identified within the last five years within approximately 1km of the crossing (planning application references: 175216, 176589 and 205940). None of these planning applications were deemed to have the potential for in-combination effects given the scale of the projects, their distance from the proposed Project and the nature of the works.

XC211 Newtown and XC212 Ballycoskery

At Newtown and Ballycoskery five planning applications were identified within the last five years within approximately 1km of the crossing (planning application references: 195597, 186539, 195964, 174997, 185179). One of these planning applications was deemed to have the potential for in-combination effects, as detailed below.

Planning Ref 195964: Retention of alterations and variations to existing service station building as constructed to which shop/ take away element/ seating area forms part of. Variations to building as constructed to include; Extended seating area to front of existing service station building, extended toilet block to rear of building as

constructed, stand-alone shop storage shed to rear of building as constructed. Retention is also sought for alterations to site layout and all associated site development works and services as constructed; this to include; site fencing, truck pump, car wash, treatment system, new concrete yard to the rear of the property, all associated underground works, to include fuel pipework, electrical etc, additional car parking, signage and services as constructed to same. The above to be carried out with all associated ancillary site works. This development is within approximately 150m of the proposed Project. Conditional permission was granted in September 2020. However, given the nature of these works (i.e. retention only) there is no potential for in-combination effects to any European site with respect to the proposed Project.

XC215 Shinanagh

At Shinanagh seven planning applications were identified within the last five years within approximately 1km of the crossing (planning application references: 195829, 164755, 204041, 186347, 185185, 185951 and 185941). Two of these planning applications were deemed to have the potential for in-combination effects, as detailed below.

Planning Ref 185185: Construct a dwelling and carry out of all associated site works, including the installation of a septic tank and percolation area. This development is approximately 60m from the works at Shinanagh. Given that there is no pathway for impact, including a hydrological link, from this development or the proposed Project to any European site there is no potential for in-combination effects.

Planning Ref 185941: Permission to demolish the existing front porch of dwelling, existing out buildings and existing lean-to extension to rear of dwelling. Permission for alterations to front elevation to include a new window and fitting of two new roof lights to existing dwelling roof and to construct a new storey and a half extension to rear of existing dwelling and install a new septic tank and percolation area. This development is within 20m of the works at Shinanagh. Given that there is no pathway for impact, including a hydrological link, from this development or the proposed Project to any European site there is no potential for in-combination effects.

Planning Ref 204041: A 10 year planning permission for the development of a 102.76 hectare solar PV farm and 3.425 kilometre underground electricity grid connection (0.34 hectares) giving a total combined area for both the solar farm and underground grid connection of 103.1 hectares. The proposed solar farm will consist of the installation of a 40 year operation and subsequent decommissioning of a series of ground mounted solar photovoltaic (PV) panels, mounted on steel support structures, together with 1 single storey ESB control room, 12 electrical transformation enclosures, underground cabling, inverters, CCTV poles and cameras, deer type security fencing, existing site entrance from the L5529 road, access tracks, hardstanding area, landscaping and biodiversity measures and all associated ancillary development works, for the purpose of generating renewable energy electricity. The proposed solar farm is located in the townlands of Ballyroe and Dromin, Ballyhea, Charleville, County Cork. The proposed underground electricity grid connection is to be installed entirely under public roads from the proposed solar farm at Ballyroe to Charleville 110kV ESB substation, which passes through the townlands of Ballyroe, Ballynadrideen, Ardnageehy, Rathnacally and Clashganniv in Ballyhea, Charleville, County Cork. This application was submitted in January 2020 and is currently awaiting a decision on planning permission. A Natura Impact Statement (NIS) was submitted to the planning authority as part of this application, which concluded that following the implementation of the mitigation outlined within the NIS that there would be no significant negative impact to any European site. This development is approximately 650m from the works at Shinanagh. It is located directly adjacent to the Awbeg river and within the boundaries of the River Blackwater SAC, approximately 8km upstream of the works at Buttevant. Based on the description available for this proposed Project, that mitigation measures will be put in place which will avoid any adverse effects, and given that the proposed Project will have mitigation measures to avoid any adverse effects it is anticipated that the conservation objectives of QI habitats and species will not be impacted. Therefore, there will be no in-combination effects from this development with the proposed Project.

XC219 Buttevant

At Buttevant five planning applications were identified within the last five years within approximately 1km of the crossing (planning application references: 204179, 196223, 166053, 195081 and 186236). Three of these

planning applications at Buttevant were deemed to have the potential for in-combination effects, as detailed below.

Planning Ref 204179: Construction of a twenty space drop off area, associated access roadway, footpath, new vehicular entrance and the extension of the existing staff car parking areas by twelve spaces and all associated ancillary site works. Approximately 150m from the works at Buttevant. Conditional permission was granted in April 2020. An AA screening report was prepared for this project in respect of the Blackwater River (Cork/Waterford) SAC. It confirmed that storm water at the site will be directed to the existing underground attenuation tank which is controlled by a hydro-brake and will then pass through an existing oil inceptor before entering into an existing storm water pipe and ultimately discharging into the Awbeg River. Storm water discharge will be managed and monitored in accordance with SUDs guidance. The AA Screening Report therefore screens out potential for significant effects on water quality of the Awbeg and qualifying interests of the Blackwater River (Cork/Waterford) SAC. Construction stage impacts are ruled out given that works will take place within the school grounds within an area separated from the Awbeg River by the existing infrastructure, buildings, playing pitches and hedgerows. It also confirms that there will be no direct discharges from the proposed Project to the Awbeg or any watercourses in the vicinity of the site.

Planning Ref 196223: Provision of 4no. classrooms in temporary cabins located to the north of the existing school building and associated site works. This development is approximately 150m from the works at Buttevant. Conditional permission was granted in April 2020. An ecologist's report stated that the proposed development will not result in surface water impacts as a result of the construction period due to separation distance and lack of a hydrological connection between the development and the river. The development also proposes to connect to the existing surface water drainage system. As part of this project assessment of the potential for the proposed Project to have significant impacts on water quality of the Awbeg River and Blackwater River (Cork/Waterford) SAC as result of increased loading from the proposed Project to the Buttevant WWTP was required. The Buttevant WWTP discharges into the Awbeg River and was in breach of Emission Limit Values (ELV) in 2017 and 2019. However, exceedance of phosphorous was a result of a mechanical failure within ferric dosing system which has been rectified and a stand by pump has been installed as back up such this issue re-occur. The report concludes that the additional loading to the WWTP from an additional 106 people in the school, is within the design capacity of the plant and will not impact on its performance and therefore will not have potential for cumulative effects. Given that the potential for adverse effects from this development would be in relation to the capacity of the WWTP and that the proposed Project will have no impact on the WWTP there is no potential for in-combination effects from this development.

Planning Ref 195081: Development of six semi-detached two storey dwellings and all associated works different from that granted under previous permission (Planning Reg no. 04/7675). This development is approximately 500m from the works at Buttevant. Given that there is no pathway for impact, including a hydrological link, from this development to any European site there is no potential for in-combination effects.

N/M20 Cork to Limerick Road Improvement Scheme

This project is currently in Phase 2 Option Selection. The N/M20 project team is developing and appraising road-based and rail-based options to identify a preferred option. The identification of a Preferred Option and completion of Phase 2 is expected in 2021. The Public Spending Code requires that the scheme develop a business case, which needs Government approval before it can be published and submitted to An Bord Pleanála. Work on this will continue for the coming years as the scheme proposal develops. There is no potential for in-combination effects from this development given that construction of the scheme will not take place simultaneously with the proposed Project.

7. Conclusion

The AA Screening and NIS examined the potential for changes in the baseline conditions as a result of the proposed Project against the conservation objectives for the Blackwater River (Cork/Waterford) SAC and Kilcolman Bog SPA.

Based on the best available scientific information and professional judgement, and on the full application of the mitigation as described in **Section 5.3.7**, it is considered that there will be no adverse effects on the integrity of the Blackwater River (Cork/Waterford) SAC and Kilcolman Bog SPA, either alone or in-combination with other plans or projects in light of the site's conservation objectives.

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Appendix A. Photographs



Photograph 1: Confluence of the Pepperhill River with the Awbeg River, designated as the Blackwater River (Cork/Waterford) SAC at this point.

Photograph 2: Otter prints beneath the road bridge over the Pepperhill River west of the Buttevant crossing. Possible mink prints also present.



Photograph 3: Suitable supporting habitat for white-clawed crayfish within the Pepperhill River approximately 50m upstream of where it joins the Awbeg River.

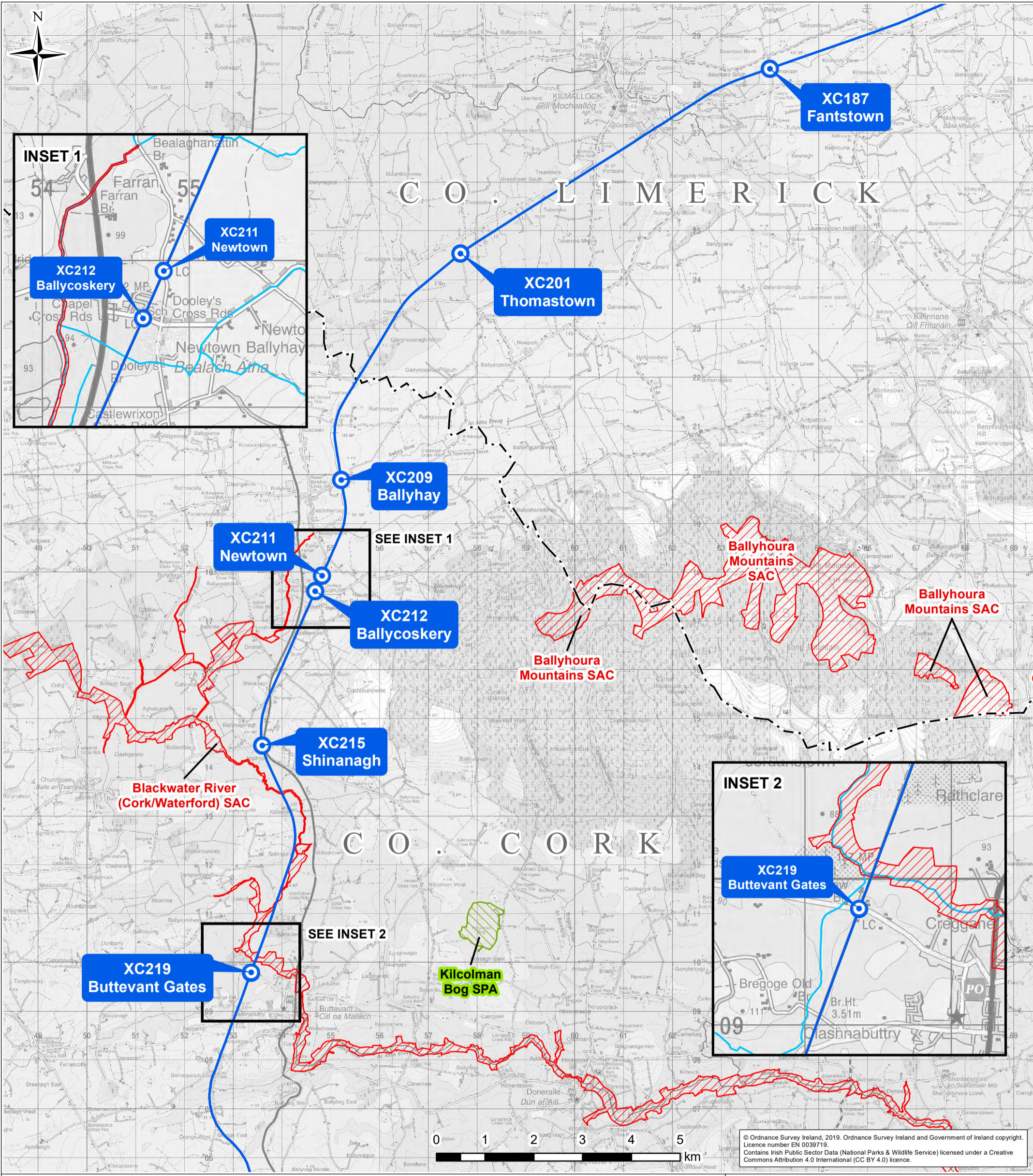


Photograph 4: Suitable supporting habitat for whooper swan adjacent to the Buttevant crossing site.



Photograph 5: New growth of Japanese knotweed at Shinanagh.

Appendix B. Figures



- LEGEND**
- Level Crossing
 - Dublin to Cork Railway Line
 - County Boundary
 - Watercourse (only shown on inset maps for clarity)
 - Special Protection Area (SPA)
 - Special Area of Conservation (SAC)

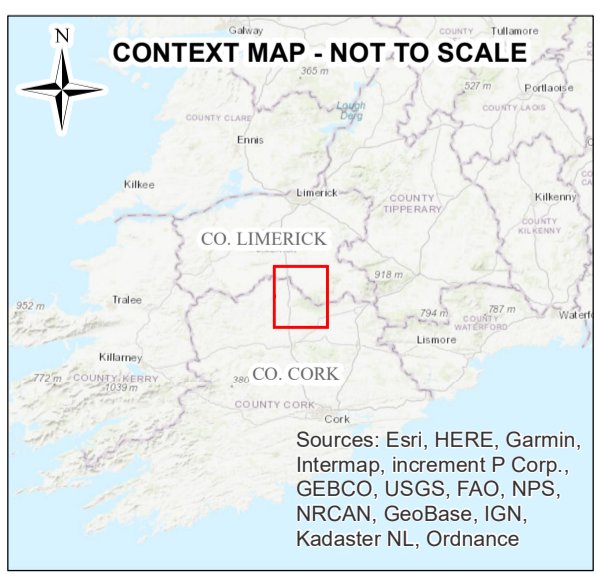


FIGURE C1

Rev.	Date	Initial Issue	GB	IC	CC	SC
0	18/12/2019	Initial Issue				
		Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

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Client:

Project: CORK LINE LEVEL CROSSINGS

Drawing Title: **FIGURE C1**
EUROPEAN DESIGNATED SITES

Scale @ A3: 1:75,000 DO NOT SCALE

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