Grand Canal to Lucan Urban Greenway

Ecological Impact Assessment

August 2022

Project No.: 2021s1212

South Dublin County Council

County Hall

Tallaght

DUBLIN 24

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Revision History

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Contract

This report describes work commissioned by South Dublin County Council, by a letter dated 09/09/2021. Patricia Byrne, Michael Coyle, Mark Desmond, Hannah Mulcahy and Éimear Stephenson of JBA Consulting carried out this work.

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Purpose

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Contents

List of Figures

List of Tables

Abbreviations

AA	Appropriate Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CEMP	Construction Environmental Management Plan
DoEHLG	Department of Environment, Heritage and Local Government
EC	European Communities
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EU	European Union
IUCN	International Union for Conservation of Nature and Natural Resources
NBDC	National Biodiversity Data Centre
NHA	Natural Heritage Area
NPWS	National Parks and Wildlife Service
pNHA	proposed Natural Heritage Area
PRF	Potential Roost Feature
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SDCC	South Dublin County Council
SPA	Special Protection Area
WFD	Water Framework Directive
WWTP	Waste Water Treatment Plant
ZOI	Zone of Influence

1 Introduction

JBA Consulting Ireland Ltd. has been commissioned by South Dublin County Council (SDCC) to undertake an Ecological Impact Assessment (EcIA) in relation to the primary route of a proposed Grand Canal to Lucan Urban Greenway, Co. Dublin. The proposed development, which will be submitted under Part 8 of the Planning and Development Act (2000) as amended, consists of a cycle route constructed on existing roadways and green areas with existing footpaths.

1.1 Aims

The aims of this EcIA are to:

- Establish baseline ecological conditions to enable identification of potentially important ecological features within the zone of influence of the project
- Determine the ecological value of identified ecological features
- Assess the significance of impacts of the proposed project on ecological features of value
- Identify avoidance, mitigation or compensatory measures
- Identify residual impacts after mitigation and the significance of their effects
- Identify opportunities for ecological / biodiversity enhancement

1.2 Project location

The location for the development is South Dublin, in the areas of Lucan and Adamstown. The proposed cycle route will run from the Grand Canal, north along the Griffeen River through Griffeen Valley Park, and over the N4 to Lucan. There will be a diversion to this main route north of N4 (see Figure 1-1).

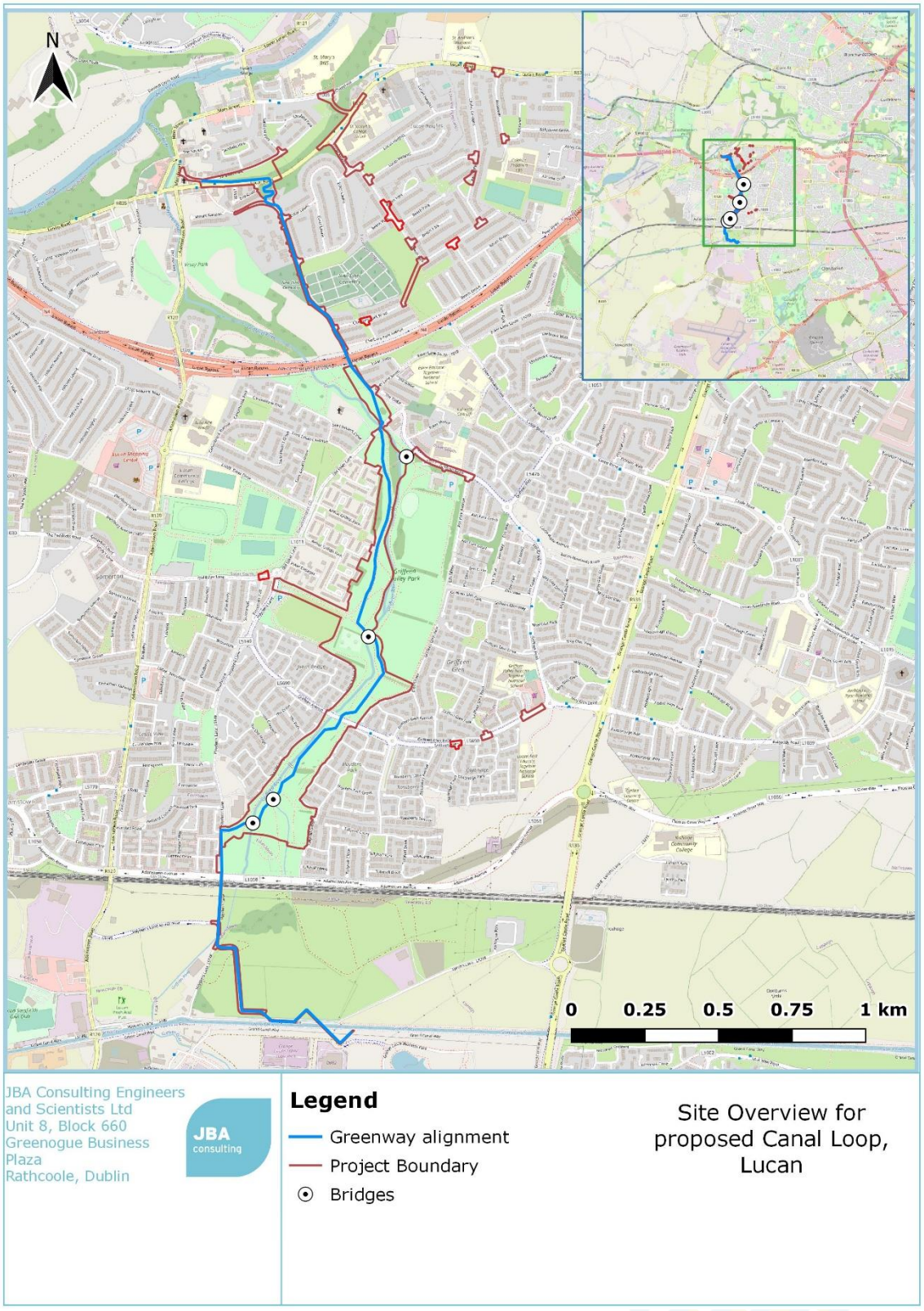


Figure 1-1 Site location for greenway

2 Project Description

2.1 Project Description:

The primary route of the scheme from Grand Canal to Lucan Village via Griffeen Valley Park has a total length of 4.2km, of which approximately 3.54km is through parks or other green areas. The majority of the route runs along existing footpaths. As part of design development a number of secondary links have been identified along existing roads and footpaths to better connect the primary route into the surrounding areas. The secondary links will comprise of small interventions such as the removal of kissing gates, installation of way finding signage, junction tightening, road markings and safe school treatments to improve permeability and access onto the primary route. The combined length of the proposed secondary links is approximately 4.29km.

The proposed alignments are shown in Figure 2-1 below.

The varying characteristics of the proposed primary route resulted in the implementation of different cycling provision types that best suit the surrounding area. Existing infrastructure has been utilised as much as practical. Where existing footpaths are to be widened to 4m wide shared surfaces this will entail excavating to a depth of 250mm and backfilling with compacted stone. The finish material will be bituminous surfacing. Existing public lighting will be maintained as part of the scheme with additional public lighting proposed where required. Proposed public lighting will require a trench excavation to a depth of 600mm for ducting. Refer to General Arrangement drawings 284399-ARUP-ZZ-XX-DR-C-0000 to 0021_P03 which detail the location of the proposed public lighting. Public lighting will be designed to mitigate the impact artificial light might have on local habitats. There are four locations where existing bridge located within Griffeen Valley park are to be replaced to provide a 4m wide shared surface connection. Additional landscaping and public realm improvements are proposed throughout to enhance the scheme.

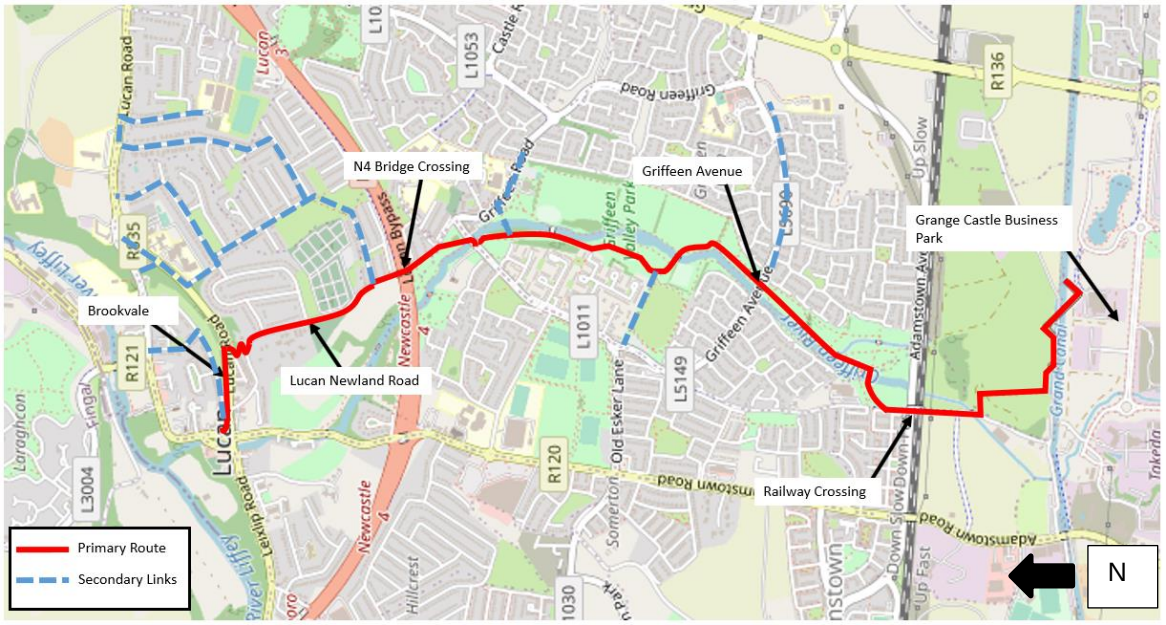


Figure 2-1: Primary Route and Secondary Links (Source: Arup)

2.1.1 Timeline

Works are expected to start in early 2023 and take at least 6 months.

2.1.2 Route Sections

The Grand Canal to Lucan Urban Greenway comprises mainly of parkland or low-speed residential roads. The varying characteristics of the proposed primary route resulted in the implementation of different cycling provision types that best suit the surrounding area. In order to best describe the proposed interventions the route has been subdivided into each eight sections. The works proposed for

each subsection are described in the summary below. Figure 2-2 illustrates the approximate location and extent of each section.

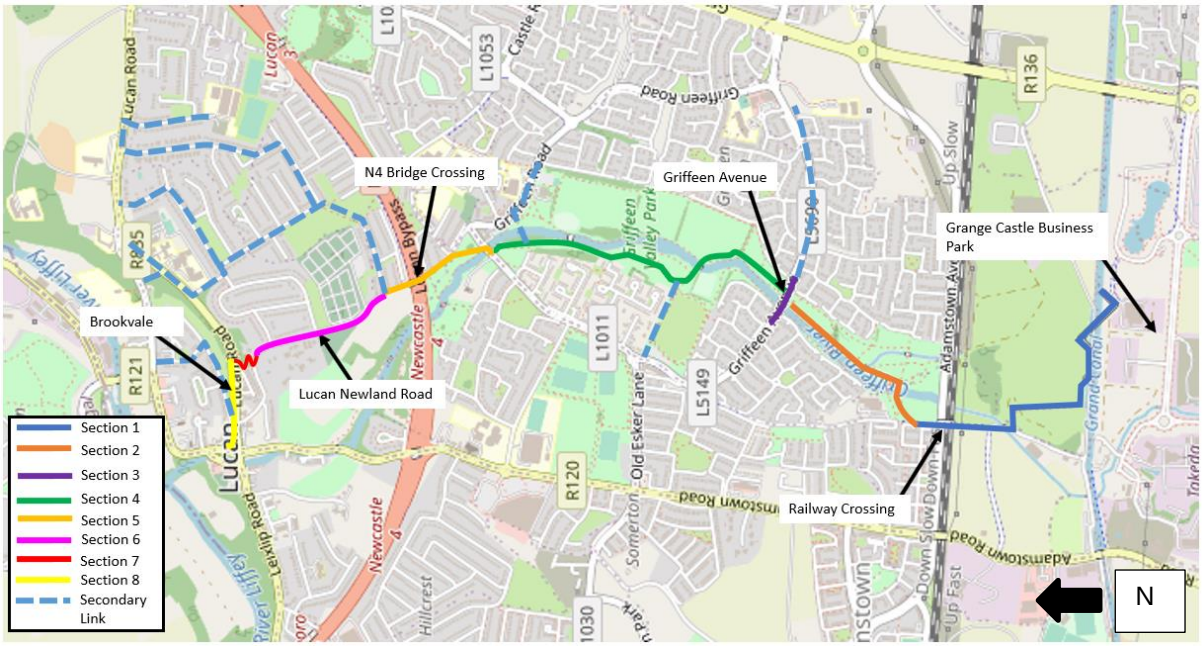


Figure 2-2: Proposed Route Sections and Secondary Links (Source: Arup)

2.1.2.1 Section 1 – Grange Castle Business Park to Griffeen Valley Park

Starting at the Grange Castle Business Park the Greenway will begin at the Grand Canal Greenway and cross the existing pedestrian bridge into the Clonburris SDZ parklands. The route will utilise the existing pavement in the parklands with minor engineering and landscaping improvements. The remainder of this section consists of Hayden's Lane and the existing railway bridge. Due to the low traffic volume and speed nature of Hayden's Lane it is proposed to upgrade it to a shared street. No major works are proposed at the existing railway bridge except for minor improvements to improve visibility and safety for users. Existing public lighting will provide appropriate lighting for this section of the greenway.

2.1.2.2 Section 2 – Hayden's Lane to Griffeen Avenue

A 4m wide shared surface is proposed for this section. The existing pavement is sufficiently wide to accommodate the proposed 4m shared surface along most of this section. There are two bridges to be upgraded in this section. Both bridges are approximately 2m wide and it is proposed to replace these with 4m wide bridges. Existing public lighting will provide appropriate lighting for this section of the greenway.

2.1.2.3 Section 3 – Griffeen Avenue

Griffeen Avenue splits Griffeen Valley Park into two sections and forms an important link between the southern and northern section of the park. It is proposed enhance the public realm areas on either side of the road to create a safe and welcoming environment. These improvements include opening the boundary wall of the park; providing a park plaza with a resting area and landscaping interventions; converting the existing signalised crossing to a raised belisha beacon zebra crossing and narrowing the carriageway to 6m. There are no changes proposed to the existing public lighting provision on Griffeen Avenue.

2.1.2.4 Section 4 – Griffeen Avenue to Esker Bridge

The northern section will consist of 4m wide shared surface. The existing pavement along this section ranges between 2 and 2.6 meters, to achieve the desirable pavement widths, existing pavements will need to be widened into the adjacent verge. The widening is designed to minimise impact on tree route systems. New pavements will also be constructed to provide connections through desire lines in the park. There are two bridges to be upgraded in this section. Both bridges are approximately 1.5 to 2m

wide and it is proposed to replace these with 4m wide bridges. There is no existing lighting in the northern section of the park. Where lighting is proposed within the vicinity of trees, bat sensitive lighting will be provided.

2.1.2.5 Section 5 – Esker Bridge to Lucan Newlands Road

It is proposed to reduce the width of the carriageway at the bridge to 6 meters, provide a new footpath on the northern section and widen the existing footpath on the southern section to a minimum width of 2 meters. A 10m wide raised belisha beacon crossing is proposed to connect the route from Griffeen Valley Park across Esker Bridge. North of Esker bridge it is proposed to upgrade the existing path to a 4m wide shared surface, the existing pavement is approximately 2m wide, therefore, widening will be required. Some realignment of the path will be required at the approach to Esker Lane to provide for smooth cycling conditions. No improvements are proposed to the N4 crossing bridge. Public Lighting will be provided in the parklands north of Esker Bridge as there are no provisions in the existing conditions. Where lighting is proposed within the vicinity of trees, bat sensitive lighting will be provided.

2.1.2.6 Section 6 –Lucan Newlands Road to Esker Lawns

This section consists of Lucan Newlands Road, between Cherbury Park Road and Esker Lawn. It is proposed to upgrade this section to a shared street and provide a series of speed mitigation measures.

2.1.2.7 Section 7 – Brookvale

Brookvale forms an important link along the proposed route as it is the connecting link between Lucan Newlands Road and Lucan Village. It is proposed to provide a gently sloped route through Brookvale that takes the form of a 3m shared space with gradients of less than 5% or 1:20 and landings every 10m or 500mm rise and resting places at each turn. Stairs are provided through the centre of route to link up the level landings and provide an alternative route for pedestrians. A landscaping and public realm design have been conducted for this location to integrate this section of the route into the surrounding area.

2.1.2.8 Section 8 – Sarsfield Park Boardwalk

It is proposed to provide a raised table and toucan Crossing on Lucan Road to provide a link from the base of Brookvale to the boardwalk adjacent to Lucan Road. The boardwalk will serve as a connection to Lucan Village through Sarsfield Park Lane and providing universal access for all along a shared pedestrian and cycling facility while avoiding the space and gradient constraints along Lucan Road. The proposed boardwalk is approximately 234m in length and has a varying width with a minimum width of 3m achieved throughout.

2.1.3 Summary of Principal Structures (bridges)

In addition to the works creating the greenway, there are four locations where principal structures are required along the Greenway and are identified as follows;

- River Griffeen Crossing No.1
- River Griffeen Crossing No.2
- River Griffeen Crossing No.3
- River Griffeen Crossing No.4

The following image details how the proposed bridge replacements will look. Each prefabricated bridge will provide a 4m wide shared pedestrian and cycle connection over the river. Further details of which are described in the next sections.

Figure 2-3: Proposed Bridge Design Precedent – 4m wide Shared Pedestrian and Cycle Connection (Source: Arup)

Figure 2-4: Proposed Bridge Design Precedent - Steel Through-Truss Arrangement Supported on Concrete Abutments (Source: Arup)

Figure 2-5: Proposed Bridge Design Precedent - Steel Through-Truss Arrangement Supported on Concrete Abutments (Source: Arup)

2.1.3.1 River Griffeen Crossing No. 1

A new shared pedestrian and cyclist path is proposed to cross the River Griffeen at the southern section of Griffeen Valley Park, adjacent to Hayden's Lane. The existing 2.1m wide 18m single span bridge is proposed to be replaced with a wider prefabricated bridge to provide for a 4m wide crossing over the river.

The proposal consists of 4m wide 18m single span bridge, comprising a steel through-truss arrangement supported on concrete abutments. This configuration minimises the structural depth below deck level, ensuring the superstructure is clear of the design flood level at this location. Soffit levels of the proposals will match that of the existing bridge where possible.

A 1.45m high parapet on the bridge will provide suitable protection for pedestrians and cyclists.

To minimise the environmental impact on the watercourse, where possible it is proposed to retain and modify the existing concrete abutments to carry the additional load of the replacement bridge. A detailed abutment design and bridge replacement methodology will follow the completion of ground investigations.

An offset of approximately 2m from the edge of abutment to Top of Bank (TOB) will provide adequate space to install protective measures to control any accidental discharge or run-off of construction materials down the slope and into the watercourse below.

A temporary working platform will be constructed to support the crane which will be used to both remove the existing bridge deck and lift the replacement deck in place. Lifting it in place will minimise any interference with the watercourse. There is sufficient space on the West side of the existing bridge to construct the working platform in a safe location that will not impact the watercourse.

In order to remove the existing bridge the superstructure will be dislodged from the abutments. The bolted connection will be disconnected in the reverse order as to how it was installed. If required, these connections can be locally broken out and the concrete can be repaired if it the support is to be reused. The superstructure will be lifted out in one go and then dismantled at a suitable location on site before

being removed off site. Lifting it out in one manoeuvre will minimise any interference with the watercourse.

A Construction Environmental Management Plan (CEMP) will be prepared in conjunction with the appointed contractor to agree appropriate additional environmental mitigation measures to ensure the watercourse is protected.

The steel decking will be finished with a combined waterproofing / anti-slip surfacing.

No additional structures are required either end of this bridge, as the shared path approaches at grade.

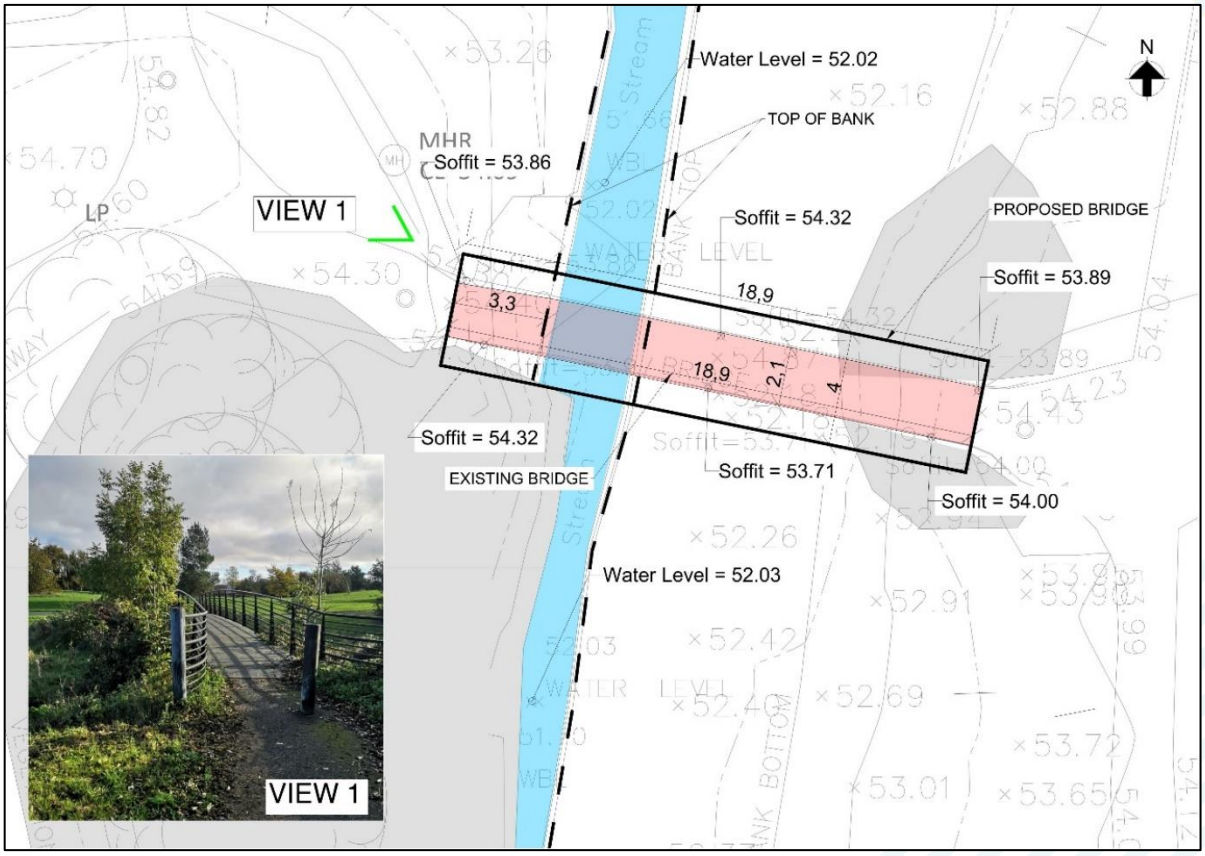


Figure 2-6: Plan View of Existing and Proposed River Griffeen Crossing No.1 (Source: Arup)

2.1.3.2 River Griffeen Crossing No. 2

A new shared pedestrian and cyclist track is proposed to cross the River Griffeen at the southern section of Griffeen Valley Park, adjacent to Hayden's Park Dale. The existing 2.1m wide with a span of 14.4m is proposed to be replaced with a wider prefabricated bridge to provide for a 4m wide crossing over the river.

The proposal consists of 4m wide 14.4m single span bridge, comprising a steel through-truss arrangement supported on concrete abutments. This configuration minimises the structural depth below deck level, ensuring the superstructure is clear of the design flood level at this location. Soffit levels of the proposals will match that of the existing bridge where possible.

A 1.45m high parapet on the bridge will provide suitable protection for pedestrians and cyclists.

To minimise the environmental impact on the watercourse, where possible it is proposed to retain and modify the existing concrete abutments to carry the additional load of the replacement bridge. A detailed abutment design and bridge replacement methodology will follow the completion of ground investigation.

An offset of approximately 2m from the edge of abutment to Top of Bank (TOB) will provide adequate space to install protective measures to control any accidental discharge or run-off of construction materials down the slope and into the watercourse below.

A temporary working platform will be constructed to support the crane which will be used to both remove the existing bridge deck and lift the replacement deck in place. Lifting the deck in place will minimise any interference with the watercourse. There is sufficient space on the East side of the existing bridge to construct the working platform in a safe location that will not impact the watercourse.

In order to remove the existing bridge the superstructure will be dislodged from the abutments. The bolted connection will be disconnected in the reverse order as to how it was installed. If required, these connections can be locally broken out and the concrete can be repaired if it the support is to be reused. The superstructure will be lifted out in one go and then dismantled at a suitable location on site before being removed off site. Lifting it out in one manoeuvre will minimise any interference with the watercourse.

A Construction Environmental Management Plan (CEMP) will be prepared in conjunction with the appointed contractor to agree appropriate additional environmental mitigation measures to ensure the watercourse is protected.

The steel decking will be finished with a combined waterproofing / anti-slip surfacing.

No additional structures are required either end of this bridge, as the shared path approaches at grade.

Figure 2-7: Plan View of Existing and Proposed River Griffeen Crossing No.2 (Source: Arup)

2.1.3.3 River Griffeen Crossing No. 3

A new shared pedestrian and cyclist path is proposed to cross the River Griffeen at the northern section of Griffeen Valley Park, adjacent to the Dog Run Park. The existing 2.2m wide 22.4m span bridge is proposed to be replaced with a wider prefabricated bridge to provide for a 4m wide crossing over the river.

The proposal consists of 4m wide 23.2m single span bridge, comprising a steel through-truss arrangement supported on concrete abutments. Soffit levels of the proposals will match that of the existing bridge where possible. This configuration minimises the structural depth below deck level, ensuring the superstructure is clear of the design flood level at this location. Soffit levels of the proposals will match that of the existing bridge where possible.

A 1.45m high parapet on the bridge will provide suitable protection for pedestrians and cyclists.

To minimise the environmental impact on the watercourse, where possible it is proposed to retain and modify the existing concrete abutments to carry the additional load of the replacement bridge. A detailed abutment design and bridge replacement methodology will follow the completion of ground investigation.

An offset of approximately 2m from the edge of abutment to Top of Bank (TOB) will provide adequate space to install protective measures to control any accidental discharge or run-off of construction materials down the slope and into the watercourse below.

A temporary working platform will be constructed to support the crane which will be used to both remove the existing bridge deck and lift the replacement deck in place. Lifting the deck in place will minimise any interference with the watercourse. There is sufficient space on either side of the existing bridge to construct the working platform in a safe location that will not impact the watercourse.

In order to remove the existing bridge the superstructure will be dislodged from the abutments. The bolted connection will be disconnected in the reverse order as to how it was installed. If required, these connections can be locally broken out and the concrete can be repaired if it the support is to be reused. The superstructure will be lifted out in one go and then dismantled at a suitable location on site before being removed off site. Lifting it out in one manoeuvre will minimise any interference with the watercourse.

A Construction Environmental Management Plan (CEMP) will be prepared in conjunction with the appointed contractor to agree appropriate additional environmental mitigation measures to ensure the watercourse is protected.

The steel decking will be finished with a combined waterproofing / anti-slip surfacing.

No additional structures are required either end of this bridge, as the shared path approaches at grade.

Figure 2-8: Plan View of Existing and Proposed River Griffeen Crossing No.3 (Source: Arup)

2.1.3.4 River Griffeen Crossing No. 4

A new shared pedestrian and cyclist path is proposed to cross the River Griffeen at the northern section of Griffeen Valley Park, adjacent to Esker Manor. The existing 1.4m wide bridge spanning approximately 10.8m is proposed to be replaced with a wider prefabricated bridge to provide for a 4m wide crossing over the river.

The proposal consists of 4m wide 13.8m single span bridge, comprising a steel through-truss arrangement supported on concrete abutments. This configuration minimises the structural depth below deck level, ensuring the superstructure is clear of the design flood level at this location. Soffit levels of the proposals will match that of the existing bridge where possible.

A 1.45m high parapet on the bridge will provide suitable protection for pedestrians and cyclists.

To minimise the environmental impact on the watercourse, where possible it is proposed to retain and modify the existing concrete abutments to carry the additional load of the replacement bridge. A detailed abutment design and bridge replacement methodology will follow the completion of ground investigation.

An offset of approximately 2m from the edge of abutment to Top of Bank (TOB) will provide adequate space to install protective measures to control any accidental discharge or run-off of construction materials down the slope and into the watercourse below.

A temporary working platform will be constructed to support the crane which will be used to both remove the existing bridge deck and lift the replacement deck in place. Lifting the deck in place will minimise any interference with the watercourse. Due to the constrained space, existing trees and vegetation, the weight of the lift could be reduced by erecting the bridge in parts and assembled over the waterway. This will reduce the size of the crane required and potentially the size of the working platform. The working platform would be constructed on the East side of the existing bridge with mitigation measures put in place to minimise impact to the existing vegetation and the watercourse.

In order to remove the existing bridge the superstructure will be dislodged from the abutments. The bolted connection will be disconnected in the reverse order as to how it was installed. If required, these connections can be locally broken out and the concrete can be repaired if it the support is to be reused. The preferred option for removing the existing bridge would be to lift the superstructure out in one go and then dismantled at a suitable location on site before being removed off site. However, similar to the proposed construction methodology the existing superstructure could be dissembled in parts before being lifted out and removed off site. If it were to be dismantled in parts suitable mitigation measures would be put in place to minimise any interference with the watercourse.

A Construction Environmental Management Plan (CEMP) will be prepared in conjunction with the appointed contractor to agree appropriate additional environmental mitigation measures to ensure the watercourse is protected.

The steel decking will be finished with a combined waterproofing / anti-slip surfacing.

No additional structures are required either end of this bridge, as the shared path approaches at grade.

Figure 2-9: Plan View of Existing and Proposed River Griffeen Crossing No. 4 (Source: Arup)

3 Methodology

3.1 The EcIA Team

This EcIA was completed by JBA Ecologists Malin Lundberg (BSc, MSc) Hannah Mulcahy (MSc BSc) and Michael Coyle (BSc, MSc). The report has been reviewed by JBA Chartered Senior Ecologist Steven Heathcote. These staff members thus fulfil the Environmental Impact Assessment (EIA) Directive personnel requirements of 'competent persons'.

3.2 Policy and Legislation

Policy and legalisation for nature conservation; and protected and priority species relevant to the proposed project is provided in Appendix A.

3.3 Guidance

This assessment was conducted in accordance with the following guidance documents:

- Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management (CIEEM, 2018).
- Guidelines on the information to be contained in Environmental Impact Assessment Reports Environmental Protection Agency (EPA, 2022).
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009a).

3.4 Baseline Methodology

To determine the baseline conditions at the site a review of all available information was made. When determining the pre-work conditions on-site, including the presence or absence of protected habitats and/or species, the precautionary principle was used where limited information was available. The following reports were consulted during this process:

- A desk-based assessment was carried out to collate information regarding protected/notable species and statutorily designated nature conservation sites in, or within proximity to, the study area.
- A data search for protected and notable species was conducted using the National Biodiversity Data Centre (NBDC) Mapping System (NBDC, 2022). Four 2km grid squares were used to encompass the study area and species records were extracted from the map at a 2km² resolution.
- Information for statutory designated sites including Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar Sites, Natural Heritage Areas (NHAs) and proposed NHAs (pNHA) was collected from the online resources provided by the National Parks and Wildlife Service (NPWS).

Other information on the local area was obtained, including information form the following sources:

- NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
- NPWS (2019b). The Status of EU Protected Habitats and Species in Ireland. Habitats Assessment Volume 2. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
- NPWS (2019c). The Status of EU Protected Habitats and Species in Ireland. Species Assessment Volume 3. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
- Environmental Protection Agency (EPA) online databases on water quality (Available online at https://gis.epa.ie/EPAMaps/).
- Aerial photography available from www.osi.ie and Google Maps http://maps.google.com/;
- All Ireland Red Data lists for vascular flora, mammals, butterflies, non-marine molluscs, dragonflies & damselflies, amphibians and fish;

- Water Framework Directive (WFD) water maps (available online at http://www.wfdireland.ie/maps.html and https://www.catchments.ie/); and
- International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species (available online at http://www.iucnredlist.org).

3.4.1 Zone of Influence

The zone of influence (ZoI) for the project is based on a judgement of the likely extent of the ecological impacts. This will vary for different ecological features, depending on their sensitivities to environmental change. For the majority of the project, impacts will be limited to within the site boundary. However, for impacts relating to airborne emissions and ground water, the ZoI is extended to 5km and for surface water pathways it is extended 15km for statutory designated sites (Natura 2000 sites) and 2km coastal/transitional water buffers are added where hydrological connectivity extension is applicable.

3.4.2 Field Surveys

An ecological walkover of the site, including habitat mapping, mammal and preliminary bat roost surveys were conducted on the 29th September 2021 (with a follow up bat roost assessment on the 18th November 2021) by Malin Lundberg and Mark Desmond, and on 12th May 2022 by Mark Desmond, Patricia Byrne, Michael Coyle and Éimear Stephenson to inform the ecological baseline of the site.

Aerial photographs and site maps assisted the habitat survey. Habitats have been named and described following A Guide to Habitats in Ireland by Fossitt (2000). Nomenclature for higher plants principally follows that given in Webb's An Irish Flora (Parnell and Curtis, 2012).

The field survey methods were in general accordance with those outlined in the following documents:

- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009b).
- Best Practice Guidance for habitat Survey and Mapping. The Heritage Council. (Smith et al., 2011).
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust (Collins, 2016).

3.5 Screening of Ecological Features

The ecological features identified during the walkover surveys and from desk-based assessments were reviewed.

An EIA screening has been prepared by JBA (2022a) in conjunction with this report and results of this EcIA has informed the EIA screening. A screening process is presented at the start of the results section to ensure that the assessment focuses only on features where the impact could have important consequences for biodiversity (valued ecological features), and this was used for inform the EIA screening. The EIA Screening concluded that the proposed development does not fall under the category of sub-threshold development, and thus an EIAR is not required.

An Appropriate Assessment (AA) Screening Report has been produced separate to this EcIA (JBA, 2021b), to assess the potential for effects on designated Natura 2000 sites. This AA Screening Report was submitted at planning application stage. The AA Screening Report concluded there would be no likely significant effects on European sites arising from the proposed development, either alone or in-combination with other plans or projects. Natura 2000 sites are therefore not considered in this report.

3.6 Assessment of the Effects on Features

Ecological features include nature conservation sites, habitats, species assemblages/communities, populations or groups of species. The assessment of the significance of predicted impacts on ecological features is based on both the 'value' of a feature, and the nature and magnitude of the impact that the project will have on it. The impact is based on the project which includes a certain amount of designed-in mitigation, including construction best practice measures that will be implemented with a high degree of certainty.

3.7 Valuation of Receptors

The value of designated sites, habitats and species populations is assessed with reference to:

- Their importance in terms of 'biodiversity conservation' value (which relates to the need to conserve representative areas of different habitats and the genetic diversity of species populations)
- Any social benefits that habitats and species deliver (e.g. relating to enjoyment of flora and fauna by the public)
- Any economic benefits that they provide

The valuation of designated sites considers different levels of statutory and non-statutory protection. Assessment of habitat depends on several factors, including the size of the habitat, its conservation status and quality. The assessment also takes account of connected off-site habitat that may increase the value of the on-site habitat through association. Valuation of species depends on a number of factors including distribution, status, rarity, vulnerability, and the population size present. Designated sites, habitats and species populations have been valued using the scale in Table 3-1 which is taken from NRA (2009a).

Table 3-1: Examples of criteria used to define the value of ecological feature.

Level of Value	Examples of Criteria
International	An internationally important site e.g. Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar (or a site considered worthy of such designation). A regularly occurring substantial population of an internationally important species (listed on Annex IV of the Habitats Directive). Designated shellfish waters. Major fisheries area.
National	A nationally designated site e.g. Natural Heritage Area (NHA), a proposed Natural Heritage Area (pNHA), statutory Nature Reserve, or a site considered worthy of such designation. A viable area of a habitat type listed in Annex I of the Habitats Directive or of smaller areas of such habitat which are essential to maintain the viability of a larger whole. A regularly occurring substantial population of a nationally important species, e.g. listed on The Wildlife Act 1976 or The Wildlife (Amendment) Act 2000. A species included in the Irish Red Data Lists/Books. Significant populations of breeding birds.
Regional/County (South Dublin County)	Species and habitats of special conservation significance within South Dublin County. An area subject to a project/initiative under the County's Biodiversity Action Plan. A regularly occurring substantial population of a nationally scarce species.
Local (works site and its vicinity)	Areas of internationally or nationally important habitats which are degraded and have little or no potential for restoration. A good example of a common or widespread habitat in the local area. Species of national or local importance, but which are only present very infrequently or in very low numbers within site area.
Less than local	Areas of heavily modified or managed vegetation of low species diversity or low value as habitat to species of nature conservation interest. Common and widespread species.

Ecological Valuation may also be considered of Local Importance (higher value) or Local Importance (lower value) (Table 3-2).

Table 3-2: Examples of criteria used to define the value of ecological features of local importance

(NRA, 2009a)

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

3.7.1 Magnitude of Impacts

Ecological effects or impacts can be described and categorised in a number of ways. Examples of relevant terms are listed in the table below.

Table 3-3: Categories of Effects (derived EPA, 2017).

Effects	Categories of effects
Quality of Effects	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Probability of Effects	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Duration and Frequency of Effects	**Temporary Effects** Effects lasting less than a year
	Short-term Effects

	Effects lasting one to seven years
	Medium-term Effects Effects lasting seven to fifteen years
	Long-term Effects Effects lasting fifteen to sixty years.
Types of Effects	**Indirect Effects** (a.k.a. Secondary Effects) Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative Effects The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	'Do-Nothing Effects' The environment as it would be in the future should the subject project not be carried out.
	'Worst case' Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents,

These factors are assessed together to determine the magnitude of the impact on the status of a habitat or species population, and on the integrity of the site that supports them. Professional judgement is then used to assign the impacts on the receptors to one of four classes of magnitude, detailed in Table 3-4.

Table 3-4: Definition of magnitude.

Level of Value	Examples of Criteria
High	An irreversible or long-term impact on the integrity of a site or conservation status of a habitat, species assemblage/community, population or group. If adverse, this is likely to threaten its sustainability; if beneficial, this is likely to enhance its conservation status.
Medium	A medium to long-term impact on the integrity of a site or conservation status of a habitat, species assemblage/community, population or group, which if adverse, is unlikely to threaten its sustainability (or if beneficial, is likely to be sustainable but is unlikely to enhance its conservation status.
Low	A short-term but temporary impact on the integrity of a site or conservation status of a habitat, species assemblage/community, population or group that is within the range of variation normally experienced between years.
Negligible	A short-term but temporary impact on the integrity of a site or conservation status of a habitat, species assemblage/community, population or group that is within the normal range of annual variation.

3.7.2 Significance of Impacts

The significance of an impact is a product of the value of the ecological feature and the magnitude of the impact on it, moderated by professional judgement. Table 3-5 below shows a matrix which is used for guidance in the assessment of significance, with impacts being considered to be of major, moderate or minor significance, or negligible. Impacts can also either be assessed as positive or negative using the same matrix.

Table 3-5: Significance of impacts matrix.

Value of feature	Magnitude of impact			
	High	Medium	Low	Negligible
International	Major	Major	Moderate	Neutral
National	Major	Moderate	Minor	Neutral
Regional / County	Moderate	Minor	Minor	Neutral
Local	Minor	Minor	Negligible	Neutral
Less than local	Negligible	Negligible	Negligible	Neutral

3.7.3 Residual Impacts

The project is assessed for impacts on receptors. Where significant impacts are identified, mitigation measures will be proposed as part of the Ecological Impact Assessment process to avoid, reduce or minimise them. Each impact assessment section assigns a final significance level to the impact described, which considers and includes the implementation of any stated mitigation measures; these are the residual impacts.

3.8 Cumulative Impacts

Potential sources of cumulative impacts were identified based on the ecology of valued ecological features. Potential sources of cumulative impacts were sought within an area where there is the potential for a significant impact on a site or species.

The following plans and projects were identified as potential sources of cumulative impacts:

- South County Dublin Development Plan 2016 - 2022
- Greater Dublin Drainage Strategy
- River Basin Management Plan for Ireland 2018-2021
- Planning Applications

3.9 Limitations and Constraints

This EcIA is based on a site visit and existing data from the above-mentioned sources. The report necessarily relies on some assumptions and is inevitably subject to some limitations. These do not affect the conclusion, but the following points are recorded in order to ensure the basis of the assessment is clear:

- Changes to the site since surveys were undertaken cannot be accounted for, however the site surveys have followed the CIEEM guidance provided on suitable lifespan for surveys (CIEEM (2019) Advice note on the lifespan of ecological reports and surveys).
- Adverse weather can cause delays to the schedule and alter the timing of works. This has been accounted for using a worst-case scenario where possible.
- The site visit was carried out in September 2021 and May 2022 and the data does not reflect the whole ecology of the site throughout the year. However, the surveys combined with background data provide a sufficient baseline to complete the assessment.
- The precautionary principle is used at all times when determining potential ecological sensitivity of the site.

4 Baseline Conditions

These baseline conditions present information gathered from existing reports and desk-based sources as detailed in Section 3.4 and the site visits conducted on 29th September 2021 and 12th May 2022.

4.1 Desk Based Assessment

4.1.1 Designated Sites

This section lists the designated sites of International and National importance. The ZoI for this project is 5km for non-statutory designated sites (proposed and existing Natural Heritage Area) and statutory designated sites (SPA/SAC). However, the ZoI via surface water pathways is extended to 15km for statutory designated sites and 2km coastal/transitional water buffers are added where hydrological connectivity extension is applicable. Table 4-1 below lists these designated sites with their respective importance and distance from the proposed site development. Figure 4-1 displays the locations of the statutory designated sites displaying the non-statutory designated sites within the ZoI of the site.

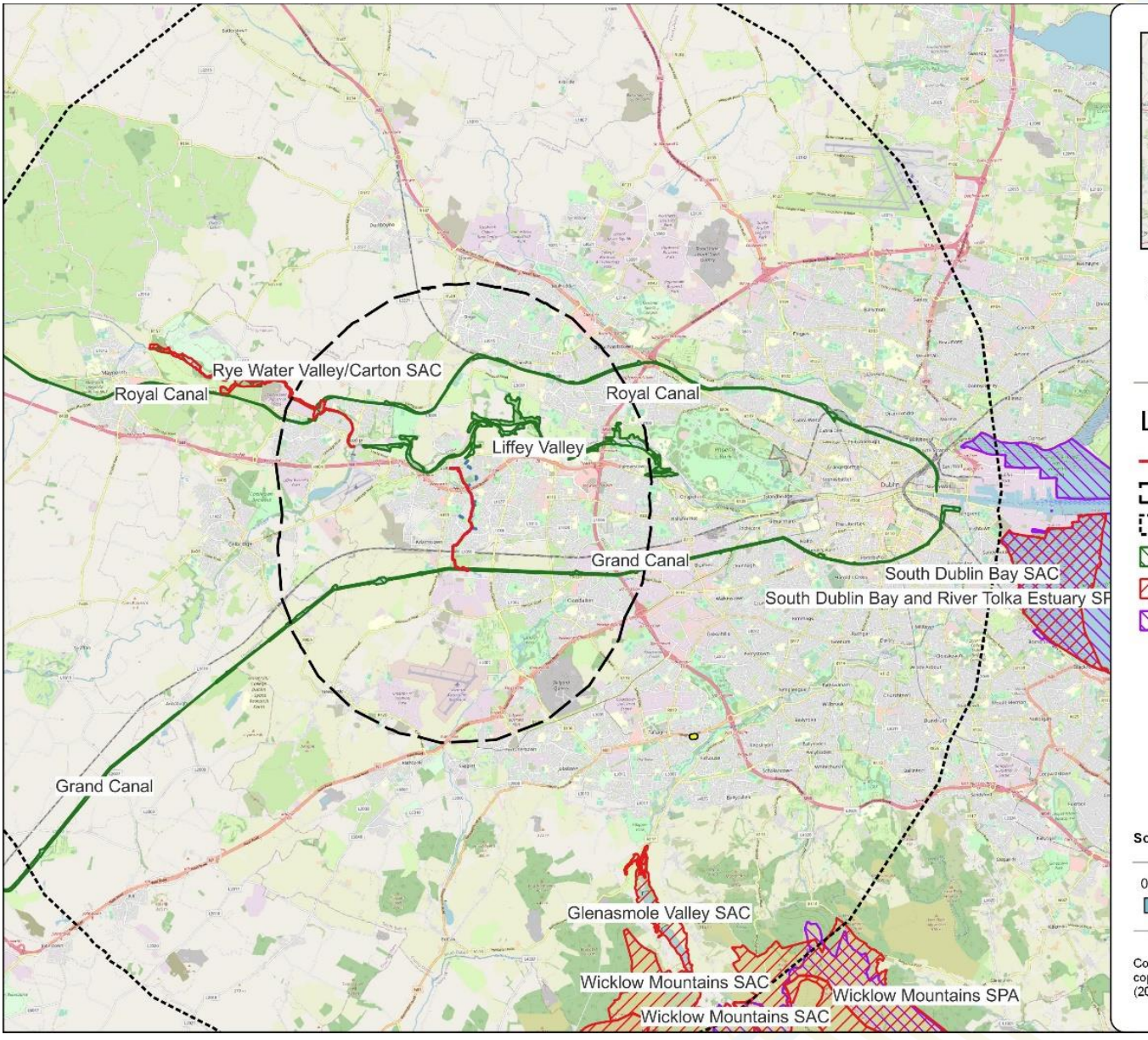


Figure 4-1: Statutory designated sites within the ZoI of the development

Table 4-2 summarises the site briefs and ecological features of exclusively proposed Natural Heritage Areas within the ZoI. As the Natura 2000 sites are assessed in the AA Screening report, they are not described in detail here, but site briefs, qualifying interests and threats and pressures are provided in Appendix B

Table 4-1: Proximity and importance of designated sites within the ZoI of the proposed development.

Name	Designation	Importance	Distance from site
Grand Canal [002104]	pNHA	National	Adjacent
Liffey Valley [000128]	pNHA	National	100m
Royal Canal [002103]	pNHA	National	1.6km
Rye Water Valley / Carton SAC [001398]	pNHA	National	2.6km
Rye Water Valley / Carton SAC [001398]	SAC	International	2.6km
South Dublin Bay and River Tolka Estuary SPA [004024]	SPA	International	13.9km
South Dublin Bay SAC [000210]	SAC	International	15.0km
North Bull Island SPA [004006]	SPA	International	17.0km
North Dublin Bay SAC [000206]	SAC	International	17.0km

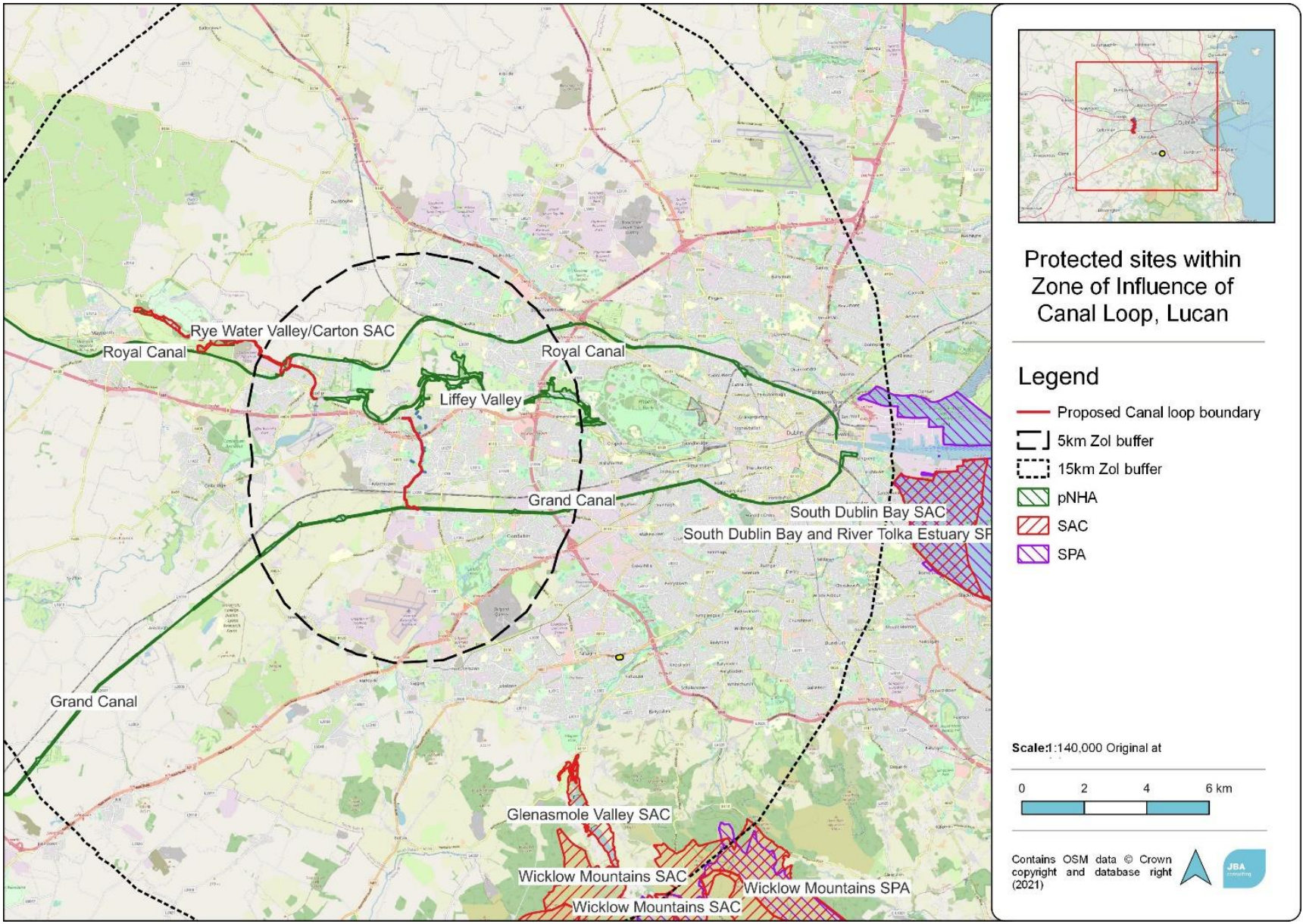


Figure 4-1: Statutory designated sites within the ZoI of the development

Table 4-2: Site briefs and ecological features of proposed Natural Heritage Areas within the ZoI.

Site Name	Brief	Ecological Features of Conservation Concern
Grand Canal pNHA	The Grand Canal is a man-made waterway linking the River Liffey at Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. The Grand Canal proposed Natural Heritage Area (pNHA) comprises the canal channel and the banks on either side of it. A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The diversity of the water channel is particularly high in the eastern section of the Main Line - between the Summit level at Lowtown and Inchicore. Otter spraints are found along the towpath, particularly where the canal passes over a river or stream. The Smooth Newt Lissotriton vulgaris breeds in the ponds on the bank at Gollierstown in Co. Dublin. The rare and legally protected Opposite-leaved Pondweed *Groenlandia densa* (Flora Protection Order 1987) is present at a number of sites in the eastern section of the Main Line, between Lowtown and Ringsend Basin in Dublin (NPWS, 2009b).	- Otter *Lutra lutra* - Smooth Newt *Lissotriton vulgaris* - Opposite-leaved Pondweed *Groenlandia densa*
Liffey Valley pNHA	The Liffey Valley site is situated along the River Liffey between Leixlip Bridge on the Kildare-Dublin border and downstream of the weir at Glenaulin, Palmerstown, Co. Dublin. The river is a Salmon river and there are a series of weirs along the river between Palmerstown and Leixlip. The main terrestrial habitat included within the site is mixed deciduous woodland on fertile, limey alluvium and boulder clay, in which Beech is dominant in some areas. These woodlands occur on both sides of the river and normally consist of old estate woodlands. A wet marsh occurs on the strip of land between the Mill Race and the river east of the metal bridge and west of the paint factory. This marsh is fed by seepage from the Mill Race and plant species such as Bulrush Typha latifolia, Marsh-marigold Caltha palustris and sweet-grass Glyceria spp. occur here. The threatened Green Figwort *Scrophularia umbrosa*, a species listed in the Irish Red Data Book, is recorded from a number of stations along the river within the site. The rare and legally protected Hairy St. John's-wort *Hypericum hirsutum* (Flora Protection Order 1987) has been recorded from the woodlands in this site. The threatened Yellow Archangel, listed in the Irish Red Data Book, is also recorded from these woodlands (NPWS, 2009d).	- Atlantic Salmon *Salmo salar* - Green Figwort *Scrophularia umbrosa* - Hairy St. John's-wort *Hypericum hirsutum* - Yellow Archangel *Lamiastrum galeobdolon*
Royal Canal pNHA	The Royal Canal is a man-made waterway linking the River Liffey at Dublin to the River Shannon near Tarmonbarry. A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The hedgerow, although diverse, is dominated by Hawthorn Crataegus monogyna. The vegetation of the towpath is usually dominated by grass species. Otter spraints are found along the towpath, particularly where the canal passes over a river or stream. The rare and legally protected Opposite-leaved Pondweed (Flora Protection Order 1987) is present at one site in Dublin, between Locks 4 and 5. *Tolypella intricata (a* stonewort listed in the Red Data Book as being vulnerable) is also in the Royal Canal in Dublin, the only site in Ireland where it is now found. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods (NPWS, 2009g).	- Otter *Lutra lutra* - Opposite-leaved Pondweed *Groenlandia densa* - *Tolypella intricata*
Rye Water Valley / Carton pNHA	As per the Natura 2000 SAC description. The Rye Water Valley / Carton SAC is a river valley site, which includes at its western end a large area of estate woodland and an artificial lake. The eastern section of the site includes a section of railway, canal and aqueduct; it continues as far as Leixlip town. The importance of the site lies in the presence of a number of rare plant and animal species and a rare habitat, i.e. thermal, mineral, petrifying spring. The spring gives rise to a calcareous marsh, the habitat	Petrifying Springs* [1130] - Narrow-mouthed Whorl Snail (*Vertigo angustior*) [1014] - Desmoulin's Whorl Snail (*Vertigo*

	for *Vertigo angustior* and *Vertigo moulinsiana*. This marsh is species-rich and holds a number of plant and insect species which are rare or locally uncommon in Ireland. Four Red Data Book plant species have been recorded from the site, two of which, *Hypericum hirsutum* and *Viola hirta* are legally protected. The woods at the eastern end of the site are also of some ornithological interest (NPWS, 2017a).	*moulinsiana*) [1016] (NPWS, 2018a) (As per those outlined in Natura 2000 SAC description).

Table 4-3: Site briefs; Qualifying Interests; and project-relevant threats /pressures and their impacts and sources in relation to the Natura 2000 sites within the 15km ZoI (plus hydrological connectivity extension).

Site Name	Brief	Qualifying Interests
Rye Water Valley / Carton SAC	The Rye Water Valley / Carton SAC is a river valley site, which includes at its western end a large area of estate woodland and an artificial lake. The eastern section of the site includes a section of railway, canal and aqueduct; it continues as far as Leixlip town. The importance of the site lies in the presence of a number of rare plant and animal species and a rare habitat, i.e. thermal, mineral, petrifying spring. The spring gives rise to a calcareous marsh, the habitat for *Vertigo angustior* and *Vertigo moulinsiana*. This marsh is species-rich and holds a number of plant and insect species which are rare or locally uncommon in Ireland. Four Red Data Book plant species have been recorded from the site, two of which, *Hypericum hirsutum* and *Viola hirta* are legally protected. The woods at the eastern end of the site are also of some ornithological interest (NPWS, 2017a).	- Petrifying Springs* [1130] - Narrow-mouthed Whorl Snail (*Vertigo angustior*) [1014] - Desmoulin's Whorl Snail (*Vertigo moulinsiana*) [1016] (NPWS, 2018a)
South Dublin Bay and River Tolka Estuary SPA (004024)	The South Dublin Bay and River Tolka Estuary SPA includes the intertidal area between the River Liffey and Dun Laoghaire, and the estuary of the River Tolka to the north of the River Liffey, as well as Booterstown Marsh. A portion of the shallow marine waters of the bay is also included. The site is important for wintering waterfowl, being an integral part of the internationally important Dublin Bay complex. An internationally important population of Light-bellied Brent Goose *Branta bernicla hrota* occurs regularly and the site is of national importance for a further nine wintering bird species. Furthermore, the site supports a nationally important colony of breeding Common Tern *Sterna hirundo* and is an internationally important passage/staging site for three tern species. It is of note that four of the species that regularly occur at this site are listed on Annex I of the E.U. Birds Directive, i.e. Bar-tailed Godwit *Limosa lapponica*, Common Tern, Arctic Tern *Sterna paradisaea* and Roseate Tern *S. dougallii*. Sandymount Strand/Tolka Estuary is also a Ramsar Convention site. (Source: NPWS, 2015a)	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Oystercatcher (*Haematopus ostralegus*) [A130] Ringed Plover (*Charadrius hiaticula*) [A137] Grey Plover (*Pluvialis squatarola*) [A141] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina*) [A149] Bar-tailed Godwit (*Limosa lapponica*) [A157] Redshank (*Tringa totanus*) [A162] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Roseate Tern (*Sterna dougallii*) [A192] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194] Wetland and Waterbirds [A999] (Source: NPWS, 2015b)

Site Name	Brief	Qualifying Interests
South Dublin Bay SAC (000210)	This intertidal site extends from the South Wall at Dublin Port to the West Pier at Dun Laoghaire, a distance of c. 5 km. At their widest, the intertidal flats extend for almost 3 km. The seaward boundary is marked by the low tide mark, while the landward boundary is now almost entirely artificially embanked. Several permanent channels exist, the largest being Cockle Lake. A small sandy beach occurs at Merrion Gates, while some bedrock shore occurs near Dun Laoghaire. A number of small streams and drains flow into the site. The proximity of the site to Dublin City results in it being a very popular recreational area. It is also important for educational and research purposes. The site possesses a fine and fairly extensive example of intertidal flats. Sediment type is predominantly sand, with muddy sands in the more sheltered areas. A typical macro-invertebrate fauna exists. The bay has the largest stand of Zostera on the east coast and supports part of the important wintering waterfowl populations of Dublin Bay. It regularly has an internationally important population of Light-bellied Brent Goose, plus nationally important numbers of at least a further 6 species, including Bar-tailed Godwit. The bay is a regular autumn roosting ground for significant numbers of Sterna terns, including Roseate Tern. (NPWS 2018b)	Tidal Mudflats and Sandflats [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Embryonic shifting dunes [2110] (Source: NPWS, 2013a)
North Bull Island SPA (004006)	The site covers all of the inner part of north Dublin Bay. The North Bull Island sand spit is a relatively recent depositional feature, formed as a result of improvements to Dublin Port during the 18th and 19th centuries. It is almost 5 km long and 1 km wide and runs parallel to the coast between Clontarf and Sutton. Part of the interior of the island has been converted to golf courses. The SPA is of international importance for waterfowl on the basis that it regularly supports in excess of 20,000 waterfowl. The site supports internationally important populations of three species, Light-bellied Brent Goose, Black-tailed Godwit *Limosa limosa* and Bar-tailed Godwit. The site is one of the most important in the country for Light-bellied Brent Goose. A further of 14 species have populations of national importance. North Bull Island is a Ramsar Convention site, and part of the North Bull Island SPA is a Statutory Nature Reserve and a Wildfowl Sanctuary. (Source: NPWS, 2014)	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Teal (*Anas crecca*) [A052] Pintail (*Anas acuta*) [A054] Shoveler (*Anas clypeata*) [A056] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Wetland and Waterbirds [A999] (Source: NPWS, 2015c)

Site Name	Brief	Qualifying Interests
North Dublin Bay SAC (000206)	The North Bull Island sand spit is a relatively recent depositional feature, formed as a result of improvements to Dublin Port during the 18th and 19th centuries. It is almost 5km long and 1km wide and runs parallel to the coast between Clontarf and Sutton. The sediment which forms the island is predominantly glacial in origin and siliceous in nature. Between the island and the mainland there occurs two sheltered intertidal areas. The seaward side of the island has a fine sandy beach. A substantial area of shallow marine water is included in the site. Site possesses an excellent diversity of coastal habitats. The North Bull Island dune system is one of the most important systems on the east coast and is one of the few in Ireland that is actively accreting. It possesses extensive and mostly good quality examples of embryonic, shifting marram and fixed dunes, as well as excellent examples of humid dune slacks. Both Atlantic and Mediterranean salt marshes are well represented, and a particularly good marsh zonation is shown. The salt marshes grade into mudflats and sandflats, some of which are dominated by annual Salicornia species. The site has five Red Data Book vascular plant species and four Red Data Book bryophyte species and is one of the most important sites for wintering waterfowl in Ireland. It is also an important site for some invertebrates of national importance. (Source: NPWS, 2017c)	Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] *Salicornia* and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes)* [2130] Humid dune slacks [2190] *Petalophyllum ralfsii* (Petalwort) [1395] (Source: NPWS, 2013b)

* = priority Annex I habitat

4.1.2 Screening of Designated Sites

4.1.2.1 Natura 2000 sites

An AA Screening has been carried out for this project by (JBA, 2021b) . Following initial screening, and based upon best scientific judgement it is concluded that there will be **no likely significant effects** from the project on the following Natura 2000 sites within the AA Screening ZoI, either alone or in combination with any other plans or projects:

- Rye Water Valley/Carton SAC (001398)
- South Dublin Bay and River Tolka Estuary SPA (004024)
- South Dublin Bay SAC (000210)
- North Bull Island SPA (004006)
- North Dublin Bay SAC (000206)

4.1.2.2 Proposed Natural Heritage Areas

Rye Water Valley/Carton pNHA is located within Rye Water Valley/Carton SAC. The pNHA has the same receptors the Natura 2000 site. The AA Screening (JBA, 2021b) concludes that due to the Natura 2000 site location upstream of the proposed site, small scale works with shallow excavations and prevailing winds, impacts are not anticipated on the Rye Water Valley/Carton SAC. As the pNHA has the same receptors, this site is covered by the assessment in the AA Screening report and is not considered to be impacted.

Grand Canal pNHA, Liffey Valley pNHA and Royal Canal pNHA lies within or partly within the same sub-catchment as the proposed site. There is no surface water pathway between the proposed route and Royal Canal pNHA, therefore impacts to this pNHA are not anticipated.

Due to the presence of surface water pathway and the close location, Grand Canal pNHA and Liffey Valley pNHA are considered further in the impact assessment in the report.

Therefore, as there are no direct pathways between the site and the pNHA sites, the following pNHA sites are **screened out**:

- Royal Canal [002103]
- Rye Water Valley/Carton [001398]

The following pNHAs are **screened in**:

- Grand Canal [002104]
- Liffey Valley [000128]

4.2 Results of Site Visit

An ecological walkover survey was conducted on 29th September 2021 by JBA Ecologists Mark Desmond and Malin Lundberg, and additional surveys were carried out on the 12th May 2022 by JBA Ecologists Mark Desmond, Patricia Byrne, Michael Coyle and Éimear Stephenson following a change in route of the greenway. Habitats and species recorded at the site are presented in detail in the following sections. The value of each habitat is based on recordings from the site visit, following the criteria set out in Table 3-1 and Table 3-2.

4.2.1 Habitats

Habitats recorded are listed in Table 4-4 and detailed descriptions are provided in the sections below. Habitat map is provided in Figure 4-2

Table 4-4: List of habitats recorded on site

Habitat	Fossitt Code
Flower beds and borders	BC4
Stone walls and other stonework	BL1
Buildings and artificial surfaces	BL3
Soil and Bare Ground	ED2
Reed and large sedge swamps	FS1
Upland/Eroding river	FW1
Depositing lowland rivers	FW2
Drainage ditches	FW4
Amenity Grassland	GA2
Dry meadows and grassy verges	GS2
Wet grassland	GS4
(Mixed) Broadleaved woodland	WD1
Mixed Broadleaf/Conifer woodland	WD2
Scattered trees and parkland	WD5
Hedgerows	WL1
Treeline	WL2
Riparian woodland	WN5
Scrub	WS1
Wet willow-alder-ash woodland	WN6
Immature woodland	WS2

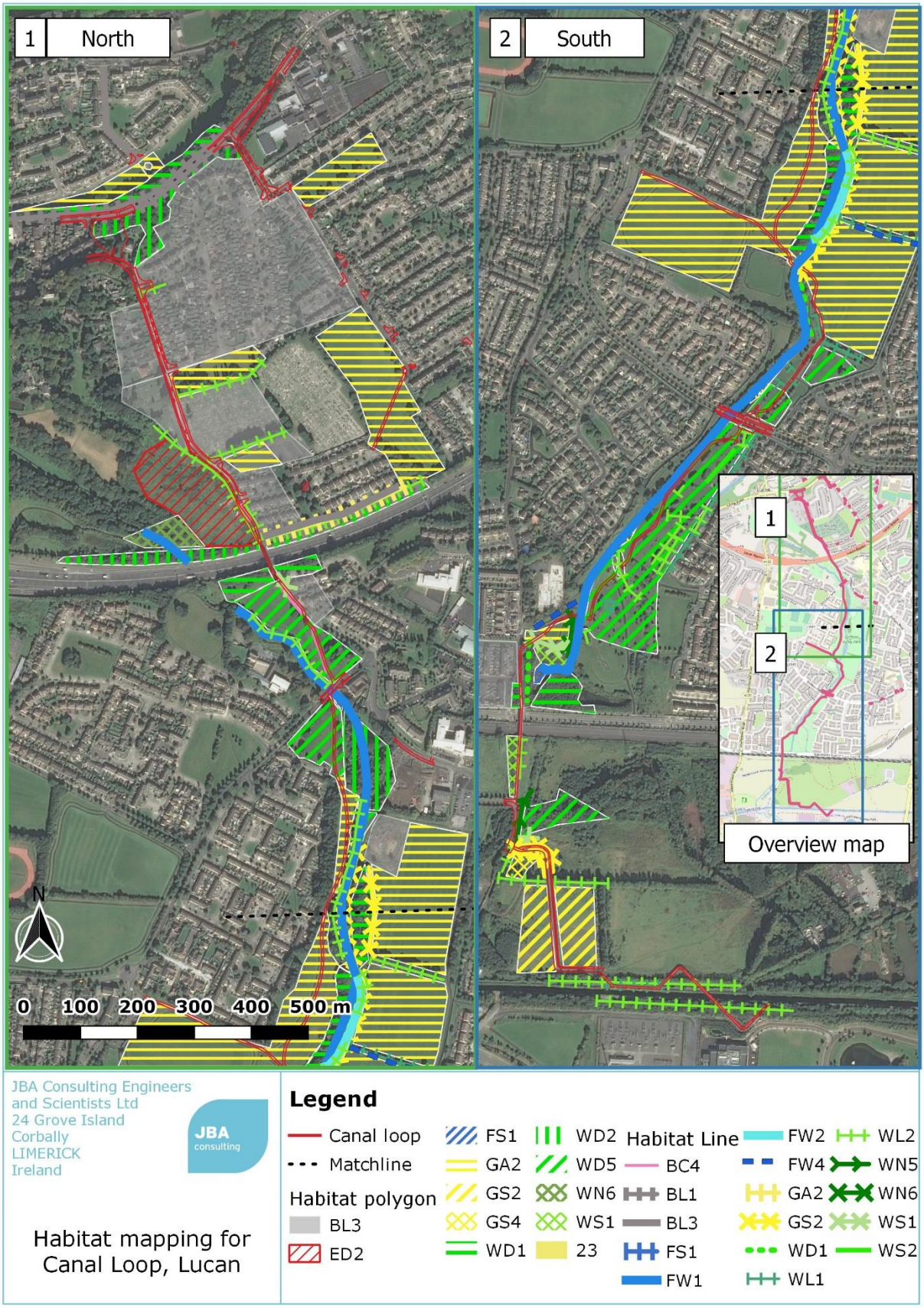


Figure 4-2: Habitat map of North and south of proposed greenway (Source: ESRI Satellite World Imagery).

4.2.1.1 Flower beds and borders - BC4

There are two strips with sown wildflowers just north of N4 (Figure 4-3). These include a range of species, such as Sunflower *Helianthus* spp., Cornflower *Centaurea cyanus*, Yarrow *Achillea millefolium*, Common Poppy *Papaver rhoeas,* Smelly Wallflower *Erysimum odoratum* and Common Mallow *Malva sylvestris*. Among this area were ornamental, non-native plant species including Marigold *Calendula* spp, along with a large abundance of herbaceous species, including Field Mustard *Brassica rapa*, Cleavers *Galium aparine*, Nettle *Urtica dioica*, Thistle *Cirsium* spp, Clover *Trifolium* spp, Cuckoo flower *Cardamine pratensis*. There is also a flower bed strip in the entryway between Esker Hill and the neighbouring parkland. This habitat included non-natives species Spanish Bluebells *Hyacinthoides hispanica*.

This habitat is considered to be of less than local importance.

Figure 4-3: Flower beds and parkland.

4.2.1.2 Stone walls and other stonework - BL1

Stonewalls occur on both sides of Lucan Road (R835) and in the residential area of Cherbury Park towards N4. There stonewalls along the stretch of road on Esker Hill and the parkland that borders it. This stonewall extends and passes through this parkland towards the Lucan Road (R835). Another stone wall passes along the northern-most stretch of secondary link of the cycle route, along the Chapel Hill road (L1005).

This habitat is considered to be of less than local importance.

4.2.1.3 Buildings and artificial surfaces - BL3

The habitat buildings and artificial surfaces include roads, walkways, cycle paths and houses. The proposed cycle route will be along existing paths through Griffeen Valley Park and roads leading to and from it. The proposed construction will occur alongside housing estates of Esker Lawns, Beech Park, Cherry Park Avenue. The works will also pass alongside the New Esker Cemetery. There is likely to be minimal disruption in these areas.

This habitat is considered to be of less than local importance.

4.2.1.4 Spoil and bare ground - ED2

There is a construction site north of N4 and west of Esker Road where the topsoil has been stripped and is now made up of bare ground. The site could not be accessed during the survey.

This habitat is considered to be of less than local importance.

4.2.1.5 Eroding/upland rivers - FW1

Griffeen River has riffle and pool sections. The substrate is gravely with some large boulders. There is sparse instream vegetation in the downstream sections; some instream mosses were recorded in the river close to the playground within the park. There is more vegetation occurring in the river further upstream; species include Bulrush *Typha latifolia*, Bur-reed *Sparganium erectum*, Fool's-watercress *Apium nodiflorum*, Pondweed *Potamogeton* spp. and some Goat Willow *Salix caprea,* and Alder *Alnus glutinosa* on the banks. Frequently along the river, small weirs and rocks creating small rapids were noted during the survey (Figure 4-5), while also containing eroded river edges and muddy banks.

This habitat is considered to be of regional importance.

Figure 4-4: The river system through the parkland containing a rock-created rapid

4.2.1.6 Depositing/lowland rivers - FW2

At the centre of the park, there is a small side channel running along the main river channel for about 150m Figure 4-5. There is a slow flow in this channel causing deposition and Fool's-water-cress covers the channel.

This habitat is considered to be of local (higher) importance.

Figure 4-5: Side channel with slow flowing water and Fool's-water-cress present in channel.

4.2.1.7 Drainage ditches - FW4

There is a dry ditch in the southwestern end of the park, next to Haydens Lane. No wetland species were recorded, however some shrubs occurred next to it, including species such as Willowherb, Dog Rose *Rosa canina*, Ash that was dead or had dieback, Elder *Sambucus nigra*, Blackthorn *Prunus spinosa* and Hawthorn *Crataegus monogyna*.

This habitat is considered to be of less than local importance.

4.2.1.8 Reed and Large Sedge Swamps- FS1

There are multiple wet areas within this project, each located alongside the banks of the Griffeen river in the south are of the project site and to the north of Adamstown Avenue and the railway. This area is dominated by wetland species including Meadowsweet *Filipendula ulmaria*, Yellow Iris *Iris pseudacorus*, mixes of Grasses *Poacea* sp, Clovers *Trifolium repens*, Cuckoo Flower *Cardamine pratensis*, Cinquefoil *Potentilla sp*, Bush Vetch *Vicia sepium*, Creeping Buttercups *Ranunculus repens*, Wild Angelica *Angelica sylvestris*, Nettle *Urtica dioica*, Thistle *Cirsium* spp, Docks *Rumex* spp, Rosebay Willowherb *Chamaenerion angustifolium*, Great Hairy Willowherb Epilobium hirsutum, with Bulrush *Typha latifolia*, Common Rush *Juncus effusus*, and Fool's Water-cress *Apium nodiflorum* present closer to the river's edge.

This habitat has the potential to provide habitat for amphibians, including spawning habitat.

This habitat is considered to be of local (higher) importance.

4.2.1.9 Amenity grassland (improved) - GA2

Amenity grassland is the main habitat occurring in Griffeen Valley Park, including sport fields and recreational areas Figure 4-6. The habitat is dominated by grasses, White Clover *Trifolium repens* and Dandelion *Taraxacum* spp. Many of the amenity grasslands are surrounded by a boundary of treelines. Other areas of amenity grassland include the greenways that occur within housing estates that are borderline to the proposed cycle tracks, which include Sarsfield park to the northern border of the Lucan road (R835), Beech Park which is on the eastern side of the New Esker cemetery, and the area to the south of Adamstown Avenue and the train tracks

This habitat is considered to be of less than local importance.

Figure 4-6: Amenity grassland with hedgerow in the distance and footpath up close.

4.2.1.10 Dry meadows and grassy verges - GS2

Dry meadows and grassy verges are grassland habitats that are not mown regularly, and the herbs and grasses are allowed to grow taller than in the amenity grassland. This habitat occurs in some areas on the bank of the river with a small number of fields in the southern end of the park and in the north-western end of the proposed cycle route north of N4. This habitat is generally more species rich and species recorded include Silverweed *Potentilla anserina*, Creeping Buttercup *Ranunculus repens,* Dock *Rumex obtusifolius*, Dandelion, White Clover, Red Clover *Trifolium pratense*, Perennial Ryegrass *Lolium perenne*, Yorkshire Fog *Holcus lanatus*, Hawksbeard *Crepis* spp., Ribwort Plantain *Plantago lanceolata*, Selfheal *Prunella vulgaris*, Bush Vetch *Vicia sepium*, Black Medic *Medicago lupulina*, Red Bartsia *Odontites vernus*, Nettle, Creeping Cinquefoil *Potentilla reptans*, Crown Daisy *Glebionis coronaria*, Common Daisy *Bellis perennis* and Rushes *Juncus* spp.

This habitat is considered to be of local (higher) importance.

4.2.1.11 Wet Grassland GS4

This habitat is located in low-lying grassy area along the eastern bank of the Griffeen river, in the southern section of the Park next to the bridge. The habitat is dominated mainly by a mixture of Grasses *Poacea* sp, with high presence of Bulrush *Typha latifolia* and frequent Meadowsweet *Filipendula ulmaria* . There was also the presence of a stand of Yellow Iris *Iris peseudocarpus* found within the site.

This habitat is considered to be of less than local importance.

Figure 4-7 Wet grassland along Griffeen River in the southern area of the Griffeen valley park

4.2.1.12 Mixed broadleaved woodland - WD1

Broadleaved woodland occurs within the Griffeen Park and on both the north and south of the Lucan Road Figure 4-8

The woodlands to the southern area of Griffeen Park contain many riparian species and mixed with planted species. There is Grey willow *Salix cinerea*, white willow *Salix alba*, Alder, Hawthorn *Crataegus*, bush vetch, creeping buttercup, willowherb, dock, nettle, meadowsweet. There contains some ash species that are showing present sins of ash dieback

Understorey includes both woody species, such as Dogwood *Cornus sanguinea*, Blackthorn *Prunus spinosa*, saplings of Ash and Cherry, Bramble *Rubus fruticosus* agg, Darwin's Barberry *Baerberis dawinii*, St John's Wort *Hypericum perforatum*, Holly *Ilex aquifolium* and non-woody species, such as Willowherb, Nettle, Reed Canary Grass *Phalaris arundinacea*, Dock, Hogweed *Heracleum*, Wood Avens *Geum urbanum* and Cow Parsley *Anthriscus sylvestris.*

The area north of the Lucan Road has some Cotoneaster, Cherry laurel, Rowan *Sorbus aucuparia,* Ash, Sycamore *Acer pseudoplatanus*, Horse chestnut *Aesculus hippocastanum*, Wild garlic *Allium ursinum*, *S*panish bluebells *Hyacinthoides hispanica* and *C*omfrey *Symphytum officinale* present.

Within woodland between the Lucan Road and Esker hill, lies an area mainly of Hazel and beech with some ash and holly present. The ground has a sparse layer of ivy *Hedera helix*, with bramble and dry meadow species spread along the verges of the adjacent scrub. Within this area a birds nest was spotted, however no birds were seen within the nest. Along the edge of the woodland, next to the Lucan road is an area of cherry laurel and sycamore.

This habitat is considered to be of local higher value importance.

Figure 4-8: Broadleaved woodland north of Lucan Road.

4.2.1.13 Mixed broadleaved/conifer woodland - WD2

A stretch of mixed woodland occurs stretching through the park, alongside the river.

Within this stretch, there were recordings of multiple saplings of mixed species, some manmade pathways, Ivy, Bramble, Harts-tongue fern *Asplenium scolopendrium*, bindweed *Convolvulus arvensis* and a Greater butterbur *Petasites hybridus*, Maple *Acer* sp, Hazel *Corylus avellana*, Elder *Sambucus nigra*, Nettle, Cow parsley, Buttercup, Dogwood, Willow tree *Salix*, Weeping willow *Salix babylonica*, and some Cypress *Cypressus*. This area also included the invasive species, Winter heliotrope *Petasites pyrenaicus*, Snowberry *Symphoricarpos*, Cherry laurel, Spanish bluebell, Sycamore, Hogweed,

Grey Squirrel *Sciurus carolinensis*, Magpie *Pica pica,* Thrush *Turdus philomelos,* Blackbird *Turdus merula,* Robin *Erithacus rubecula*, Pigeon *Columbidae,* Wren *Troglodytes troglodytes,* Great tit *Parus major, and* Blue tit *Cyanistes caeruleus* were recorded within the mixed forest, however there were no sightings of any bird's nests in this area was recorded in the woodland.

This habitat is considered to be of local higher value importance.

4.2.1.14 Scattered trees and parkland - WD5

Amenity grassland with scattered trees and benches occurs in the lower half of Griffeen Park and there are two smaller parks along Beech Park Road (east of Esker Cemetery) with this habitat. Trees include Ash, Silver Birch *Betula pendula*, Weeping Willow, Oak *Quercus* spp., Leyland Cypress *Cupressus* × *leylandii*, Sycamore, Rowan, Poplar *Populus*, Horse Chestnut, Beech *Fagus*, Ash, Elder, Lime *Tilia* and Whitebeam *Sorbus aria*.

This habitat is considered to be of less than local importance.

4.2.1.15 Hedgerows - WL1

Hedgerows make up some of the boundaries between fields within Griffeen Park. In some hedgerows Hawthorn and Ash are the dominant species, but there are also Holly and Beech hedges and Yew *Taxus baccata* hedges. Other species that were recorded but not dominant include Blackthorn, Field Maple and Dog Rose *Rosa canina*. Herbs include Creeping Buttercup, Dock, Meadow Foxtail *Alopecurus pratensis* and Cock's Foot *Dactylis glomerata*.

This habitat is considered to be of local (higher) importance.

4.2.1.16 Treelines - WL2

Treelines border the river, occur along roads Figure 4-9 and are often seen on the boundary of the amenity grassland. A range of species were recorded and include White Willow, Oak, Copper Beech *Fagus sylvatica* f. *purpurea*, Ash, Horse Chestnut, Hazel *Corylus avellana*, Lime, Alder, Beech, Hawthorn, Spindle *Euonymus europaeus*, Rugosa Rose *Rosa rugosa*, Blackthorn, Wild Cherry *Prunus avium*, Black Poplar *Populus nigra*, Rowan and Sycamore.

A treeline along a tributary to Griffeen River in the southern end of the park is dominated by White Willow, Goat Willow and Alder, with dense Bramble also occurring. Non-woody species include Bur-reed, Bulrush, Fool's-water-cress, Nettle, Hedge Bindweed, Dog Rose, Common Ragwort *Jacobaea vulgaris*, Thistle and Willowherb.

This habitat is considered to be of local (higher) importance.

Figure 4-9: Treeline and stonewall beside the residential area of Cherbury Park.

4.2.1.17 Riparian woodland - WN5

Riparian woodland occurs in the southwestern end of the park, along the Griffeen River. Ash, White Willow and Grey Willow are dominating; Blackthorn, Bramble, Butterfly-bush *Buddleja davidii*, Elder, Teasel *Dipsacus fullonum*, Nettle and Hogweed are also present.

This habitat is considered to be of county importance due to its connection to the Griffeen River.

4.2.1.18 Wet willow-alder-ash woodland - WN6

There is a wooded area north of N4, next to Griffeen River of wet willow-alder-ash woodland that is dominated by Ash, but other species such as Sycamore and Alder are present. The understorey is dominated by Blackthorn, Butterfly-bush, Bramble, Hogweed, Cow Parsley, Nettle, Herb Robert *Geranium robertianum*, Hart's Tongue Fern *Asplenium scolopendrium*.

In the south, just north of the railway line is a wet willow-alder-ash woodland composed of Willow, Alder and Ash in the canopy and an understorey with dense Bramble. Nipplewort *Lapsana communis*, Cleavers *Galium aparine*, Small-flowered Cranesbill *Geranium pusillum* and Dandelion are also present in the understorey.

This habitat is considered to be of county importance, particularly due to its connection to the Griffeen River.

4.2.1.19 Scrub - WS1

Scrub occurs in less managed areas along the proposed cycle route. The largest sections of scrub land occurs in the area between the grand canal and the train tracks alongside the Adamstown Avenue. Woody species include Bramble, some young Willow and Elder, Hawthorn, Field Maple, Guelder Rose *Viburnum opulus*, Purple Willow *Salix purpurea* and Ash. Non-woody species include Sedges *Carex* spp., Red Bartsia, Willowherb, Thistle, False Oatgrass *Arrhenatherum elatius*, Nettle, Dock, Bush Vetch, Perennial Rye-grass, Cock's foot and Creeping Cinquefoil.

This habitat is considered to be of local (higher) importance.

4.2.1.20 Immature woodland - WS2

There is a small area of immature woodland south of Griffeen Avenue with young species of Elm, Alder, White Willow and Ash.

This habitat is considered to be of less than local importance.

4.2.2 Flora

The NBDC (2022) records were referenced and no occurrence of protected floral species has been recorded within the site's boundary to date. However several protected plants are located within 2km of the proposed site:

Green Figwort *Scrophularia umbrosa* is an Endangered plant in Ireland and is located along the River Liffey. This plant will not be impacted by the works due to distance from the proposed site.

Yellow Archangel *Lamiastrum galeobdolon* subsp. *montanum* is a planted listed as Vulnerable in Ireland. This population is located in St Catherine's Woods, Lucan along the Liffey river and will not be impacted by the works due to distance from the proposed site.

Hairy St John's-wort *Hypericum hirsutum* is an Endangered plant in Ireland and a population of this plant is found in Vesey Park, near the Griffeen River. Although it is close in proximity to the proposed project boundary, it is unlikely this plant will impact as no works will take place within Vesey Park.

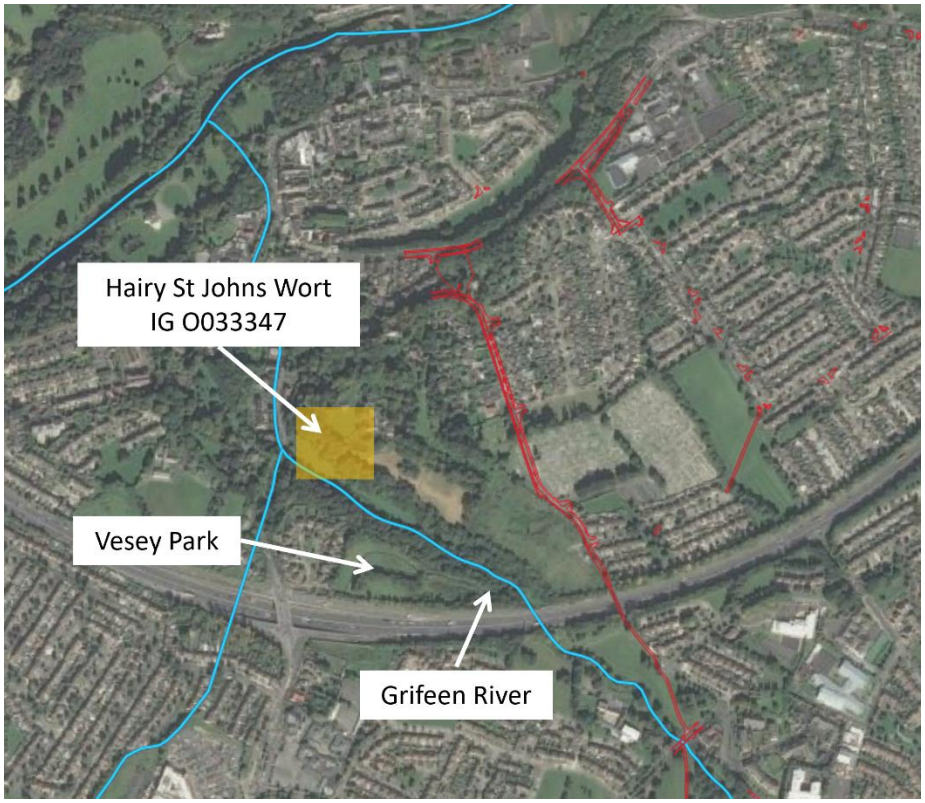


Figure 4-10: Location of Hairy St Johns Wort in relation to proposed project (in red)

No protected floral species were recorded by JBA ecologists during the ecological walkover survey of the proposed site.

4.2.3 Fauna

The following fauna was recorded during the surveys in 2021 and 2022:

- Grey Squirrel *Sciurus carolinensis,*
- Magpie *Pica pica,*
- Thrush *Turdus philomelos*,
- Blackbird *Turdus merula*,
- Robin *Erithacus rubecula,*
- Pigeon *Columbidae*,
- Wren *Troglodytes troglodytes,*
- Great tit *Parus major*, and
- Blue tit *Cyanistes caeruleus*,

Records of protected fauna including invertebrates, amphibians, fish, birds and mammals collated from the NBDC (2022) database, present within the surrounding four 2km squares (O03H, O03M, O03G, O03L) within the past 10 years are listed in Appendix B. This list includes their level of protection, if they are red or amber listed on the IUCN Red List and the date of the last record of this species at this location.

4.2.3.1 Terrestrial Mammals

A review of records held by the NBDC returned records of the following terrestrial mammal species protected under the Wildlife Acts (As Amended) within the four 2km squares of the proposed site:

- Eurasian Badger *Meles meles*
- Pygmy Shrew *Sorex minutus*
- West European Hedgehog *Erinaceus europaeus*

- Pine Martin *Martes martes*

Otter

Otter *Lutra lutra* spraint was recorded next to Griffeen River north of Griffeen Avenue (Figure 4 3). No Otter holt was recorded during the survey. The presence of Griffeen River within the park and River Liffey to the north and Grand Canal to the south provide suitable habitat for Otter. The site is therefore considered to be of regional importance for Otter

Badger, Hedgehog, and Pygmy Shrew

Badger, Hedgehog and Pygmy Shrew are likely to be present in the Griffeen Valley Park with suitable habitats present for commuting and foraging. No signs of these species were observed during the survey and no Badger setts were found.

Given the presence of hedgerows, woodlands and river which provide cover and commuting habitat for the species and previous recordings in the vicinity, the site is considered to be of higher local importance for these mammals.

Pine Marten

Pine Marten have been recorded occasionally along the River Liffey and also the Grand Canal. The nearest record for this species in relation to the proposed greenway is just south of the Grand Canal in Clondalkin. This mammal is extremely shy and woodland specialists therefore due, to the urban environment and the predominant habitat being grassland, the site can be considered of less than local importance for this species.

Grey Squirrel

A grey squirrel was observed during the survey. This is a non-native mammal to Ireland, and is discussed further in Section 4.2.4

4.2.3.2 Bats

Preliminary Bat Roost Survey

Trees present along the route were inspected from ground level. None of the trees in the woodland north of Lucan Road were identified to have potential roost features (PRFs). They are early mature with smooth bark, ca 20cm in diameter at breast height. They have some Ivy cover, but it is thin and is not creating suitable crevices for bats.

Previous assessments of the trees were identified to have low to moderate bat roost potential due to the presence of PRFs, such as hollow stem, thick Ivy growth and broken limbs.

Given that there is potential for bats to be roosting in some of the trees along the route, the site is considered to be of local (higher) importance for roosting bats.

Foraging and Commuting Habitat

The habitats within the site offer commuting and foraging opportunities for bats. Bats use linear features, such as hedgerows/treelines and watercourses, to commute. They also provide foraging habitat along with the open grass fields in the park. The sparse use of lighting within the park further adds to the suitability for bats. The bat habitat connects with the wider landscape via River Liffey in the north and Grand Canal in the south. The site is in the outskirts of the suburban area and connects with the rural landscape. The site provides habitat of **moderate to high suitability for commuting and foraging bats**.

Four bat species have been recorded within the 2km grid squares of the proposed route (NBDC, 2022), which are:

- Daubenton's Bat (*Myotis daubentonii),*
- Brown Long-eared Bat (*Plecotus auritus*),
- Leisler's Bat (*Nyctalus leisleri*),
- Common Pipistrelle (*Pipistrellus pipistrellus*)

Roughan & O'Donovan Consulting Engineers carried out a bat survey in Griffeen Valley Park in June and July 2020 (ROD, 2020). They recorded four bat species commuting and foraging along treelines and hedgerows, and within the open spaces of the amenity grasslands including:

- Common Pipistrelle,
- Soprano Pipistrelle (*Pipistrellus pygmaeus*),
- Leisler's Bat
- Daubenton's Bat,

The site is considered to be of regional importance for bats commuting and foraging due to number of species and urban context.

4.2.3.3 Breeding Birds

Several amber listed birds have been recorded on NBDC within the four 2km grid squares along the proposed route, some of which use the same type of habitat found on site and could therefore be found within the site. No amber or red list birds were witnessed during the survey. The NBDC records for endangered bird species within the past ten years are listed below and details are included in Appendix B

Barn Owl (*Tyto alba*)
Barn Swallow (*Hirundo rustica*)
Black-headed Gull (*Larus ridibundus*)
Common Coot (*Fulica atra*)
Common Kestrel (*Falco tinnunculus*)
Common Kingfisher (*Alcedo atthis*)
Common Linnet (*Carduelis cannabina*)
Common Pheasant (*Phasianus colchicus)*
Common Pochard (*Aythya ferina*)
Common Redshank (*Tringa totanus*)
Common Starling (*Sturnus vulgaris*)
Common Swift (*Apus apus*)
Common Wood Pigeon (*Columba palumbus*)
Great Cormorant (*Phalacrocorax carbo*)
Herring Gull (*Larus argentatus*)
House Martin (*Delichon urbicum*)
House Sparrow (*Passer domesticus*)
Little Egret (*Egretta garzetta*)
Little Grebe (*Tachybaptus ruficollis*)
Mallard (*Anas platyrhynchos*)
Mew Gull (*Larus canus*)
Mute Swan (*Cygnus olor*)
Northern Lapwing (*Vanellus vanellus*)
Peregrine Falcon (*Falco peregrinus*)
Tufted Duck (*Aythya fuligula*)

However these protected birds were not observed during the survey, and it is unlikely the habitats around the proposed route provides suitable habitat for protected or listed birds. The presence of woodlands, treelines, hedgerows, and scrub provides good nesting habitat for breeding birds commonly found in the urban areas. The following bird species have been recorded during site visit and are likely breeding in the area:

- Magpie *Pica pica,*
- Thrush *Turdus philomelos*,
- Blackbird *Turdus merula*,
- Robin *Erithacus rubecula,*
- Pigeon Columbidae,
- Wren *Troglodytes troglodytes*,
- Great tit *Parus major*
- Blue tit *Cyanistes caeruleus*,

A breeding bird survey was carried out in 2020 in Griffeen Valley Park as part of a proposed integrated constructed wetland project (ROD, 2020). This survey concluded that the following listed species were confirmed to be breeding or possibly breeding in Griffeen park:

- House Sparrow *Passer domesticus*
- Linnet *Linaria cannabina*
- Robin *Erithacus rubecula*
- Starling *Sturnus vulgaris*

- Grey Wagtail *Motacilla cinerea*

Other amber or red listed birds recorded in the area (but not breeding) include:

- Common Gull *Larus canus*
- Herring Gull *Larus argentatus*
- House Martin *Delichon urbicum*
- Lesser Black-backed Gull *Larus fuscus*
- Sparrowhawk *Accipiter nisus*
- Swallow *Hirundo rustica*

Grey Wagtail *Motacilla cinerea* and Grey Heron *Ardea cinerea* have been noted along the Griffeen River. Much of site has been valued as being of local ecological (higher value) importance for birds, although the river and associated riparian habitats can be considered of regional importance for birds. .

4.2.3.4 Amphibians

The reed and large sedge swamps habitat provides suitable spawning habitat for amphibians and the riparian habitat along Griffeen River could support amphibians. Most notably the Common Newt *Triturus vulgaris* and the Common Frog *Rana temporaria* and their nesting habits in ponds, still water ditches and grassy banks.

The site is considered to be of local ecological (higher value) importance for amphibians.

4.2.3.5 Fish

European Eel *Anguilla anguilla*; Lamprey *Lampetra* spp.; and Atlantic Salmon *Salmo salar* have been recorded in River Liffey near the confluence of the Griffeen River (Kelly et al. 2015). The European Eel currently has Critically Endangered IUCN status and is protected under the OSPAR Convention. Lamprey and Atlantic Salmon are currently protected under Annex II and V of the EU Habitats Directive. Additionally, Atlantic Salmon is currently considered to be Vulnerable under Ireland's Freshwater Fish Red List. Casual records of Brown trout (fario). Northern Pike and European perch have been noted from those caught in the Griffeen River.

Given that these species are protected and/or rare, populations of these fish, particularly European Eel, Lamprey and Atlantic Salmon, the Griffeen River can be considered to be of national importance.

4.2.3.6 Invertebrates

There are two endangered bees reportedly sighted within the site, the Large Red Tailed Bumble Bee *Bombus lapidarius* and the Moss Carder Bee *Bombus muscorum*. The former associated with dunes and unimproved grasslands, while the latter which associated with damp areas of mosses and streams. Both species are currently Near Threatened according to the regional red list of Irish bees and are known to be found in parks and gardens (NBDC 2022)

The presence of plant species of Comfrey, Thistle, Cornflower, Clovers, Bellflowers, Vetch and the invasive threat species groups Maples and Cherry are also of use to these pollinators.

Overall the site is considered to be of regional ecological (higher value) importance for these invertebrates.

4.2.4 Invasive Non-native species

A total of four invasive non-native species were recorded during the ecological walkover survey within or adjacent to the site. These species are listed in Table 4-5. None are listed on the Third Schedule of the EC (Birds and Natural Habitats) Regulations 2011 S.I. No. 477/2011. Cherry Laurel is a High Impact invasive species. Locations are shown in Figure 4-11.

Table 4-5: Invasive species recorded during the ecological walkover survey.

Invasive Species	Third Schedule species	High Impact Species
Giant Butterbur *Petasites japonicus*	No	No
Snowberry *Symphoricarpos albus*	No	No
Cotoneaster spp.	No	No
Cherry Laurel *Prunus laurocerasus*	No	Yes
Sycamore *(Acer pseudoplatanus*	No	No

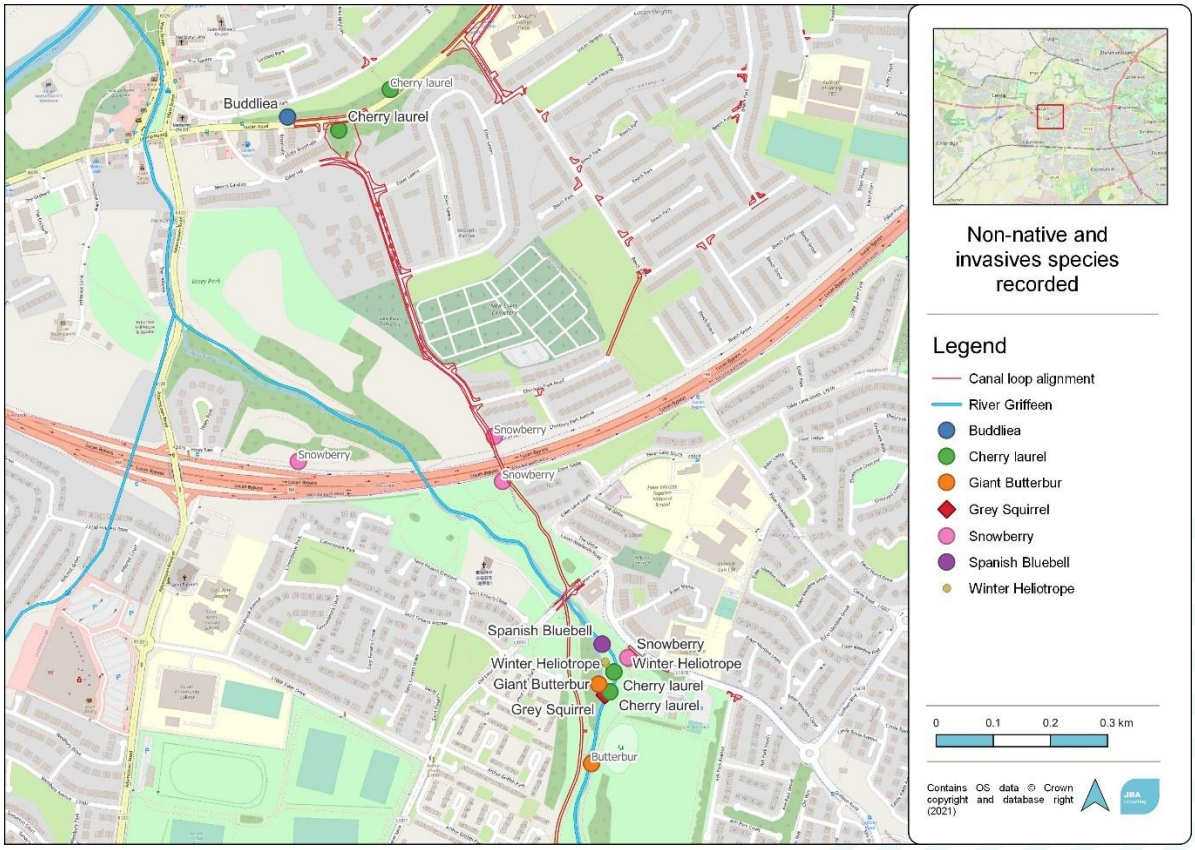


Figure 4-11: Invasive non-native species recorded in the vicinity of the proposed cycle route. (Map source: OSM)

Giant Butterbur was recorded on the eastern bank of Griffeen River, next to the playground in Griffeen Valley Park.

Snowberry was recorded at three locations. One stand was present south of N4, to the west of the existing path. Another stand was present just north of N4, in the residential area. The third location was recorded in the treeline north of N4 in Vesey Park. The existing path in Vesey Park is just beside the treeline and proposed upgrading works could disturb the plants and cause further spread of the species.

Cotoneaster, Sycamore and Cherry Laurel were recorded spread in the woodland understorey north of Lucan Road.

A grey squirrel was observed in Griffeen Park. The proposed works will not affect the spread of this mammal.

As a new cycle path is proposed through the woodland north of Lucan Road, the proposed works will require removal of invasive species. The works could cause further spread of the species, both within the woodland but also when moving between sites.

All invasive non-native species on the NBDC (2021) database, present within the relevant 2km squares of the proposed development site, are provided in Appendix B.

4.3 Waterbodies

4.3.1 Surface water bodies

The proposed cycle path will be located along the Griffeen River, which runs in a northerly direction through the Griffeen Valley Park and eventually joins River Liffey north east of the proposed cycle route. The WFD status is Moderate for Griffeen River and for River Liffey at the confluence with Griffeen River (EPA, 2021).

The Grand Canal is located at the southern end of the proposed cycle route and runs in an east west direction. Its WFD status is Good (EPA, 2021).

The proposed site lies within the Water Framework Directive (WFD) Liffey and Dublin Bay catchment and Liffey_SC_090 sub-catchment (EPA, 2021) (see Figure 3 8).

The proposed works will need to ensure that there will be no reduction of status due to the works.

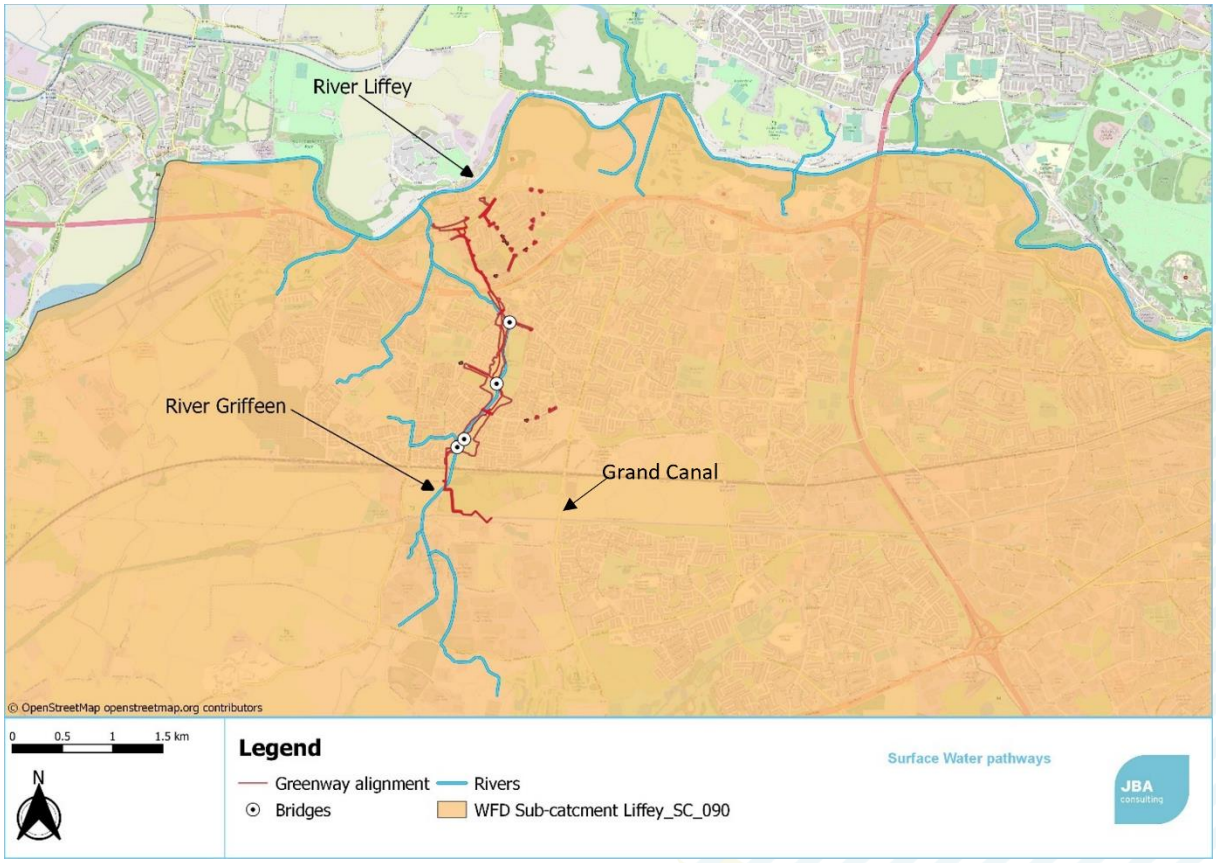


Figure 4-12 Surface water bodies near the proposed cycleway

4.3.2 Groundwater

The groundwater body underlying the site is Dublin (IE_EA_G_008), which is Good status and Under Review.

Groundwater vulnerability, a measure of the likelihood of groundwater contamination occurring, is High to Extreme across most of the site. The site is therefore generally at high risk of groundwater contamination (Figure 4-13).

The area north and south of road N4 is made up of the Lucan Esker, next to the Griffeen River.

There are no Groundwater Zone of Contribution sites listed by the EPA near the development site, nor any drinking water sites with groundwater abstraction that are not on the groundwater quality monitoring network.

The proposed works will need to ensure that there will be no reduction of status due to the works.

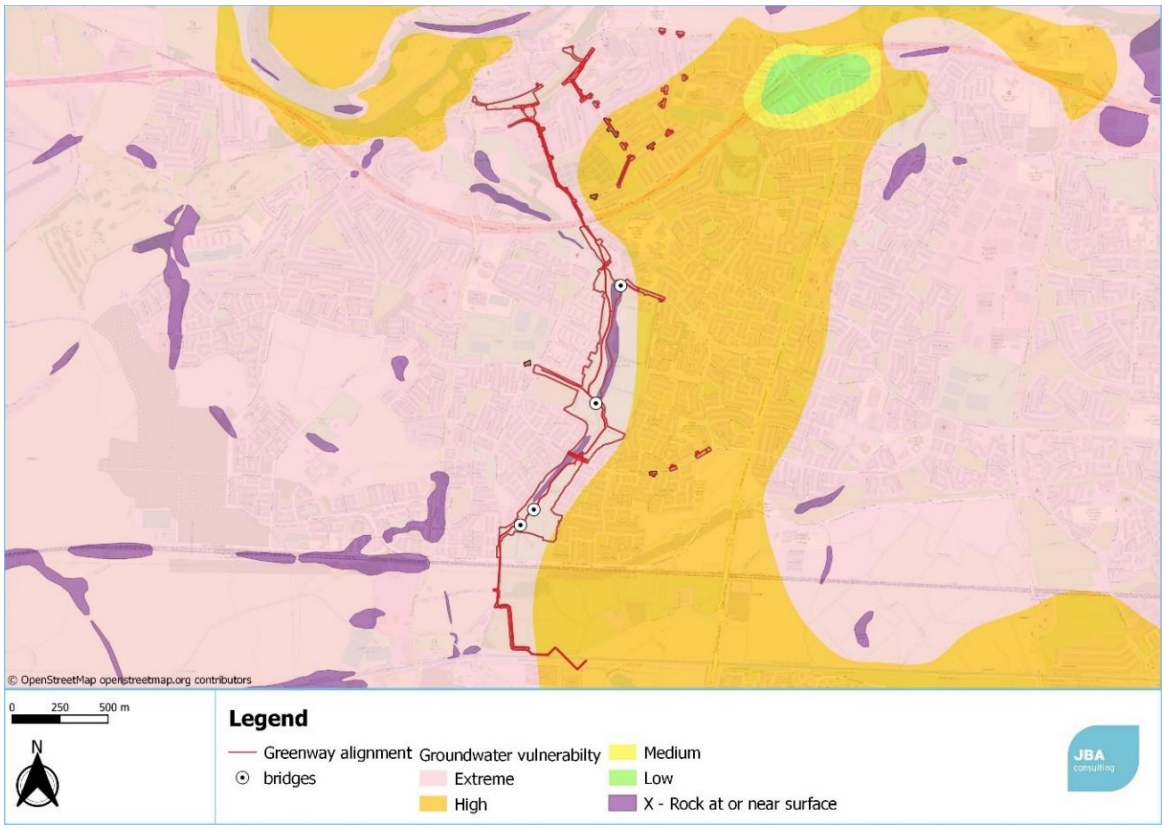


Figure 4-13: Groundwater vulnerability in the vicinity of the site.

4.4 Screening of Ecological Features

The screening of ecological features is given in Table 4-6. Those features screened out are not considered further in this assessment. Ecological features that are screened in are assessed for potential impact during construction and operation in Section 5.

Table 4-6: Summary of ecological features and the screening assessment.

Ecological feature	Value	Screening	Reasoning
Rye Water Valley/Carton SAC [001398]	International	Screened out	Lack of connectivity
South Dublin Bay and River Tolka Estuary SPA [004024]	International	Screened out	Distance, dilution of potential pollutants
South Dublin Bay SAC [000210]	International	Screened out	Distance, dilution of potential pollutants
North Bull Island SPA [004006]	International	Screened out	Distance, dilution of potential pollutants
North Dublin Bay SAC [000206]	International	Screened out	Distance, dilution of potential pollutants
Grand Canal pNHA [002104]	National	**Screened in**	
Liffey Valley pNHA [000128]	National	**Screened in**	
Royal Canal pNHA [002103]	National	Screened out	Lack of connectivity
Rye Water Valley/Carton pNHA [001398]	National	Screened out	Lack of connectivity
Flower beds and borders	Less than local	Screened out	Low value
Stone walls and other stonework	Less than local	Screened out	Low value
Buildings and artificial surfaces	Less than local	Screened out	Low value
Spoil and bare ground	Less than local	Screened out	Low value
Reed and large sedge swamps	Local (higher)	**Screened in**	
Eroding/upland rivers and Depositing lowland river - Griffeen River	Regional	**Screened in**	
Drainage ditches	Less than local	Screened out	Low value
Amenity grassland (improved)	Less than local	Screened out	Low value
Dry meadows and grassy verges	Local (higher)	**Screened in**	
Wet grassland	Local (higher)	**Screened in**	
(Mixed) broadleaved woodland	Local (higher)	**Screened in**	
Mixed broadleaved/conifer woodland	Local (higher)	**Screened in**	
Scattered trees and parkland	Less than local	Screened out	Low value
Hedgerow	Local (higher)	**Screened in**	
Treeline	Local (higher)	**Screened in**	
Riparian woodland	County	**Screened in**	

Ecological feature	Value	Screening	Reasoning
Wet willow-ash-alder woodland	County	**Screened in**	
Scrub	Local (higher)	**Screened in**	
Immature woodland	Less than local	Screened out	Low value
Flora	No impact-	Screened out	No protected plants in site boundary
Mammals - Badger, Hedgehog, Pygmy Shrew	Local (higher)	**Screened in**	
Mammals- Pine Marten	Unlikely to be present	Screened out	Unlikely to be present
Mammals - Otter	Regional	**Screened in**	
Bats - roosting	Local (higher)	**Screened in**	
Bats - commuting and foraging	Regional	**Screened in**	
Breeding Birds	Regional	**Screened in**	
Amphibians	Local (higher)	**Screened in**	
Fish - European Eel, Lamprey, Atlantic Salmon	National	**Screened in**	
Invertebrates	Regional (higher)	**Screened in**	
Invasive non-native species	No spread of 3rd schedule species. Possible spread of species	**Screened in**	

5 Potential Impacts

The impacts on the valued ecological features are assessed here. The initial assessment considers the potential impact pathways and whether these apply to the ecological features. The impact assessment considers the project and the anticipated effects in the absence of any mitigation.

The features which require further assessment are:

Protected Sites:

- Grand Canal pNHA [002104]
- Liffey Valley pNHA [000128]

Habitats

- Reed and large sedge swamps
- Eroding/upland rivers and Depositing lowland river - Griffeen River
- Dry meadows and grassy verges
- Wet grassland/ - riparian habitat
- (Mixed) broadleaved woodland
- Mixed broadleaved/conifer woodland
- Hedgerow
- Treeline
- Riparian woodland
- Wet willow-ash-alder woodland
- Scrub

Species

- Mammals - Badger, Hedgehog, Pygmy Shrew
- Mammals - Otter
- Bats - roosting
- Bats - commuting and foraging
- Breeding Birds
- Amphibians
- Fish - European Eel, Lamprey, Atlantic Salmon
- Invertebrates

Invasive non-native species

WFD Surface water body - River Griffeen

WFD Ground water body - Dublin

The following sections described the nature of immediate / short-term impacts, as well as any medium- or long-term impacts, predicted for designated protected sites, habitats and species in the absence of implemented mitigation measures during the maintenance works.

5.1 Do Nothing Scenario

If the proposed works were not to go ahead and the present land management continues as is, the ecological value of the site would remain unchanged.

5.2 Construction Phase

5.2.1 Designated Sites

5.2.1.1 Grand Canal pNHA

Potential impacts to the Grand Canal pNHA could be via surface water runoff of potential pollutants used on site (e.g. hydrocarbon leakage from machinery) and sediment when works are carried out along the ca 170m long stretch along the canal, at an approximate distance of 5m from the canal. This could impact on water quality and its ecological features, such as Otter and Opposite-leaved Pondweed.

Impacts could also arise from excavation works generating air pollutants and potential noise disturbance. While the works will generate some noise, it will mainly impact the local area and will be temporary in nature.

The proposed greenway alignment crosses the Grand canal at one location over an existing pedestrian bridge.

The proposed works are not anticipated to generate a great amount of dust given the small scale works where the proposed route will be along existing roads and involve resurfacing or widening of paths. The main habitats within the pNHA, including hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland, are not sensitive to dust.

There will be an increase in local traffic attending the site during construction, resulting in an increase in NOx emissions, however the works are temporary and will not significantly impact on the ecological features of the pNHA. The total number of additional journeys will be negligible compared to background traffic levels around and across the site.

Therefore, in the absence of mitigation during the construction phase, temporary, minor impacts to Grand Canal pNHA are anticipated.

5.2.1.2 Liffey Valley pNHA

The proposed alignment of the greenway is located 55m from the Liffey valley pNHA. Potential impacts to the Liffey Valley pNHA would be similar to those of Grand Canal pNHA. Surface water runoff of potential pollutants and sediments could reach River Liffey via Griffeen River. This could impact on water quality and its ecological features, Atlantic Salmon or its prey species.

Potential impacts from air pollutants or noise disturbance are not anticipated to be significant. While the works will generate some noise, it will mainly impact the local area and will be temporary in nature. Any dust generated during the construction phase will be temporary and will not be in great amounts given the small scale works.

There will be an increase in local traffic attending the site during construction, resulting in an increase in NOx emissions, however the works are temporary and will not significantly impact on the ecological features of the pNHA. The total number of additional journeys will be negligible compared to background traffic levels around and across the site.

Therefore, in the absence of mitigation during the construction phase, temporary, minor impacts to Liffey Valley pNHA are anticipated.

5.2.2 Habitats

5.2.2.1 Reed and large sedge swamp; Eroding/upland rivers; Depositing/lowland rivers

For the Griffeen River, its side channel and the wetland areas of reed and large sedge swamps, the main impact concerns would be that of an accidental introduction of pollutants (hydrocarbon leakages from site machinery) and excess sediment from the excavations and soil works. Generally, the existing path which the proposed cycle route will follow is several metres (generally >10m) away from the river and swamp. The reed and large sedge swamp in Vesey Park is located on a lower level than the proposed route, thus increasing the potential for runoff into the swamp. These inputs could degrade the habitats and reduce water quality. Given that the swamp has standing water and very little movement of the water, any pollutants entering the habitat would stay there during a longer period than when entering a watercourse. However, potential runoff during heavy rainfall would run over vegetated grass strips for several meters, where it would infiltrate into the soil, before potentially entering the swamp and river, thus the amount of silt and pollutants entering the surface water system would be reduced.

Where bridges area to be replaced, there may be a direct impact on the sedges and swamps, however the bridges will be replaced without requirement to excavate a large area, It is expected there will be a small area of excavation to connect the new bridge to the top of the bank. Therefore it is expected there will be minimal direct impact to these habitats.

Therefore, in the absence of mitigation during the construction phase, negligible impacts on the reed and large sedge swamps which are of local importance, and temporary, minor impact on the Griffeen River (eroding/upland river; and depositing/lowland river habitats) of local and regional importance are anticipated.

5.2.2.2 Dry meadows and grassy verges; Wet grassland

This habitat occurs beside the existing pathway in the southern end and north-western end of the proposed route. There might be a slight reduction of the habitat due to widening of the path, however it is not anticipated to significantly impact on the habitat's distribution.

Therefore negligible impacts are anticipated on this habitat of local importance.

5.2.2.3 (Mixed) broadleaved woodland; Mixed broadleaved/conifer woodland; Riparian woodland; Wet willow-

ash-alder woodland

The woodlands that will be impacted by the proposed works include the mixed broadleaved woodland located on opposite sides, north and south, of Lucan Road. The new path going from Lucan Road to Sarsfield Park (North of Lucan Road) and between the Lucan Road and Esker hill (south of road) will require removal of trees for construction of the new path. Surrounding trees that are being retained could be damaged by machinery working in the area during construction or if works are conducted within the tree root protection zone. As invasive non-native species (Cherry Laurel and Cotoneaster) are present in the woodland, there is the risk of further spread of these species.

The proposed cycleway between the Lucan Road and Esker hill will also pass through the woodland between these two roads. In this circumstance, the trees will need to be removed, the land will need to be adjusted in order to account for a steep incline which will result in larger scale construction. This pathway will pass through a series of Cherry Laurel and Sycamore and presents the opportunity to remove these invasive species from the area, while the machinery and land excavation.

The loss of this woodland is approximated to be 0.3acres (north side of Lucan Road) and 0.2acres (south side of Lucan Road for a total loss of 0.5acres).

No impact is anticipated for Mixed broadleaved/conifer woodland; Riparian woodland; Wet willow-ash-alder woodland

While the loss of the trees will be permanent, it will have a minor impact as it is not considered to impact on the integrity of the habitat, with possible overall beneficial effects if the invasive species are correctly removed.

5.2.2.4 Hedgerow; Treeline; Scrub

The introduction of cycle route and widening of footpaths may require the removal of some trees along the roads, mainly at Beech Park where the treelines occur between the footpath and the road and there is restricted width space for widening the path. These treelines are composed of mixed tree species, some of which include important native species such as Oak, Hazel and provide important diverse corridors for birds and mammals. Therefore it is expected the loss of these trees will result in a long term minor impact to a locally important habitat.

Impacts to hedgerow and scrub habitat are not anticipated.

Therefore, in the absence of mitigation, long-term, minor impacts to the treeline habitat of local importance are anticipated.

5.2.3 Species

5.2.3.1 Mammals - Badger, Hedgehog, Pygmy Shrew

Potential impact on Badger, Hedgehog and Pygmy Shrew is through reduction of habitat (mixed broadleaved woodland), potential loss of life to individuals in the case of accidents within the construction site (e.g. accidental trappings) after failure to exclude entry, increased noise and human activity during construction and dust deposition leading to changes in structural, foraging and commuting habitat. Although this group of species are generally mobile, constructional impacts attributed to noise, vegetation removal and dust deposition must be considered. Dust can have direct impacts on insect and other invertebrate populations. Impacts on plant and invertebrate communities may result in effects further up the food chain (terrestrial mammals).

Given the temporary and small scale of the works, generation of dust is not anticipated to impact on this species group as it is not anticipated to impact on the foraging habitat.

Any losses of foraging habitat and noise disturbance could cause stress to this species group. Across the entire proposed route, there is very little reduction in habitat, removal of trees within the woodland north of Lucan Road being the main reduction of habitat. The impact will be negligible and is not anticipated to impact on the conservation status of the local populations.

Therefore it is not anticipated there will be an impact to Badger, Hedgehog and Pygmy Shrew.

5.2.3.2 Otter; Amphibians; Fish - European Eel, Lamprey, Atlantic Salmon

Potential impacts on these species would be through potential reduction in water quality caused by potential spill of pollutants or increased sediment load to Griffeen River and River Liffey further

downstream and the reed and large sedge swamps which are providing habitat for these species. This could have a negative effect on aquatic species such as amphibians, European Eel, Lamprey and Atlantic Salmon, including smothering of fish eggs and spawn of Common Frog and Smooth Newt. It could also have a negative effect on prey species of Otter, thus indirectly impacting on Otter. Generally, the existing path which the proposed cycle route will follow is several metres (generally >10m) away from the river, and the construction(replacement) of the bridges will be carried out so that the watercourse will not be directly interfered with.

However there is still potential for runoff of sediment and pollutants during heavy rainfall would run over vegetated grass strips for several meters before potentially entering the river, thus reducing the amount of silt and pollutants entering the surface water system.

Therefore, in the absence of mitigation during construction phase, temporary, minor impacts to species of regional and national importance (Otter; European Eel, Lamprey and Atlantic Salmon) are anticipated. Temporary, negligible impacts to amphibians, which are of local importance, are anticipated.

5.2.3.3 Bats

Roosting

The construction of the proposed cycle route is not anticipated to have an adverse impact on population numbers of the bat species identified as using the site, as there will be no reduction in potential roosting locations due to the proposed route. No tree with bat roost potential has been identified for removal in the broadleaf woodlands along the Lucan Road to the North. The only places where tree removal is required is in the woodland north of Lucan Road and potentially along Beech Park. The trees in these locations have negligible bat roost suitability.

Therefore, no impacts to bats roosting habitat are anticipated.

Commuting and foraging

Predicted impacts to bats will result from construction site lighting at night during the bat active season (April-October), which could illuminate commuting and foraging habitats and potential roosts, thus reducing the quality of these habitats. Noise effects associated with the works would be temporary during diurnal parts of the day and no nocturnal noise effects are anticipated.

Construction noise and lighting will be temporary during construction and impacts are anticipated to be negligible.

5.2.3.4 Breeding Birds

Potential impact on birds during construction is through habitat removal and noise disturbance. Removal of vegetation (scrub, trees) during the breeding season which is used by nesting birds could result in the loss of individuals, including young of the species. Given that birds are mobile species, and the majority of available habitat will be retained, long- term impact is not considered on breeding birds using the site.

The disturbance caused by noise and increased human presence is unlikely to cause stress to this group, given the temporary nature of the works.

Therefore, in the absence of mitigation, temporary minor impacts to this species group of regional importance are anticipated.

5.2.3.5 Invertebrates

Potential impacts on the bee species present in the area are set to be minor, with the main influence of the construction being the removal and expansion of the pathway and the renovation and addition of a bridge. These structures are unlikely to remove substantial amounts of pollinating flora**, and the overall impact of this project on invertebrates is negligible.**

5.2.3.6 Invasive non-native species

Invasive species (Cherry Laurel and Cotoneaster) occur in the woodland north of Lucan Road. It is proposed to construct the cycle path through this woodland and there is a risk of the works causing further spread of these species within the woodland. There is also potential for plant material or seeds

to get stuck on machinery and then be transferred to other sites when the machines move between sites.

While vegetation removal is not proposed along the treeline north of N4 in Vesey Park where Snowberry is present, there is a risk for disturbance of the ground given that the path will be widened. This could also increase the spread of Snowberry in the area and to other sites.

Biosecurity measures should be in place to avoid contamination and further spread of invasive non-native species.

5.3 Operational Phase

5.3.1 Designated Sites

5.3.1.1 Grand Canal pNHA; Liffey Valley pNHA

It is not anticipated that the operational phase will impact on Grand Canal pNHA and Liffey Valley pNHA. While the increase in hardstanding surfaces may result in an increase in surface water runoff, most of the water will infiltrate into the ground and any water entering the watercourses **will not significantly impact on the pNHAs.**

5.3.2 Habitats

5.3.2.1 Reed and large sedge swamp; Eroding/upland rivers;

While the increase in hardstanding surfaces may result in an increase in surface water runoff, most of the water will infiltrate into the ground and any water entering the waterbodies will not significantly impact on the habitats reed and large sedge swamps; eroding/upland rivers; and depositing/lowland rivers. **Impacts on these habitats during the operational phase are anticipated to be neutral.**

5.3.2.2 Dry meadows and grassy verges; wet grassland

No impacts to this habitat are anticipated during the operational phase.

5.3.2.3 (Mixed) broadleaved woodland; Mixed broadleaved/conifer woodland; Riparian woodland; Wet willow-alder-ash woodland

During the operational phase, the trees in the broadleaved woodland north of Lucan Road may require pruning to maintain the cycle path. This will only involve removal of branches and the impact is anticipated to be neutral and is not expected to degrade the habitat.

Impacts on these habitats during the operational phase are anticipated to be neutral.

5.3.2.4 Hedgerow; Treeline; Scrub

No impacts to this habitat are anticipated during the operational phase.

5.3.3 Species

5.3.3.1 Mammals - Badger, Hedgehog, Pygmy Shrew

Potential impacts on this species group during operation is through operational noise disturbance and human activity. However, it is not anticipated to significantly increase compared to current disturbances. Any disturbance would be intermittent during diurnal parts of the day and nocturnal noise effects are anticipated to be limited. Mammals habiting the area would be used to human presence and noise disturbance given the urban landscape.

Therefore a neutral impact to this species group is anticipated during the operational phase of the project.

5.3.3.2 Otter

Potential impacts to Otter during operation is through operational noise disturbance and human activity. However, it is not anticipated to significantly increase compared to current disturbances. Any disturbance would be intermittent during diurnal parts of the day and nocturnal noise effects are anticipated to be limited. Otter habiting the area would be used to human presence and noise disturbance given the urban landscape.

Therefore a neutral impact to this species group is anticipated during the operational phase of the project.

5.3.3.3 Bats

Roosting; and commuting and foraging

Existing public lighting is present along much of the route, however additional lighting is proposed along Section 4 and 5 from Griffeen Avenue to Esker Bridge to Lucan Newlands road, where no lighting is currently present. Bats are sensitive to lighting during the hours of darkness, and lighting onto habitats would reduce the quality of foraging, commuting and roosting habitat for bats in woodland and along treelines/scrub. It is important to maintain dark spaces and connectivity with the wider landscape, thus the development's lighting design and planting plan must compliment the current commuting routes (vegetated dark corridors). Where lighting is proposed within the vicinity of trees, bat sensitive lighting will be provided. Details of this is provided in the Mitigation Section 7.3.1

Therefore, in the absence of mitigation, medium-term minor impacts to this species of regional importance are anticipated.

5.3.3.4 Breeding Birds

Potential impact during operation on breeding birds is through operational noise disturbance and human activity. However, it is not anticipated to significantly increase compared to current disturbances.

Therefore a negligible impact to this species group is anticipated during the operational phase of the project.

5.3.3.5 Amphibians; Fish - European Eel, Lamprey, Atlantic Salmon

While the increase in hardstanding surfaces may result in an increase in surface water runoff, most of the water will infiltrate into the ground and any water entering the waterbodies will not significantly impact on the aquatic species, such as amphibians, European Eel, Lamprey and Atlantic Salmon. **Impacts to this species group during the operational phase are anticipated to be neutral.**

5.3.3.6 Invertebrates

The impact of the operational phase of this project is not anticipated to have any impact on the invertebrates of the area.

5.3.3.7 Invasive non-native species

It is not anticipated that the operation of the project will cause further spread of invasive non-native species. However, the project does present the opportunity to remove these from selected areas.

5.4 Summary

The following potential impacts have been identified below and in Table 5-1 below and possible mitigation is discussed in the next chapter:

- Pollution of the Grand Canal pNHA; Liffey Valley pNHA; eroding/upland river; depositing/lowland river; and reed and large sedge swamp and the ecological features that they host (i.e. Otter, amphibians, European Eel, Lamprey and Atlantic Salmon) during construction.
- Degradation of woodland habitat and disturbance/harm to species that may inhabit it (breeding birds) through physical damage and removal of vegetation during construction.
- Disturbance of commuting and foraging terrestrial mammals and bats, as well as potentially accidental fatal entrapment for terrestrial mammals during construction.
- Spread of invasive species during construction.
- Increased lighting causing disturbance to bats and reducing habitat quality during operation.

Table 5-1 Summary of impacts on Screened-in Ecological features

Ecological feature	Value	Construction Impacts	Operation Impacts
Grand Canal pNHA [002104]	National	**Yes- sediment and pollutant run off - short term impact**	Negligible impact
Liffey Valley pNHA [000128]	National	**Yes- sediment and pollutant run off - short term impact**	Negligible impact
Reed and large sedge swamps	Local (higher)	Negligible impact	Negligible impact
Eroding/upland rivers and Depositing lowland river - Griffeen River	Regional	**Yes- sediment and pollutant run off – short term impact**	Negligible impact
Dry meadows and grassy verges	Local (higher)	No impact	No impact
Wet grassland	Local (higher)	No impact	No impact
(Mixed) broadleaved woodland	Local (higher)	**Direct loss of habitat, spread of Invasive species**	Trimming /pruning during operation – neutral impact
Mixed broadleaved/conifer woodland	Local (higher)	No impact	Trimming /pruning during operation – neutral impact
Riparian woodland	Regional	No impact	No impact
Hedgerow	Local (higher)	No impact	No impact
Treeline	Local (higher)	**Direct loss of trees- long term minor impact**	No impact
Scrub	Local (higher)	No impact	No impact
Wet willow-ash-alder woodland	County	No impact	No impact
Mammals - Badger, Hedgehog, Pygmy Shrew	Local (higher)	Negligible impact	Negligible impact
Mammals - Otter	Regional	**Yes- sediment and pollutant run off – short term impact**	Neutral impact
Bats - roosting	Local (higher)	No impact	**Increased public lighting – medium-term minor impact**
Bats - commuting and foraging	Regional	**Temporary noise and lighting disturbance impact**	**Increased public lighting – medium-term minor impact**
Breeding Birds	Regional	**Construction during breeding bird season – temporary impact**	Negligible impact
Amphibians	Local (higher)	Negligible impact	Neutral impact
Fish - European Eel, Lamprey, Atlantic Salmon	National	**Yes- sediment and pollutant run off – short term impact**	Neutral impact
Invertebrates	Regional (higher)	Negligible impact	No impact

Ecological feature	Value	Construction Impacts	Operation Impacts
Invasive non-native species	Possible spread of species	**Possible spread during construction;** **Positive impact to remove some stands**	Negligible impact

6 Cumulative Impacts

Potential sources of cumulative impacts were identified based on the ecology of valued ecological features. Potential sources of cumulative impacts were sought within areas where there is the potential for a significant impact on a site or species. The following plans were identified as potential sources of cumulative impacts:

6.1 Plans

South Dublin County Council Development Plan 2016 - 2022

The proposed development is in line with the South Dublin County Development Plan 2016-2022. It is an objective of the Council to re-balance priorities towards sustainable modes of transportation by prioritising walking and cycling facilities.

- TM3 Objective 1: To create a comprehensive and legible County-wide network of cycling and walking routes that link communities to key destinations, amenities and leisure activities with reference to the policies and objectives contained in Chapter 9 (Heritage, Conservation and Landscape) particularly those that relate to Public Rights of Way and Permissive Access Routes.
- TM3 Objective 2: To ensure that connectivity for pedestrians and cyclists is maximised in new communities and improved within existing areas in order to maximise access to local shops, schools, public transport services and other amenities, while seeking to minimise opportunities for anti-social behaviour and respecting the wishes of local communities.
- TM3 Objective 3: To ensure that all streets and street networks are designed to prioritise the movement of pedestrians and cyclists within a safe and comfortable environment for a wide range of ages, abilities and journey types.
- TM3 Objective 4: To prioritise the upgrade of footpaths, public lighting & public realm maintenance and supporting signage on public roads/paths where a demonstrated need exists for busy routes used by runners & walkers.
- TM3 Objective 5: To provide that planning permissions granted for the development of all new schools or for existing schools where 25% or greater expansion in classrooms is proposed, should include a requirement for the provision of cycle paths from the school to join the nearest cycle network, where feasible.
- TM3 Objective 6: To ensure that all walking and cycling routes have regard to pertaining environmental conditions and sensitivities and incorporate appropriate avoidance and mitigation measures as part of any environmental assessments.

In addition, the extension of the existing cycleway in Griffeen Valley Park to Lucan is included as part of the Six Year Cycle Network Programme in the CDP.

The Plan also aims to protect and enhance surface water quality, to support, improve and protect Natura 2000 sites, and to develop an integrated Green Infrastructure network to enhance biodiversity, provide accessible parks, open spaces and recreational facilities (SDCC, 2016a). The plan also states that work will be in conjunction with Irish Water to protect existing water and drainage infrastructure, to promote investments aiming to support environmental protection and facilitate the sustainable growth of the county (SDCC, 2016a).

A Screening for Appropriate Assessment was carried out on the plan. This concluded that there are no likely significant direct, indirect or secondary impacts of the project on any Natura 2000 sites (SDCC, 2016b), therefore the South Dublin County Council (SDCC) Development Plan is not anticipated to contribute to cumulative or in-combination effects.

Greater Dublin Drainage Plan

The Greater Dublin Drainage Strategy sets out the strategic planning for the development of waste water treatment in the Greater Dublin area in relation to the Ringsend WWTP Upgrade, Greater Dublin Drainage Project and associated wastewater network drainage projects (Irish Water, 2018). The Ringsend WWTP Upgrade includes plans to expand the WWTP to its ultimate capacity, together with associated network upgrades required. The Greater Dublin Drainage Project is planned to relieve both the Ringsend WWTP and network loading by construction of a new WWTP at Clonshaugh, an orbital sewer and provision of an outfall pipe discharging 1km north east of Ireland's Eye.

The Ringsend WWTP upgrade is in progress and carried out in stages, the works for increased capacity of 400,000 PE are at an advanced stage with testing and commissioning stages expected to be completed in the second half of 2021. Further works for capacity of 2.1 million PE in the second half of 2023 and the ultimate capacity of 2.4 million PE to be in operation by 2025 (Irish Water, 2021).

The Greater Dublin Drainage Project is strategically important to the Dublin Region in that it will provide capacity for residential and commercial growth (Irish Water, 2018).

The Greater Dublin Drainage Strategy is not anticipated to contribute to cumulative or in-combination effects.

River Basin Management Plan for Ireland 2018-2021

The River Basin Management Plan (RBMP) for Ireland 2018-2021 sets out the actions that Ireland will take to improve water quality and achieve 'good' ecological status in water bodies (rivers, lakes, estuaries and coastal waters) by 2021 (DoHPLG, 2018a). Changes from previous River Basin Management Plans is that all River Basin Districts are merged as one national River Basin District. The Plan provides a more coordinated framework for improving the quality of our waters — to protect public health, the environment, water amenities and to sustain water-intensive industries, including agri-food and tourism, particularly in rural Ireland.

The first cycle of River Basin Management Plans included the Eastern River Basin District - River Basin Management Plan 2009 – 2015 (WFD, 2010). The plans summarised the waterbodies that may not meet the environmental objectives of the WFD by 2015 and identified which pressures are contributing to the environmental objectives not being achieved. The plans described the classification results and identified measures that can be introduced in order to safeguard waters and meet the environmental objectives of the WFD;

- Prevent deterioration of water body status.
- Restore good status to water bodies.
- Achieve protected areas objectives.
- Reduce chemical pollution of water bodies.
-

The RMBP for Ireland (2018-2021) outlines the new approach that Ireland will take to protect our waters over the period to 2021. It builds on lessons learned from the first planning cycle in a number of areas:

- stronger and more effective delivery structures have been put in place to build the foundations and momentum for long-term improvements to water quality
- a new governance structure, which brings the policy, technical and implementation actors together with public and representative organisations. This will ensure the effective and coordinated delivery of measures.

The River Basin Management Plan for Ireland 2018-2021 is not anticipated to contribute to cumulative or in-combination effects.

Ireland's third River Basin Management Plan 2022-2027 is due to be published in 2022. The 3rd cycle draft Catchment Reports were published in August 2021. The draft Catchment Reports provides a summary of the water quality assessment outcomes for respective catchment, including status and risk categories, significant threats and pressures, details on protected areas and a comparison cycle 2 and cycle 3. The draft Catchment Report for Liffey and Dublin Bay Catchment identifies an overall improvement of 5 waterbodies across the catchment since the cycle 2 assessment (Catchment Science & Management Unit 2021). The significant pressures of the River Liffey in the downstream section are urban runoff and urban wastewater, where the impacts are a combination of nutrient and organic pollution and Ringsend agglomeration. The transitional and coastal waterbodies meet the requirements for the habitats and species of the SACs, including the Dublin Bays SACs. Specific water supporting conditions have not been identified for the dependent bird species in the SPAs and so waterbodies associated with SPAs are not included in the assessment, though for Dublin Bay they overlap with the SACs.

Given the restorative nature of the River Basin Management Plan for Ireland 2022-2027, RBMP is not anticipated to contribute to cumulative or on-combination effects.

6.2 Other Projects

Since October 2019, the projects listed below (Table 6-1), which are not retention applications, home extensions and/or internal alterations, have been granted planning permission in the locality of the proposed site.

Table 6-1: Projects granted planning permission since 2019 in vicinity of proposed site.

Planning Application Reference	SDZ20A/0021
Development address	In the townlands of Adamstown, Grange, Kishoge, Clonburris Little & Cappagh, Co. Dublin
Description: 10 year permission for roads and drainage infrastructure works as approved under the Clonburris Strategic Development Zone Planning Scheme (2019) to form part of the public roads and drainage networks providing access and services for the future development of the southern half of the overall Strategic Development Zone (SDZ) lands; the roads infrastructure works are for the construction of c. 4.0km of a new road, known as Clonburris Southern Link Street, generally consisting of 7m wide single carriageway, plus on either side of the carriageway landscaped verges, 1.75m wide off-road cycle tracks and 2m wide footpath including public lighting, trees, 288 on-street car parking spaces (including 26 disabled parking spaces), pedestrian crossings, bus stops, a number of vehicular access spurs to facilitate future development of adjoining lands, a total of 8 new junctions (including 3 junctions to facilitate future road developments within the SDZ; 2 junctions with proposed local access roads and 3 new junctions with Hayden's Lane, Lynch's Lane and Ninth Lock Road); alterations to the existing public roads Newcastle Road (R120), Hayden's Lane Access Road, Hayden's Lane, Lynch's Lane, Grange Castle Road (R136), Fonthill Road (R113) and Ninth Lock Road arising from new junctions with the Clonburris Southern Link Street consisting of reconfiguration of a c.165m long section of Newcastle Road (R120) including road widening and revisions to layout of junction with Hayden's Lane Access Road; incorporation of Hayden's Lane Access Road into proposed Clonburris Southern Link Street; provision of new junction with Hayden's Lane and Clonburris Southern Link Street; incorporation of a c. 26m long section of Lynch's Lane into proposed Southern Link Street and provision of a new junction with Clonburris Southern Link Street; reconfiguration of a c. 260m long section of Grange Castle Road, including road widening and replacement of existing roundabout with signalised junction; reconfiguration of a c. 250m long section of Fonthill Road, including road widening and replacement of existing roundabout with signalised junction; reconfiguration of a c.125m long section on Ninth Lock Road including road widening and provision of a new junction with Clonburris Southern Link Street; construction of 2 local access roads, consisting of c. 110m long road extending north from Clonburris Southern Link Street and providing access to proposed foul pumping station and generally consisting of a 6m wide single carriageway plus on either side of the carriageway 2m wide footpath including public lighting , 2 set-down parking spaces and vehicular access to proposed foul water pumping station; north/south Link Street (c. 240m in length) extending north from southern Link Street to the Kildare-Cork railway line and generally consisting of a 7m wide single carriageway plus on either side of the carriageway 1.3m wide landscaped verge, 1.75m wide off-road cycle lane, 2m wide footpath including public lighting and 2 vehicular access spurs to facilitate future development of adjoining lands; the drainage infrastructure works include 8 attenuation systems (with outfalls to Griffeen River, Kilmahuddrick Stream and existing storm sewers) including 4 ponds , 2 modular underground storage systems and 2 detention basins combined with modular underground storage systems all adjacent to proposed Clonburris Southern Link Street; surface water drainage culverts to existing watercourses; flood water compensation area adjacent to Griffeen River; surface water drainage and water supply trunk infrastructure within proposed road corridors; wastewater infrastructure including a foul pumping station and pipe network within proposed road corridors to facilitate drainage connections to future wastewater drainage infrastructure within the adjoining SDZ lands (including future Irish Water pumping station) and to connect to the existing sewer network in Cappaghmore housing estate; ducting for public electrical services and utilities and the diversion of existing utilities is provided for within the proposed road corridor.	
Final Decision on Application	Grant permission
Decision Date	12-Aug-2021

6.3 Summary of Cumulative Impacts

Only one planning application in the vicinity was identified to potentially act in-combination with the proposed project.

Application SDZ20A/0021 involves roads and drainage infrastructure works as approved under the Clonburris Strategic Development Zone Planning Scheme for the future development of the southern half of the overall Strategic Development Zone lands. The Biodiversity Chapter of the EIAR identified a number of potential impacts, including reduction of water quality in Griffeen River, loss of habitat, spread of invasive species, bird mortality, and disturbance/displacement. However, with the mitigation measures proposed, no significant residual impacts are identified, either from the project alone or in combination with other projects.

Therefore, significant cumulative impacts are not expected to occur on the ecological features within the proposed site.

7 Mitigation

The following mitigation is recommended to ensure that the proposed project does not adversely impact on the ecological receptors outlined in Section 5.

7.1 Construction Phase

7.1.1 Construction impacts to water quality

The water column may be temporarily impacted by potential pollutants and increased sediment during works carried out near waterbodies, including the Griffeen River, Grand Canal. With no mitigation it is expected to have short-term (temporary) impacts on:

- Grand Canal pNHA
- Liffey Valley pNHA
- Eroding/upland rivers and Depositing lowland river - Griffeen River
- Otters
- Fish incl. European Eel, Lamprey, Salmon.

The following pollution and sediment controls shall be implemented when carrying out works near the waterbodies.

7.1.1.1 Sediment Control Measures

Appropriate mitigation measures should be implemented prior and during the construction phase to ensure that the water quality is not adversely affected through pollution incidents and the release of contaminants from the site. The measures outlined below should be included in a Construction Environmental Management Plan (CEMP) for the proposed development.

Relevant legislation and best practice guidance that have been considered include, but are not limited to the following:

- C532 Control of water pollution from construction sites. Guidance for consultants and contractors (www.ciria.org);
- C515 Groundwater control – design and practice, 2nd ed. (www.ciria.org);
- Inland Fisheries Ireland 2016 'Guidance on Protection of Fisheries During Construction Works In and Adjacent to Waters';
- IFI 2020. Planning for watercourses in the Urban Environment. A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning. (IFIUrbanWatercoursesPlanningGuide (fisheriesireland.ie))
- NRA 2008 ' Guidelines for the crossing of watercourses during the construction of national road schemes'.

The above best practice mitigations will alleviate the risk associated with accidental spills and runoff events. In particular silt runoff will be prevented by incorporating the following actions:

- A silt fence shall be installed between the works and the banks of the watercourse, where works are taking place closer than 15m of a waterbody to prevent runoff from entering. This should be installed prior to any works commencing. The silt fencing should be removed only when bare soil is re-vegetated and sediment movement is no longer a risk.
- The silt fence will be a permeable geotextile barrier installed vertically on support posts and entrenched in the ground.
- A 10m buffer zone of vegetation will remain undisturbed between the works and the waterbody;
- Run-off from the working site or any areas of exposed soil should be channelled and intercepted for discharge to silt-traps with over-flows directed to land to prevent any flow of surface water to the waterbody;
- Silt-traps should be maintained and cleaned regularly during the course of site works;

- All excavations close to a waterbody should be carried out in the dry and there will be no working near any waterbody during heavy or sustained period of rain
- All soil stockpiles shall be located >10m away from any waterbody. All stockpiles shall be covered to minimise the risk of rain / wind erosion;

General measures

- No excavation shall take place below the water-table on the site;
- Any stockpiling of topsoil must be considered and planned such that risk of pollution from these activities is minimised. Drainage from the topsoil storage area should not enter the waterbodies;
- The compound shall be located within the site boundary and will be sited as far from any waterbody (>50m) as possible in order to minimise potential impacts;
- Drainage collection system for washing area to prevent run-off into surface water system;
- There must be no discharge to, including any suspended solids or other deleterious matter, to any waterbody;
- All site runoff will be controlled and if necessary diverted to a sediment tank and the contents will be removed off site by a licenced waste contractor;
- Daily checks will be carried out and records kept on a weekly basis and any items that have been repaired/replaced/rejected noted and recorded. Any items of plant machinery found to be defective should be removed from site immediately or positioned in a place of safety until such time that it can be removed.

7.1.1.2 Pollution Control and Spill Prevention

Spill kits containing absorbent pads, granules and booms will be stored in the site compound with easy access for delivery to site in the case of an emergency. A minimum stock of spill kits will be maintained at all times and site vehicles will carry large spill kits at all times. Absorbent material will be used with pumps and generators at all times and used material disposed of in accordance with the Waste Management Plan. All used spill materials e.g. absorbent pads will be placed in a bunded container in the contractor's compound. The material will be disposed of by a licenced waste contractor at a licenced facility. Records will be maintained by the environmental site manager.

Regular inspections and maintenance of plant and machinery checking for leaks, damage or vandalism will be made on all plant and equipment.

In the event of a spill the Contractor will ensure that the following procedures are in place:

- Emergency response awareness training for all Project personnel on-site works.
- Appropriate and sufficient spill control materials will be installed at strategic locations within the site. Spills kits for immediate use will be kept in the cab of mobile equipment.
- Oil booms and oil soakage pads should be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge. The correct disposal of these booms and pads will be demonstrated during the toolbox talks. Records will be maintained by the environmental manager of the used booms and pads taken off site for disposal.
- Spill kits will be stored in the site compound with easy access for delivery to site in the case of an emergency. A minimum stock of spill kits will be maintained at all times and site vehicles will carry spill kits at all times. Spill kits must include suitable spill control materials to deal with the type of spillage that may occur and where it may occur. Typical contents of an on-site spill kit will include the following as a minimum;
    - Absorbent granules;
    - Absorbent mats/cushions;
    - Absorbent booms.
- Spill kits will contain gloves to handle contaminated materials and sealable disposal sacks.
- Track mats, drain covers and geotextile material.
- Any pollutant chemicals, fuels of any kind, concrete additives etc. used on site will be stored in labelled waterproof and secured protective containers to mitigate the risk of pollution of the watercourses.

- To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents etc, used during construction will be stored in temporary bunded area within the construction compound, however they will not be stored on site overnight.
- Oil and fuel storage tanks shall be stored in designated areas, and these areas will, as a minimum, be bunded to a volume not less than the following;
    - 110% of the capacity of the largest tank or drum within the bunded area (plus an allowance of 30 mm for rainwater ingress); or
    - 25% of the total volume of substances which could be stored within the bunded area.
- The site compound fuel storage areas and cleaning areas will be rendered impervious and will be constructed to ensure no discharges will cause pollution to surface or ground waters.
- Re-fuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area which will be away from any existing surface water drains which could also provide pathways to the underlying geology.
- Mobile plant will refuel over a drip tray with an absorbent mat.
- The contractor will ensure that no hazardous or noxious materials enters a watercourse/drain. Should this situation arise emergency procedures will be activated.
- Potentially contaminated run off from plant and machinery maintenance areas will be managed within the site compound surface water collection system.
- Damaged or leaking containers will be removed from use and replaced immediately.
- During all works the weather forecast will be monitored and a contingency plan developed to prevent damage or pollution during extreme weather. Machinery and equipment will not be left on-site during such events and will be removed beforehand.

7.1.2 Loss of Broadleaf woodland on Lucan road

It is estimated there will be a loss of woodland of 0.5 acres to the north and south of Lucan Road where the footpath will be extended/widened into the woodland area. As part of the landscape design, additional tree planting will be carried out along the greenway, including at the location in question. This should follow planting advice to plant native species and species beneficial for pollinators (in an urban context) outlined in Section 7.1.2.1 Tree Planting below.

Trees that are not being removed for this extension should be protected so that the damage is minimised to the other trees located in this woodland. During removal of vegetation and construction works, trees to be retained will be protected to avoid damage.

The following recommendations are from 'Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes' (NRA, 2006).

- A protective fencing will be erected prior to any excavation and construction activities start.
- Any excavation carried out within the Root Protection Area should be undertaken with extreme care, avoiding damage to the protective bark covering larger roots.
- Once any remedial works are complete and all plant equipment has evacuated the site, protective barriers can be removed.

7.1.2.1 Tree planting

If new trees are planted along the proposed cycle route, the selection of tree species should consider their value for wildlife and it is recommended that native tree species are chosen. Listed below are examples of species and their biodiversity benefits:

- Silver Birch *Betula pendula* - provides food and habitat for a wide range of insect species, including caterpillars of many moths. The seeds are eaten by Siskins *Carduelis spinus,* Greenfinches *Carduelis chloris* and Redpolls *Carduelis flammea cabaret*.
- Bird Cherry *Prunus padus* - Flowers support numerous pollinator species, while the fruits are often consumed by Badger, other small mammals and bird species.
- Lime *Tilia cordata* - Supports diverse insect life, including pollinator species like bees and moths, suppling local birds and bats with prey.

- Field maple *Acer campestre* - It is attractive to many species of ladybird, hoverfly and birds. Lots of species of moths feed on its leaves. The flowers provide nectar and pollen sources for bees and birds, and small mammals eat the fruits.
- Sessile Oak *Quercus petraea* - Supports diverse insect life, suppling local birds and bats with prey. Additionally, the acorns are consumed by Badger.
- Guelder Rose *Viburnum opulus* - The red berries are an important food source for birds and the shrub canopy provides shelter for a wide range of wildlife. The flowers are especially attractive to hoverflies.
- Hazel *Corylus avellana* - Provides food for the caterpillars of moths, suppling local birds and bats with prey. Additionally, hazelnuts are eaten by a wide range of mammals and birds.

Further information on native trees and shrubs and their conditions of planting can be found in 'Buds of the Banner' (information applicable for all of Ireland):

https://www.clarecoco.ie/services/environment/publications/buds-of-the-banner-a-guide-to-growing-native-trees-and-shrubs-in-clare-10116.pdf

7.1.3 Degradation of woodland and treeline habitat and parkland trees

There are many treelines and parkland trees close to the proposed cycleway that may be inadvertently damaged during construction. During removal of vegetation and construction works, trees to be retained will be protected to avoid damage. The following recommendations are from 'Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes' (NRA, 2006).

- A protective fencing will be erected prior to any excavation and construction activities start.
- Any excavation carried out within the Root Protection Area will be undertaken with extreme care, avoiding damage to the protective bark covering larger roots.
- Once any remedial works are complete and all plant equipment has evacuated the site, protective barriers can be removed.

7.1.4 Mitigation for breeding birds

Removal of trees will be conducted outside of the bird nesting season (March to September inclusive). If this is not possible, a breeding bird survey will be undertaken in advance of the works to ensure that there will be no impacts on nesting birds. The survey will be carried out by an appropriately qualified ecologist, i.e. able to identify bird species and experience in undertaking breeding bird surveys. If nests are found, they will be safeguarded, with an appropriate buffer, until the chicks have successfully fledged.

7.1.5 Disturbance/harm to species (mammals, bats)

Although it has been identified that there will be no permanent impact through disturbance to wildlife during the work, it is advised that general avoidance measures be undertaken to protect wildlife while the works are being carried out.

General avoidance measures that should be incorporated by the contractors working on site include:

- Limit the hours of working to daylight hours, to limit disturbance to nocturnal and crepuscular animals;
- Due to the potential presence of Badger; Hedgehog; Pygmy Shrew; and bat species, the use of lighting at night should be avoided. If the use of lighting is essential, then a directional cowl should be fitted to all lights to prevent light spill and to be directed away from woodland / treelines / hedgerows;
- Contractors must ensure that no harm comes to wildlife by maintaining the site efficiently and clearing away materials which are not in use, such as wire or bags in which animals can become entangled; and
- Any pipes should be capped when not in use (especially at night) to prevent animals becoming trapped. Any excavations should be covered overnight to prevent animals from falling and getting trapped. If that is not possible, a strategically placed plank should be placed to allow animals to escape.

7.1.6 Invasive species management and biosecurity

Given that Cherry Laurel and Cotoneaster are present in the woodland north of Lucan Road, and Snowberry is present along the footpath in Vesey Park, there is a risk of further spread of these species within the site when construction works are carried out.

Management of Cherry Laurel and Cotoneaster

A combination of physical and chemical treatment should be carried out on Cherry Laurel and Cotoneaster. Stems shall be cut and removed by hand or chainsaw, cutting as close to the ground as possible. Young plants of Cotoneaster can be hand pulled. Thereafter, the freshly cut stumps shall immediately be painted with a herbicide (glyphosate, tryclopyr or ammonium sulphate). Vegetable dye should be painted on all stumps. It is not recommended to use herbicidal spray in the woodland as the herbicide is non-selective and may affect other vegetation as well. It is preferable if the understorey of the woodland can be replanted with appropriate native plants when the Cherry Laurel and Cotoneaster has been eradicated to minimise regrowth of non-native species. Follow-up seedling removal work should be carried out. All cut material shall be chipped or removed from the area to prevent regrowth.

7.2 Operational Phase

7.2.1 Lighting Disturbance to Bats

Existing lighting is likely to already impact on bats commuting and foraging opportunities in the area. Any new lighting should be carefully designed to minimise impact on bat species using the site. The lighting design should incorporate the following mitigation measures.

Hours of illumination:

Site lighting should be switched off or at lower light output during inactive site hours; this would benefit the bats commuting and/or foraging in the locality. Additionally, lighting should be controlled by occupancy / motion sensors so that it will remain off / low if there is no pedestrian traffic nearby, where possible.

Light levels and type:

Site lighting that meets the lowest light levels permitted under health and safety would be preferable for bats in the vicinity. The specification and colour of light treatments, such as single bandwidth lights and no UV light are essential. LED luminaires should be used where possible due to their sharp cut-off, lower intensity, and dimming capability. A warm white spectrum (2700K – 3000K or peak wavelengths higher than 550nm) should be used to reduce the blue light component.

Column heights of lamp posts:

As bats most likely forage in the unlit areas surrounding the site, the introduction of new lighting with accompanying light spillage, could result in the bats becoming averse to commuting and foraging within the proposed site and potentially the adjacent habitats also. In order to reduce the amount of light spillage where it is not needed, the height of new lamp columns should be restricted. A height of 6m or less is necessary to avert lighting impacts. Where necessary, lighting should be cowled/shielded to prevent upward and backward light impacting on bats using the site. There should be no up lighting directed towards trees.

8 Residual Impact

Residual ecological impacts are those that remain once the development proposals and mitigation have been implemented. The main aim of ecological mitigation, compensation, and enhancement is to minimise or eliminate residual impacts.

8.1 Do Nothing Scenario

Under the current use of the site there is a neutral effect on the general ecology of the area. If the proposed works were not to go ahead, it is likely that the current regime of management of the land will continue as currently with no residual impacts.

8.2 Construction Phase

The proposed project will result in a permanent reduction/ loss of approximately 0.5acres of woodland habitat north and south of Lucan Road and the potential removal of individual trees. This is not anticipated to have a significant effect on habitat integrity. Removal of vegetation during bird nesting season could cause harm to breeding birds. Working machinery could cause physical damage to roots and stems of trees. It is also likely that the works will cause disturbance to mammals. There is potential for temporary pollution and sediment runoff to the waterbodies in the area during construction activities which could degrade the water quality and impact on aquatic species, such as amphibians, European Eel, Lamprey and Atlantic Salmon, potentially using the habitat.

Mitigation measures to be implemented include sediment and pollution controls, protection of retained vegetation and general avoidance measures incorporating good site management and construction practices to minimise harm and disturbance to species. Vegetation will be removed outside of the bird nesting season and if this is not possible, the site should be surveyed for breeding birds by a suitably qualified ecologist and any nests found will be safeguarded until chicks have successfully fledged.

The mitigation in place will minimise any significant and/or permanent impact on the environment. There will be a residual impact of loss of approximately 0.5acres of woodland to the north of the proposed route (along Lucan Road) resulting in a permanent loss of this locally important woodland. This will be slightly offset by the additional planting proposed along the route, particularly in Griffeen Valley Park as part of the landscape plan.

No other residual impacts are anticipated from the construction phase.

8.3 Operational Phase

The operation of the site will be similar to the current use, with likely increase in cyclists along the route. New lighting of the site has the potential to negatively impact on potential bat roosts and bats foraging and commuting in the area by lighting of retained vegetation and reducing the quality of the habitat for bats.

Mitigation measures for the lighting design will ensure that additional lighting impacting on surrounding natural habitats is minimised and any disturbance to bats. The operational phase is not anticipated to have any significant residual impact.

8.4 Summary Table

Table 8-1 (construction phase) and Table 8-2 (operation phase) below presents a summary of the EcIA assessment describing the ecological features, the potential impacts of the works on these ecological features, their value according to European environmental law, the severity of the impact and mitigation measures which are to be implemented to avoid these impacts. Residual impacts following the implementation of mitigation measures are also provided.

Table 8-1: Summary table of impact assessment, mitigation measures and residual impact during construction phase.

Ecological Features	Importance of Feature	Potential Impact	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
Construction Impacts					
Designated Sites					
Grand Canal pNHA	National	Temporary decrease in water quality from sediment and/or pollution incidents	Minor	Follow measures outlined in Section 7.1.1, including silt and pollution prevention measures.	No significant residual impact
Liffey Valley pNHA	National		Minor		No significant residual impact
Habitats					
Reed and large sedge swamp; Depositing / lowland rivers Eroding/upland rivers	Local (higher) Regional	Temporary decrease in water quality from sediment and/or pollution incidents	Negligible Minor	Follow measures outlined in Section 7.1.1, including silt and pollution prevention measures.	No significant residual impact
Dry meadows and grassy verges/ Wet grassland	Local (higher)	No Impact	Negligible	-	No significant residual impact
(Mixed) broadleaved woodland, Mixed broadleaf/conifer woodland, Riparian woodland	Local (higher)	Reduction of habitat Degradation of habitat due to physical disturbance Spread of invasive species	Minor	Follow measures outlined in section 7.2.2.& 7.1.3, including protective fencing of retained trees and if excavations are necessary within the tree root protection zone they should be undertaken with extreme care. Follow measures outlined in Section 7.1.6, including management of invasive species.	Permanent loss approx. 0.5 acres locally important woodland. Proposed additional planting along the route will offset this loss.
Mixed broadleaved woodland, Mixed broadleaf/conifer woodland, Riparian woodland	Regional	None anticipated	Neutral	-	No significant residual impact

Ecological Features	Importance of Feature	Potential Impact	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
Hedgerows; Treeline; Scrub	Local (higher)	Potential removal of single trees	Minor	Follow measures outlined in section 7.1.3, including protective fencing of retained trees and if excavations are necessary within the tree root protection zone they should be undertaken with extreme care.	No significant residual impact
Species					
Mammals - Badger, Hedgehog, Pygmy Shrew	Local (higher)	Minimal disturbance to species, negligible impact	Negligible	Follow measures outlined in Section 7.1.5, including limit work to daylight hours, any necessary lighting directed away from vegetation and ensuring pipes are capped and excavations covered during night to avoid mammals becoming entrapped.	No significant residual impact
Otter	Regional	Temporary decrease in water quality from sediment and/or pollution incidents	Minor	Follow measures outlined in Section 7.1.1, including silt and pollution prevention measures.	No significant residual impact
Amphibians	Local (higher)		Negligible		No significant residual impact
Fish – European Eel, Lamprey, Atlantic Salmon	National		Minor		No significant residual impact
Bats -roosting	Local (higher)	None anticipated	Neutral	-	No significant residual impact
Bats – commuting and foraging	Regional	Disturbance to foraging and commuting activities within the vicinity of the site	Negligible	Follow measures outlined in Section 7.1.5, including limit work to daylight hours, any necessary lighting directed away from vegetation	No significant residual impact
Breeding birds	Regional	Noise and human activity disturbance Harm to individuals if trees are removed during nesting season	Minor	Follow measures outlined in Section 7.1.2. Trees should be removed outside of the bird nesting season (March to September inclusive). If this is not possible, a breeding bird survey will be undertaken in advance of the works to ensure that there will be no impacts on nesting birds.	No significant residual impact

Table 8-2: Summary table of impact assessment, mitigation measures and residual impact during operation phase.

Ecological Features	Importance of Feature	Potential Impact	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
Operational Impacts					
Designated Sites					
Grand Canal pNHA	National	None anticipated	Neutral	-	No significant residual impact
Liffey Valley pNHA	National		Neutral		No significant residual impact
Habitats					
Reed and large sedge swamp; Depositing / lowland rivers Eroding/upland rivers	Local (higher) Regional	None anticipated	Neutral	-	No significant residual impact
Dry meadows and grassy verges	Local (higher)	None anticipated	Neutral	-	No significant residual impact
Mixed broadleaved woodland, Mixed broadleaf/conifer woodland, riparian woodland;	Regional	Lighting of habitat impacting on foraging and commuting habitat for bats	Minor	Adhere to mitigation measures outlined in Section 7.1.5, these include lighting design to minimise impacts on bats.	No significant residual impact
Hedgerows; Treeline; Scrub	Local (higher)	Lighting of habitat impacting on foraging and commuting habitat for bats	Minor		No significant residual impact
Species					
Mammals - Badger, Hedgehog, Pygmy Shrew	Local (higher)	Disturbance to commuting and foraging activities in the vicinity of the site	Neutral	-	No significant residual impact
Otter	Regional		Neutral	-	No significant residual impact

Ecological Features	Importance of Feature	Potential Impact	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
Amphibians	Local (higher)	None anticipated	Neutral	-	No significant residual impact
Fish – European Eel, Lamprey, Atlantic Salmon	National	None anticipated	Neutral	-	No significant residual impact
Bats -roosting, commuting and foraging	Local (higher)/Regional	Lighting disturbance to commuting and foraging activities within the site	Minor	Adhere to mitigation measures outlined in Section 7.1.5, these include lighting design to minimise impacts on bats.	No significant residual impact
Breeding birds	Regional	Disturbance to commuting and foraging activities in the vicinity of the site	Negligible	-	No significant residual impact

9 Conclusion

The construction of this proposed development has been shown to potentially impact a number of different habitats with regional (eroding/upland rivers), mixed broadleaved woodland, Mixed broadleaf/conifer woodland and Riparian woodland; and local importance (reed and large sedge swamps, depositing/lowland rivers, dry meadows and grassy verges, treeline, hedgerow, scrub) and faunal groups (Badger; Hedgehog; Pygmy Shrew; Otter; bats; breeding birds; amphibians; European Eel, Lamprey and Atlantic Salmon) that have ecological importance ranging from local to national. Potential impacts were also identified for Grand Canal pNHA and Liffey Valley pNHA which are of national importance.

Based upon the information supplied and provided that the development is constructed in accordance with the mitigation measures outlined above, there will be no significant impact alone or cumulatively with other projects and plans, except loss of locally important woodland, as result of the development and associated works on the ecology of the area and on any designated conservation sites.

Appendices

A Relevant Policy and Legislation

The legislation discussed below is intended as a guide only and does not replace formal legal advice.

A.1 Biodiversity Policy Guidance

'Biodiversity: The National Biodiversity Action Plan 2017-2021 (DCHG, 2017) sets out actions through which a range of government, civil and private sectors will undertake to achieve Ireland's 'Vision for Biodiversity' and has been developed in response to The Earth Summit, held in Rio de Janeiro in 1992 (UN Convention on Biological Diversity) and subsequent EU and International Biodiversity strategies and policies.

As part of the Action Plan process Local Authorities (LA) must produce Biodiversity Action Plans (BAP). BAPs highlight local biodiversity issues and set out a series of objectives and action plans for the conservation of priority species and habitats where they occur in each district or county.

A.2 Designated Sites and Nature Conservation

A.2.1 Statutory Designated Nature Conservation Sites

Sites with statutory designations receive varying degrees of legal protection under Irish statute (i.e. Wildlife Act 1976 and Wildlife (Amendment) Act (2000) and European Directives (i.e. the EC Birds Directive (2009/147/EC) and EC Habitats Directive (92/43/EC). The EU directives were transposed into Irish national law and subsequent amendments were revised and consolidated in the European Communities (Birds and Natural Habitats) Regulations 2011 and Irish Statutory Instrument 477/2011

There are a number of statutory designations used for sites of high nature conservation value in Ireland, which are applied depending upon the importance of the site in a local, regional, national or international context. These include:

- National
- Natural Heritage Area (NHA)
- Wildfowl Sanctuary
- Statutory Nature Reserve
- Refuge for Fauna
- European
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- International
- UNESCO Biosphere Reserve
- Ramsar Convention Site
- National Park (Category II) Sites

A.2.2 Non-Statutory Designations

Non-statutory sites are afforded no statutory legal protection, but are normally recognised by local planning authorities and statutory agencies as being of local nature conservation value

A proposed Natural Heritage Area (pNHA) is an area deemed to be of special interest containing important wildlife habitat and often containing rare or threatened species. They may also be selected on the basis of their geology or geomorphology.

A.2.3 Protected and Notable Species

A number of species are protected under Irish and international legislation. In Ireland, primary protection is provided under the 1976 Wildlife Act and Wildlife (Amendment) Acts (2000 & 2010) and revision 2018. Species of European importance receive additional protection in Ireland under the Birds and Natural habitats Regulations 2011.

The Flora (Protection) Order (2015) makes it illegal to cut, uproot or damage a listed species in any way. It is illegal to alter, damage or interfere in any way with their habitats.

A.2.4 Birds

Almost all resident wild birds are protected under the 1976 Wildlife Act (and amendments) This makes it an offence to:

- intentionally take, damage or destroy the nest of any wild bird whilst it is in use or being built
- take, destroy or possess the egg of any wild bird.

A.2.5 Badger

Badgers are protected under the 1976 Wildlife Act (and amendments) and it is illegal to intentionally kill, capture, injure or ill-treat any Badger. It is also an offence to obstruct, destroy or damage a Badger sett or disturb Badgers within a sett. Disturbance is defined, for development purposes, as any activity that could damage a sett or be greater than what Badgers commonly tolerate.

A.2.6 Bats

All Irish bat species are European Protected Species (EPS), protected under the Wildlife Act (and amendments) and the Conservation of Habitat and Species Regulations 2017 (as amended). This makes it an offence to:

- deliberately capture, injure or kill a bat
- intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats
- damage or destroy a bat roosting place (even if bats are not occupying the roost at the time)
- intentionally or recklessly obstruct access to a bat roost.

A.2.7 Otter

The European Otter is an EPS protected under the Conservation of Habitats and Species Regulations 2017 (as amended), making it an offence to:

- deliberately capture, injure or kill an Otter
- deliberately disturb an Otter such as to affect local populations or breeding success
- damage or destroy an Otter holt, possess or transport an Otter or any part of an Otter
- sell or exchange an Otter.
- Otters also receive protection under the Wildlife Act (and amendments), this makes it an offence to:
- intentionally or recklessly disturb any Otter whilst within a holt
- intentionally or recklessly obstruct access to a holt.

A.2.8 Reptiles and Amphibians

Common Frog Rana temporaria, Natterjack Toad, *Bufo calamita*, Smooth Newt *Triturus vulgaris* and Common Lizard *Zootoca vivipara* are all protected under the Wildlife Act 1976 (and amendments).

A.2.9 Invasive Non-native Species

Certain invasive non-native animals and plants are listed under the Third Schedule of S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011. This makes it an offence to release, plant them in the wild or cause them to disperse, spread or otherwise cause them to grow. If these species occur on a site proposed for development or other work which may disturb the ground, control of these species is likely to be required.

European Council's Regulation on the prevention and management of the introduction and spread of invasive alien species [1143/2014] sets out to prevent, minimise and mitigate the adverse impacts of the introduction and spread, both intentional and unintentional, of invasive alien species on biodiversity and the related ecosystem services as well as on human health and the economy

B NBDC Records

B.1 Recent records (within 10 years) of protected species within the 2km squares (O03G, O03H, O03L, O03M) of the site (National Biodiversity Data Centre, 2021)

Species name	Date of last record	Title of dataset	Designation
Barn Owl (*Tyto alba*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Barn Swallow (*Hirundo rustica*)	16/09/2017	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Black-headed Gull (*Larus ridibundus*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Common Coot (*Fulica atra*)	13/01/2018	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Kestrel (*Falco tinnunculus*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Kingfisher (*Alcedo atthis*)	31/03/2014	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Linnet (*Carduelis cannabina*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Pheasant (*Phasianus colchicus*)	27/06/2014	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Common Pochard (*Aythya ferina*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Redshank (*Tringa totanus*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Common Starling (*Sturnus*	16/09/2017	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species:

vulgaris)			Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Swift (*Apus apus*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Wood Pigeon (*Columba palumbus*)	28/03/2013	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Great Cormorant (*Phalacrocorax carbo*)	16/10/2012	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Herring Gull (*Larus argentatus*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
House Martin (*Delichon urbicum*)	08/06/2018	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
House Sparrow (*Passer domesticus*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Little Egret (*Egretta garzetta*)	12/10/2017	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
Little Grebe (*Tachybaptus ruficollis*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mallard (*Anas platyrhynchos*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Mew Gull (*Larus canus*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mute Swan (*Cygnus olor*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Northern Lapwing (*Vanellus vanellus*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Peregrine Falcon (*Falco peregrinus*)	16/09/2017	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
Tufted Duck (*Aythya fuligula*)	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of

			Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Green Figwort (*Scrophularia umbrosa*)	10/07/2020	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Threatened Species: Endangered
Hairy St John's-wort (*Hypericum hirsutum*)	11/06/2020	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Threatened Species: Endangered
Lamiastrum galeobdolon subsp. *montanum*	08/04/2019	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Threatened Species: Vulnerable
Large Red Tailed Bumble Bee (Bombus (*Melanobombus) lapidarius*)	27/04/2013	Bees of Ireland	Threatened Species: Near threatened
Moss Carder-bee (Bombus (*Thoracombus) muscorum*)	10/06/2012	Bees of Ireland	Threatened Species: Near threatened
Brown Long-eared Bat (*Plecotus auritus*)	28/04/2011	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Daubenton's Bat (*Myotis daubentonii*)	26/08/2014	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Eurasian Badger (*Meles meles*)	17/02/2013	Road Kill Survey	Protected Species: Wildlife Acts
Eurasian Pygmy Shrew (*Sorex minutus*)	14/08/2012	Atlas of Mammals in Ireland 2010-2015	Protected Species: Wildlife Acts
Leisler's Bat (*Nyctalus leisleri*)	28/04/2011	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Pine Martin (*Martes martes*)	23/06/2020	Mammals of Ireland 2016-2025	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	28/04/2011	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
West European Hedgehog (*Erinaceus europaeus*)	28/12/2020	Hedgehogs of Ireland	Protected Species: Wildlife Acts

B.2 Recent records (within 10 years) of invasive non-native species within the 2km squares (O12D, O12E, O02Y, O02Z) of the site (National Biodiversity Data Centre, 2021)

Species name	Date of last record	Title of dataset	Designation
Black Currant (*Ribes nigrum*)	16/09/2017	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Cherry Laurel (*Prunus laurocerasus*)	14/01/2019	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species
Giant Hogweed (*Heracleum mantegazzianum*)	11/06/2020	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Himalayan Balsam (*Impatiens glandulifera*)	20/07/2019	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Sycamore (*Acer pseudoplatanus*)	12/05/2018	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Jenkins' Spire Snail (*Potamopyrgus antipodarum*)	26/03/2003	All Ireland Non-Marine Molluscan Database	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
American Mink (*Mustela vison*)	02/08/2018	Mammals of Ireland 2016-2025	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Brown Rat (*Rattus norvegicus*)	14/08/2012	Atlas of Mammals in Ireland 2010-2015	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Eastern Grey Squirrel (*Sciurus carolinensis*)	05/09/2018	Mammals of Ireland 2016-2025	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> EU Regulation No. 1143/2014 || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
European Rabbit (*Oryctolagus cuniculus*)	06/02/2014	Atlas of Mammals in Ireland 2010-2015	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species

C Bat Report

Baseline Bat Monitoring Report

Lucan, County Dublin

Doherty Environmental Consultants Ltd.

July 2022

Baseline Bat Monitoring Report

Lucan, Co. Dublin

Document Stage	Document Version	Prepared by
Final	1	Pat Doherty MSc, MCIEEM

Table of Contents

1.0 INTRODUCTION

Doherty Environmental Consultants (DEC) Ltd. has been commissioned by DBH on behalf of South Dublin County Council to undertake baseline bat monitoring at three locations along the proposed Griffeen greenway at Lucan Co. Dublin. The location of the three survey point that were subject to bat monitoring are shown on Figure 1.1.

1.1 PURPOSE OF BAT MONITORING

It is understood that the purpose of the bat monitoring completed at the three points shown on Figure 1.1 is to inform an assessment of the potential impact of the proposed Griffeen greenway to bat populations occurring along the greenway.

2.0 DESCRIPTION OF MONITORING LOCATIONS

2.1 MONITORING POINT 1

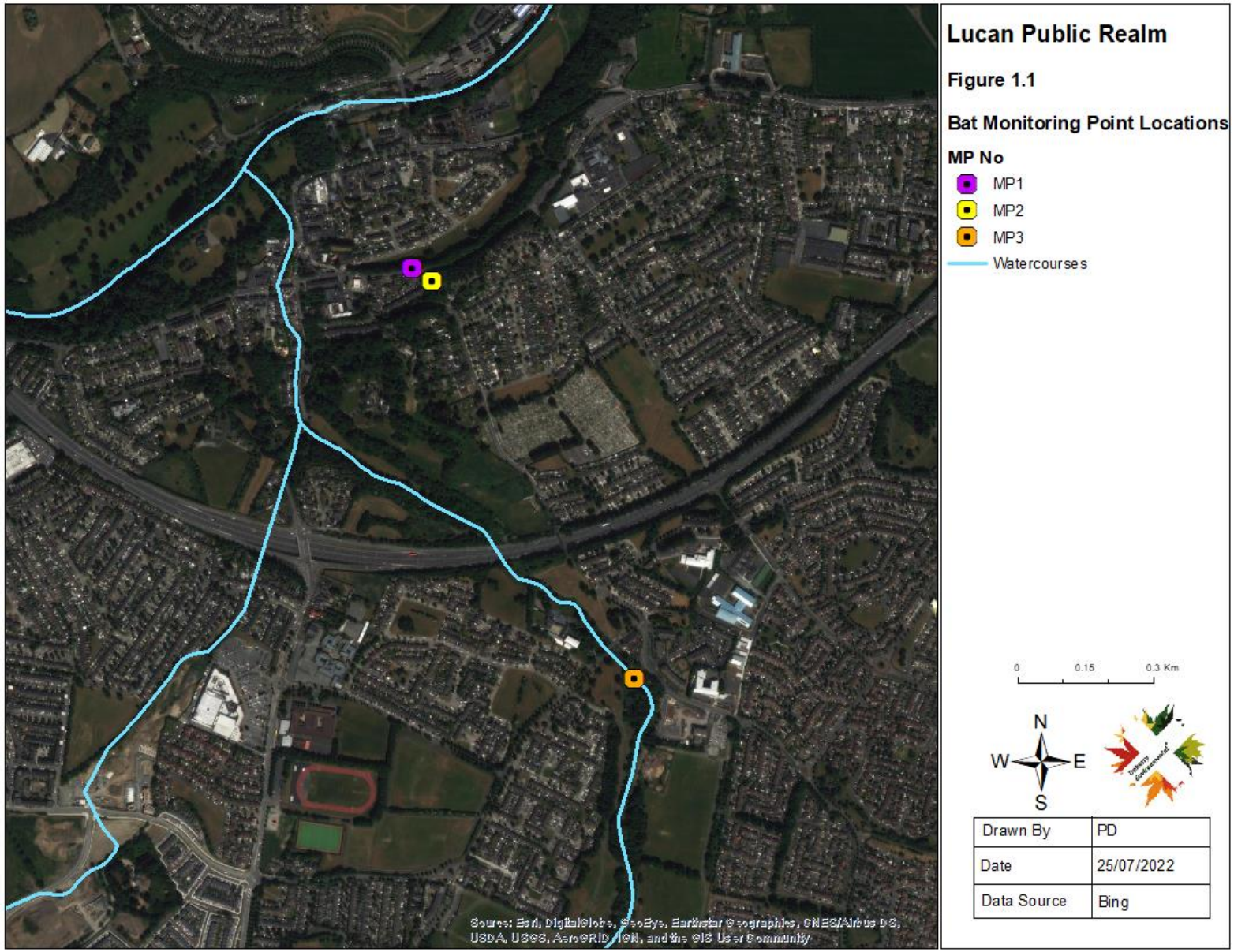
Monitoring Point (MP) 1 was position within linear woodland habitat to the north of the R835 Lucan Road. A Wildlife Acoustics Mini full spectrum bat detector was erected on a birch tree at a height of approximately 3.5m within the woodland habitat. The bat detector was erected adjacent to the masonry wall that bounds the woodland and the road.

2.2 MONITORING POINT 2

MP2 was positioned on an immature ash tree to the south of woodland habitat between Lucan Road and Lucan-Newlands Road. A Wildlife Acoustics Mini full spectrum bat detector was erected on tree at a height of approximately 4m above ground level. The bat detector was positioned outside the woodland habitat in a grassland clearing.

2.3 MONITORING POINT 3

MP3 was positioned on a mature sycamore tree along the bankside of the Griffeen River within woodland habitat to the west of the Esker Manor Road. An Wildlife Acoustics SM4 full spectrum bat detector was erected on tree at a height of approximately 4m above ground level. The bat detector was positioned on a bank over the river.


Lucan Public Realm
Figure 1.1
Bat Monitoring Point Locations
MP No
MP1
MP2
MP3
Watercourses
0
0.15
0.3 Km
N
W
E
S
Drawn By
PD
Date
25/07/2022
Data Source
Bing
Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

3.0 METHODOLOGY

Each of the three static bat detectors were installed on the 17th June 2022. Continuous nightly monitoring was completed between the 17th June and 30th June 2022, amounting to a total of 14 nights monitoring at each location.

The static bat detectors were programmed to continuously monitor for bat activity throughout the night from 30 minutes prior to sunset to 30 minutes after sunrise. All bat calls recorded during the automatic monitoring sessions were analysed using Kaleidoscope Pro software (V5.4.8). The bat call classifiers for British Bats provided by Kaleidoscope Pro were used to identify the species responsible for generating bat calls. These classifiers assign calls to species based on call characteristics, with the peak frequency of the calls being particularly important in distinguishing between species with similar call characteristics (i.e. Pipistrelle species). Kaleidoscope automatic bat identification software was used to assign bat calls to species level. Bat calls assigned to Myotis species were grouped together under the Myotis genus.

Kaleidoscope Pro automatically identified calls recorded during the monitoring sessions to Serotine and Noctule bats. Serotine and Noctule are not known to occur in the Ireland and the project site is located outside their known distribution range. As such all automatically identified as Serotine and Noctule calls were manually analysed using Kaleidoscope and following this analysis all of these calls were assigned to Leisler's Bats.

3.1 METHOD FOR EVALUATING BAT ACTIVITY

There are varying methods to quantity bat activity recorded during automatic static monitoring. Matthews et al. (2016) provided an arbitrary threshold for levels of low, medium and high bat activity. Kepel (2011) used the bat passes recorded per hour as a metric against which activity levels can be assigned. The Mammal Society have established EcoBat, an online database that compares bat activity recorded at a monitoring point against all other bat activity held by the database for the surrounding area.

The approach outlined by Kepel (2011) to quantifying bat activity has been used to evaluate the level of bat activity recorded at and surrounding the proposed development site and the importance of the proposed development site and surrounding area as a foraging resource for bats.

The Kepel approach is based on assigning the number of bat passes recorded per hour per night of each monitoring session to an activity category. Kepel has assigned the number of passes per hour to three activity categories. These activity categories are as follows:

- Pipistrelle species and Leisler's bat: Low = <3.5 passes per hour; Moderate = 3.6 – 6.5 passes per hour; High = >6.5 passes per hour.
- All Other Bat species: Low = <4.0 passes per hour; 4.1 to 10 passes per hour; high = >10 passes per hour.

The median bat pass per hour per night for each species recorded during bat activity surveys has been used to assign bat activity levels in line with the Kepel approach. Median bat pass per hour per night is used during this analysis as it is recognised as providing a more accurate representation of activity, as bat activity levels between nights can be highly variable and thus the median provides a more reliable value that the mean or maximum (Lintott & Matthews, 2018).

3.2 LIMITATIONS

It is noted that the bat monitoring surveys were completed during the height of the bat activity season in June and as such reflects bat activity during this time of the year. No data was collected during the spring or autumn seasons but it is considered that the data recorded provides an adequate representation of the species that are presence at the monitoring locations.

4.0 RESULTS

4.1 MP1

The results of the automatic bat detector monitoring at MP1 are provided in Tables 4.1 below.

Table 4.1: Results of Automatic Static Monitoring at MP1

Date	MYSP	NYCLEI	PIPPIP	PIPNAT	PIPPYG	PLEAUR	Total/Night
20220617	0	0	0	0	0	0	0
20220618	0	0	0	0	0	0	0
20220619	0	1	0	0	0	0	1
20220620	0	0	0	0	0	0	0

20220621	0	1	0	0	0	0	1
20220622	0	1	0	0	0	0	1
20220623	0	0	0	0	0	0	0
20220624	0	0	0	0	0	0	0
20220625	0	0	0	0	0	0	0
20220626	0	1	0	0	0	0	1
20220627	0	1	0	0	0	0	1
20220628	0	0	0	0	0	0	0
20220629	0	0	0	0	0	0	0
20220630	0	0	0	0	0	0	0
Total/Spp.	**0**	**5**	**0**	**0**	**0**	**0**	**5**

MY SP = Myotis species; NYCLEI = Leisler's bat; PIPNAT = Nathusius pipistrelle; PIPPIP = Common pipistrelle; PIPPYG = Soprano pipistrelle; PLEAUR = Brown long-eared

MP No. 1 was positioned within the linear woodland habitat occurring along the northern boundary of the project site. High levels of bat activity were recorded on a nightly basis on all nights of monitoring. The vast majority of the activity recorded was related to Common pipistrelle and Soprano pipistrelle, both of which made up 96.5 of all bat calls recorded.

Low numbers of passes were recorded on a nightly basis for all other species.

4.2 MP2

The results of the automatic bat detector monitoring at MP2 are provided in Tables 4.2 below.

Table 4.2: Results of Automatic Static Monitoring at MP2

Date	MY0SPP	NYCLEI	PIPNAT	PIPPIP	PIPPYG	PLEAUR	Total/Night
20220617	6	13	0	23	41	0	83
20220618	6	15	1	12	39	0	73
20220619	7	14	1	14	36	0	72
20220620	8	29	0	20	39	2	98
20220621	13	48	1	21	64	3	150
20220622	6	50	1	17	29	1	104
20220623	10	52	0	20	64	2	148
20220624	1	14	0	15	34	1	65
20220625	18	10	0	41	68	3	140
20220626	6	12	0	14	62	0	94
20220627	13	13	0	21	59	3	109

20220628	6	22	0	20	91	5	144
20220629	3	18	0	9	39	0	69
20220630	7	24	0	11	51	2	95
Total/Spp.	**110**	**334**	**4**	**258**	**716**	**22**	**1,444**

MY SP = Myotis species; NYCLEI = Leisler's bat; PIPNAT = Nathusius pipistrelle; PIPPIP = Common pipistrelle; PIPPYG = Soprano pipistrelle; PLEAUR = Brown long-eared

MP No. 1 was positioned within the linear woodland habitat occurring along the northern boundary of the project site. High levels of bat activity were recorded on a nightly basis on all nights of monitoring. The vast majority of the activity recorded was related to Common pipistrelle and Soprano pipistrelle, both of which made up 96.5 of all bat calls recorded.

Low numbers of passes were recorded on a nightly basis for all other species.

4.3 MP3

The results of the automatic bat detector monitoring at MP3 are provided in Tables 4.3 below.

Table 4.3: Results of Automatic Static Monitoring at MP3

Date	MYSP	NYCLEI	PIPNAT	PIPPIP	PIPPYG	PLEAUR	Total/Night
20220617	0	15	0	281	2	0	298
20220618	1	28	5	619	39	0	692
20220619	2	3	2	134	13	0	154
20220620	0	2	11	300	8	0	321
20220621	1	2	2	74	1	0	80
20220622	1	3	24	278	8	0	314
20220623	0	2	3	462	6	0	473
20220624	0	1	1	245	6	0	253
20220625	0	0	1	361	9	0	371
20220626	0	0	0	254	1	0	255
20220627	0	13	0	630	22	0	665
20220628	0	0	1	235	3	0	239
20220629	0	0	0	329	5	0	334
20220630	0	0	1	558	5	0	564
Total/Spp.	**5**	**69**	**51**	**4,760**	**128**	**0**	**5,013**

MY SP = Myotis species; NYCLEI = Leisler's bat; PIPNAT = Nathusius pipistrelle; PIPPIP = Common pipistrelle; PIPPYG = Soprano pipistrelle; PLEAUR = Brown long-eared

MP No. 1 was positioned within the linear woodland habitat occurring along the northern boundary of the project site. High levels of bat activity were recorded on a nightly basis on all nights of monitoring. The vast majority of the activity recorded was related to Common pipistrelle and Soprano pipistrelle, both of which made up 96.5 of all bat calls recorded.

Low numbers of passes were recorded on a nightly basis for all other species.

5.0 EVALUATION

Table 5.1 shows the median bat pass recorded per hour per night for each of the bat species recorded.

The median bat passes per hour at each of the three monitoring points for each of the bat species recorded during field surveys are provided below as Table 5.1.

Table 5.1: Median Bat Pass per Hour Recorded at Monitoring Points

MP No.	MYSP	NYCLEI	PIPNAT	PIPPIP	PIPPYG	PLEAUR
1	0.00	0.00	0.00	0.00	0.00	0.00
2	0.93	2.36	0.00	2.64	6.57	0.21
3	0.00	0.29	0.14	41.50	0.86	0.00

MY SP = Myotis species; NYCLEI = Leisler's bat; PIPNAT = Nathusius pipistrelle; PIPPIP = Common pipistrelle; PIPPYG = Soprano pipistrelle; PLEAUR = Brown long-eared

The median values shown in Table 5.1, as categorised according to the activity categories outlined by Kepel (2011) is discussed in the following sub-sections below.

Bat activity was very low during the monitoring completed at MP1 with a total of 5 passes recorded during the monitoring session. The median activity levels recorded at MP1 was 0 for all species. The results of the monitoring at MP1 indicate that this location is not used by bats for foraging.

Given the near absence of bat activity during monitoring at MP1, the results also indicate that the masonry wall in the vicinity of the monitoring point is not used as a roost site for bats.

Bat activity for all species, with the exception of Soprano pipistrelle, was low throughout the monitoring session at MP2. The median bat pass per hour recorded at MP2 for Soprano

pipistrelle is indicative of high levels of Soprano pipistrelle activity (i.e. >6.5 bat passes per hour).

Bat activity for all species, with the exception of Common pipistrelle, was low throughout the monitoring session at MP3. The median bat pass per hour recorded at MP3 for Common pipistrelle (i.e. 41.50 passes per hour) is indicative of high levels of Common pipistrelle activity (i.e. >6.5 bat passes per hour). As shown on Table 4.3 above nightly activity for Common pipistrelle throughout the monitoring session at MP3 was consistent with high levels of activity recorded during each night of monitoring. The results at MP3 indicate that the stretch of the Griffeen River and associated woodland habitat along the riparian corridor provides a foraging resource for Common pipistrelle and is relied upon by the local population as a foraging habitat.

The presence of Soprano pipistrelle and Common pipistrelle foraging in the area surrounding MP2 and MP3 respectively is not unexpected. Both species are widespread and commonly occurring throughout the country and are "commonly encountered during bat surveys" (NPWS, 2019). Both species are also "very general in its habitat preference, foraging in woodland, riparian habitats and parkland, along linear features in farmland, and in towns and cities" (NPWS, 2019). The national population of both these species is increasing and no existing pressures or threats to the conservation status of these two species at a national level have been identified. Overall the future prospects for these two species in terms of range, population and habitat are Good (NPWS, 2019).

6.0 CONCLUSIONS

Bat activity monitoring has been completed at three locations along the proposed Griffeen greenway. These locations are within and adjacent to habitats that are representative of high value foraging habitats for bats such as broad-leaved woodland (at MP1), broad-leaved woodland (at MP2) and grassland mosaic; and broad-leaved woodland, watercourse and grassland mosaic (at MP3).

The results of the monitoring indicates that the broad-leaved woodland habitat at MP1 is not used as a foraging habitat by bats. The near absence of any bat activity in the vicinity of the MP1 monitoring point also indicates the absence of any roosting activity by bats along the masonry wall adjacent to the monitoring point.

The results of monitoring at MP2 indicates that the broadleaved woodland and grassland mosaic habitat occurring at this location is used as foraging site by Soprano pipistrelle but is not relied upon by other bat species.

REFERENCE

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APPENDIX 1: PLATES

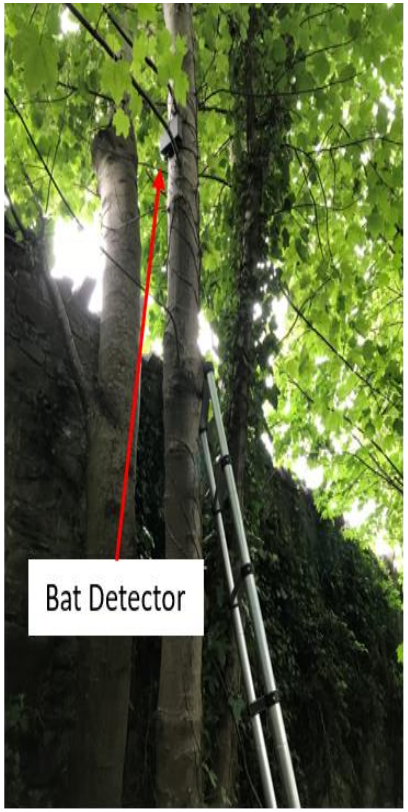

Plate 1: MP1 Location

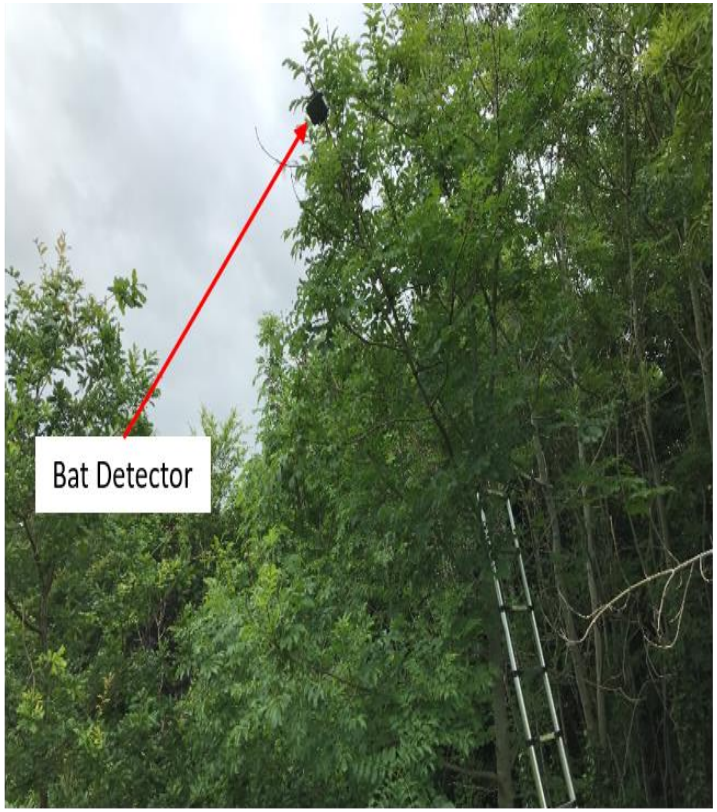

Plate 2: MP2 Location

Plate 3: MP3 Location

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