7 BIODIVERSITY

7.1 Introduction

7.1.1 Assessment Brief

The aim of this Ecological Impact Assessment (EcIA) is to identify, quantify and evaluate the impacts of the proposed development on ecosystems and their components, including designated sites, habitats, flora and fauna. It has been prepared in accordance with the *Guidelines for Ecological Impact Assessment in the UK and Ireland* (2018), which is the primary resource used by members of the Chartered Institute of Ecology and Environmental Management (CIEEM).

The purpose of this document is to:

- Provide an objective and transparent assessment of the potential ecological impacts of the proposed development for all interested parties, including planning authorities and the general public
- Facilitate objective and transparent determination of the consequences of the development in terms of national, regional and local policies relevant to ecology
- Propose the steps will be taken to adhere to legal requirements relating to designated sites and legally protected species (CIEEM, 2018).

Although the above guidelines provide a scientifically rigorous framework for EcIA, some processes also rely on the professional judgment of an ecologist, including survey design, the valuation of ecological features, and the characterisation of impacts. An outline of the author's experience, training and accreditation is provided in the following section, which support his competency to make such judgements.

7.1.2 Statement of Authority

All surveying and reporting was carried out by Nick Marchant, the principal ecologist of NM Ecology Ltd. He has an MSc in Ecosystem Conservation and Landscape Management from NUI Galway and a BSc in Environmental Science from Queens University Belfast. He is a member of CIEEM and operates in accordance with their code of professional conduct.

Nick has twelve years of professional experience, including nine years as an ecological consultant, one year as a local authority biodiversity officer, and two years managing an NGO in Indonesia. He provides ecological assessments for developments throughout Ireland and Northern Ireland, including wind farms, infrastructural projects (water pipelines, greenways, *etc*.), and a range of residential and commercial developments.

7.1.3 Preliminary Scoping of Potential Impacts

The proposed development will comprise of raised earthen flood embankments, integrated constructed wetland, channel realignment and regrading, improvements to the surface water drainage system and ancillary and temporary works.

These proposed works could potentially affect a range of ecological features, as follows:

- Vegetation will need to be cleared from the development footprint and along access routes. This will directly affect habitats and flora in affected areas, either on a temporary or permanent basis;

- The removal of vegetation on river banks may have direct impacts on terrestrial fauna, or may damage / disturb their breeding or resting places, *e.g*. bird nests or bat roosts;
- The construction of embankments and retaining walls may affect fauna that live underground, *e.g*. badger setts or kingfisher nesting-burrows;
- In-stream works could cause direct impacts on fish and aquatic fauna; and
- Pollutants from the construction site (*e.g*. suspended sediments, cement products, hydrocarbons) could be washed into the river by surface water runoff and could cause pollution of the river and downstream protected areas.

This preliminary scoping exercise was used to determine an appropriate surveying strategy for the site. An updated scoping exercise is provided in **Section 7.4.4** *Identification of important ecological receptors*, which is based on the species present within the zone of influence, their ecological value, and their susceptibility to impacts.

7.1.4 Consultation and Engagement

Copies of all consultation responses in the EIA scoping are provided in **EIAR Volume 4, Appendix 3-2**. A summary of the responses received from the consultations and stakeholder engagement relevant to ecological issues is provided below.

7.1.4.1 SDCC Heritage Officer

An informal meeting was held between the South Dublin County Council Heritage Officer and a project engineer in February 2019 regarding the scoping of the project, and some notes were forwarded to the ecologist for review. Reference was made to the following ecological receptors:

- Brent Geese in Tymon Park;
- Flowering Rush on the stretch between the lakes and Wellington Rd;
- Nesting waterfowl at the Tymon Lakes;
- Otters, particularly near Limekiln Rd;
- Habitat surveys; and
- Bat surveys.

Potential impacts on these receptors have been addressed in this chapter.

Additional comments were received from the SDCC Heritage Officer and Parks department in July 2019 regarding the timing of habitat surveys, the protection of wildflower meadows, the retention of trees, and the suitability of trees for roosting bats. These comments have also been addressed in this chapter.

7.1.4.2 Inland Fisheries Ireland

Informal consultation by telephone was held with a Fisheries Environmental Officer of Inland Fisheries Ireland (IFI) in October 2018. The representative indicated that the River Poddle has limited fisheries value, with no recent records of salmonids or other fish listed on Annex II of the Habitats Directive. Common species such as three-spined stickleback may be present, but no larger fisheries are known to occur. The reason for its impoverished fish communities is likely to be the extensive culverting and re-alignment of the river

through Dublin City, which has made the lower sections of the river impassable to migratory fish. No significant concerns were raised about the development, but it was indicated that best-practice pollution-prevention measures would be required.

A consultation meeting was held with the Fisheries Environmental Officer on 25th March 2019. It was confirmed that the Poddle is not a salmonid river, and subsequently that detailed aquatic surveys would not be required for the Environmental Impact Assessment.

7.1.5 Development Proposals

The proposed development consists of flood alleviation works along and adjacent to the River Poddle on sites totalling 12 ha with further works to rehabilitate or replace manholes, along with associated ancillary and temporary works.

7.1.5.1 Construction

The proposed works extend from the upper reaches of the River Poddle at Tymon North in Tallaght to Saint Teresa's Gardens in Merchant's Quay, Dublin. A detailed description of the proposed works is contained in **Chapter 5** and illustrated in **EIAR Volume 3**. A brief description is summarised as follows:

a) Construction of flood defence embankments in Tymon North and Tymon Park, Tallaght;

b) Demolition of the existing flow control structure and footbridge and construction of a flood storage defence spillway with passive flow control structure and replacement footbridge at Tymon Lake in Tymon Park, Tallaght;

c) Construction of an integrated constructed wetland in Tymon Park, Tallaght;

d) Channel re-alignment and embankments, and flood defence walls on both banks of the River adjacent to the Lakelands Overflow at an open space located at Whitehall Park, east of Templeville Road, Kimmage and Perrystown;

e) Construction of a flood defence wall on the left bank of the River, at the rear of properties on Whitehall Road and Glendale Park, Terenure;

f) Demolition of existing walls and construction of new flood defence walls on the right bank of the River at the rear of properties on Fortfield Road south of Kimmage Crossroads, Kimmage;

g) Construction of flood defence walls and demolition and replacement of footbridge at Ravensdale Park, Kimmage;

h) Construction of a flood defence wall on the right bank of the River at the end of St. Martin's Drive, Kimmage;

i) Construction of a flood defence wall on the right bank of the River at Mount Argus Close, Harold's Cross; and

j) Rehabilitating or replacing manholes in the public roads in Poddle Park, Crumlin and in the vicinity of Saint Teresa's Gardens and Donore Road, and at the rear of the National Stadium, South Circular Road, Merchant's Quay.

k) Proposed ancillary works and associated development includes drainage channel clearance and removal of trees where required for the works; rehabilitating or installing culvert screens in locations as required; installing flap valves in all culverts draining to the River; biodiversity enhancements including installation of floating

nesting platforms in Tymon Lake, Tymon Park, Tallaght; and landscape mitigation and restoration at Tymon Park, Tallaght, Whitehall Park, Terenure, and Ravensdale Park and St. Martin's Drive, Kimmage which include public realm improvements, biodiversity enhancements and tree planting and landscaping.

l) Temporary works include establishing a main construction compound in Tymon Park with access off Limekiln Road, Tallaght which will be in operation for the entire duration of the works; and temporary works / set down areas at Wainsfort Manor Crescent, Terenure and Ravensdale Park and St. Martin's Drive, Kimmage which will be in use for the duration of the works to be carried out in these locations. Other temporary works include stockpiling of excavated earth in designated areas of Tymon Park, Tallaght; temporary channel crossings at Tymon North and Tymon Park, Tallaght; and channel diversions at Tymon Park, Tallaght and Whitehall Park, Terenure to enable the works along the River channel to be carried out.

7.1.5.2 Potential In-Combination Effects

The proposed working area is in an urban / suburban setting in the south-west of Dublin City. It passes through several zones of the South Dublin County Development Plan 2016 – 2022 and the Dublin City Development Plan 2016 - 2022, including areas zoned for industrial, residential and recreational uses. The catchment is fully urbanised, and given the demand for housing in Dublin, the main pressures are from intensification of urban development through infill or redevelopment of sites.

Live and recently approved planning applications in the vicinity of the River Poddle were reviewed on the online planning registers of South Dublin County Council (SDCC) and Dublin City Council (DCC). The following applications were considered to be relevant to the proposed development:

- A Part VIII Application was made in 2016 for the construction of a new library beside Castletymon Road (planning reference SD168/0003) adjacent to the River Poddle. An Appropriate Assessment screening report was included in the documentation, and it was concluded that there was no risk of likely significant impacts on any European sites. Construction of this project commenced in January 2019 and is expected to be completed in January 2020, prior to the commencement of the proposed development;
- Permission was granted in 2019 to Scoil Aonghusa Senior National School for a single storey temporary prefab classroom adjacent to the southeast boundary of the site and associated site works (SD19A/0289). These works will be relatively small in scale;
- A large residential development has been under construction for several years in the grounds of Mount Argus church on Kimmage Road Lower, and may continue in 2020. It is in close proximity to the River Poddle;
- There is a current planning application for demolition of an office building and development of a 12 no. units apartment building at a site located at Unit 1, KCR Estate in Ravensdale Park (3193/19);
- There is a site on the Vacant Sites Register of Dublin City Council in close proximity to the River Poddle located at the side of Riverpark House, in Poddle Park, Kimmage (VS-0751). Being on the Vacant Sites Register, this site is likely to be brought

forward for residential development. There are no sites in proximity to the River Poddle on the Vacant Site Register of South Dublin County Council; and

- An application for 7 no. houses was submitted at the Terenure Badminton Club on Whitehall Rd. in 2018 (planning reference SD18A/0360) but was 'deemed withdrawn' by SDCC following the expiration of a request for further information.

It is noted that all of these developments are outside the proposed working areas of the River Poddle Flood Alleviation Scheme, but if multiple sites were constructed concurrently, it is possible that they could lead to cumulative impacts on water quality in the River Poddle, and thus on downstream European sites. This is addressed in greater detail in the Natura Impact Statement that accompanies this application.

All other planning applications in the surrounding area were for small-scale works such as residential extensions. There is no risk that any of these minor developments would cause in-combination impacts with the proposed development.

7.2 Methodology

7.2.1 Overall Approach

The objective of this assessment was to identify any ecological features that would pose a constraint to the proposed development. It involved the following steps:

- Identification of designated sites within an appropriate zone of influence;
- Review of existing biological records on online databases (*e.g*. the National Biodiversity Data Centre);
- Walkover surveys incorporating the following elements:
    - Classification and mapping of habitats;
    - Surveys for rare or protected flora, and for any problematic non-native plant species (*e.g*. Japanese Knotweed);
    - Surveys for field signs of rare or protected fauna (*e.g*. badgers), and habitat suitability assessments for species that are shy, nocturnal or seasonal;
- Valuation of ecological features, review of legal considerations, and selection of important ecological features; and
- Assessment of impacts on important ecological features and development of appropriate mitigation strategies.

7.2.2 Data Collection and Walkover Survey

A desk-based scoping study was carried out using data from the following sources:

- Plans and specifications for the proposed development;
- *Winter Habitat Study of Tymon and Bancroft Parks* (a confidential report by Roughan & O'Donovan Consulting Engineers, 2018) (contained in **EIAR Volume 4, Appendix 7-1**);
- *Mammal, Bird and Botanical surveys relating to the Poddle River Flood Alleviation Measures* within the boundary of Dublin City Council (Malgorzata Goska Wilkowska and Brian Keeley, 2018) (contained in **EIAR Volume 4, Appendix 7-2**);

- Bedrock, soil, subsoil, ground water and surface water maps from the Geological Survey of Ireland web mapping service (www.gsi.ie/mapping.htm), and the Environmental Protection Agency web viewer (http://gis.epa.ie/EPAmaps/);
- Maps and details of designated sites from www.npws.ie;
- Biological records from the National Biodiversity Data Centre online mapping service, and from the National Parks and Wildlife Service internal database.

The following resources were used for the walkover surveys:

- Habitat surveys were carried out in accordance with the *Best Practice Guidance for Habitat Survey and Mapping* (Smith et al 2011), and using the classification system of *A Guide to the Habitats of Ireland* (Fossitt 2000);
- Flora were identified using *An Irish Flora* (Parnell & Curtis, 2012) and *The Vegetation Key to the British Flora* (Poland & Clement 2009). Nomenclature follows the plant crib of the Botanical Society of the British Isles (BSBI 2007). The abundance and extent of species is described using the DAFOR scale (Dominant, Abundant, Frequent, Occasional, Rare);
- Fauna surveys and habitat suitability assessments followed the methods outlined in the *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* (NRA 2006), with reference to other guidelines where required.

The study area for this assessment consisted of all land within the footprint of the proposed development, with a buffer zone of up to 20m in relevant areas. All desktop and field data was collected between January 2018 and August 2019.

Table 7-1: Overview of fieldwork personnel and dates

Type of survey	Surveyors	Dates
Habitats, flora and invasive species	Roughan O'Donovan (Tymon and Bancroft Parks)	Jan - Apr 2018
	Malgorzata Wilkowska (Dublin City Council lands)	August / September 2018
	NM Ecology (full scheme)	September 2018, March, May and August 2019
Winter birds	Roughan O'Donovan (Tymon and Bancroft Parks)	Weekly from Jan to mid-Apr 2018 (14 surveys)
	NM Ecology (Tymon Park)	March 2019
Badgers, otters, and other terrestrial fauna	Roughan O'Donovan (Tymon and Bancroft Parks)	Jan - Apr 2018
	Brian Keeley (Dublin City Council lands)	September 2018
	NM Ecology (full scheme)	September 2018, March, May and August 2019
Bats	Brian Keeley (DCC lands)	September 2018
	NM Ecology (Dublin City Council lands)	August 2019

7.2.3 Bat surveying techniques

Bat surveys for the Dublin City Council lands (i.e. works areas between Mount Argus Close and Ravensdale Park) were carried out by Brian Keeley in 2018. All methods and results for Brian Keeley's surveys are presented in **EIAR Volume 4, Appendix 7-2**. Separate surveys were carried out in South Dublin County Council lands (all areas between Fortfield Road and Tymon Park) by NM Ecology Ltd. in 2019. Preliminary ecological appraisals of potential roost features were also undertaken by NM Ecology Ltd throughout the scheme. Methods for NM Ecology's surveys are outlined below.

Survey methods were developed with reference to *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Bat Conservation Trust, 3rd edition, 2016). Preliminary ground-level roost assessments were carried out for all mature trees and built structures (buildings and bridges) to assess their suitability for roosting bats, using the methods in Section 6.2 of the BCT Guidelines. No potential bat roosts were found within the site boundary, so emergence / re-entry surveys were not considered necessary.

A transect survey of the SDCC lands was carried out in August 2019. It involved a continuous walk at a slow pace through the works area, recording bats using a handheld detector (an Anabat Walkabout detector, Titley Scientific Inc). August is during the peak season of bat activity, and coincides with the maternity period, i.e. the birth and raising of offspring. Weather conditions at the time of survey were ideal for bats, with warm temperatures and no wind or rain.

7.2.4 Valuation of Ecological Features

Based on the information collected during the desktop and walkover surveys, the ecologist assigns an ecological value to each feature based on its conservation status at different geographical scales (**Table 7-2**). For example, a site may be of national ecological value for a given species if it supports a significant proportion (*e.g.* 5%) of the total national population of that species.

Table 7-2: The six-level ecological valuation scheme - CIEEM guidelines (2016)

Ecological value	Geographical scale of importance
International	International or European scale
National	The Republic of Ireland or the island of Ireland
Regional	Leinster, and/or the east coast of Ireland
County	County Dublin
Local	Suburban / rural areas between Tallaght and Harold's Cross
Negligible	None, the feature is common and widespread

It is accepted that any development will have an impact on the receiving environment, but the significance of the impact will depend on the value of the ecological features that would be affected. The following is outlined in the CIEEM guidelines: "*one of the key challenges in an EcIA is to decide which ecological features (habitats, species, ecosystems and their functions/processes) are important and should be subject to detailed assessment. Such ecological features will be those that are considered to be important and potentially affected by the project. It is not necessary to carry out detailed assessment of features*

that are sufficiently widespread, unthreatened and resilient to impacts from the development, and that will remain viable and sustainable."

For the purposes of this chapter we have only assessed impacts on ecological features that are of local value or higher (refer to **Table 7-2**) or those that receive legal protection. These features are termed 'important ecological features' and are listed in **Section 7.4.4.** Impacts on features of negligible ecological value (*e.g*. amenity grasslands) are not considered to be significant, so they are not included in the impact assessment.

7.2.5 Ecological Impact Assessment

Potential direct, indirect or cumulative impacts on ecological features can be described in relation to their magnitude, extent, duration, reversibility and timing/frequency, as outlined in the CIEEM (2019) guidelines. Depending on the type of impact and the sensitivities of the important ecological feature, the ecologist may determine that the impact would have a 'significant effect'. The following definitions are provided in the CIEEM guidelines: *"A significant effect is simply an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project*". "*For the purpose of EcIA, a 'significant negative effect' is an effect that undermines biodiversity conservation objectives for 'important ecological features', or for biodiversity in general."* Reference is also made to the *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EIAR) of the Environmental Protection Agency regarding the significance of impacts. Where significant impacts are identified, measures will be taken to avoid, minimise, reinstate or provide replacement habitat (where possible). Based on these measures, the impact assessment will be repeated, and any residual impacts of the proposed development will be discussed.

7.3 Existing Environment

7.3.1 Environmental Setting

The River Poddle is a highly-modified urban watercourse that arises in Cookstown/Tallaght and flows in a north-easterly direction through Dublin city to meet the River Liffey at Wellington Quay. The proposed working area covers a section of the watercourse between Tymon North in Tallaght and Saint Teresa's Gardens in Merchant's Quay, Dublin.

The underlying bedrock is dark limestone and shale of the Calp formation, which is a locally-important aquifer (moderately productive in local zones). Subsoils are limestone till and localised pockets of limestone gravels, while soils are gravels and alluvium along the original course, with made ground and brown earths along re-aligned sections.

7.3.1.1 Description of the River Poddle

The river was part of the original settlement of Dublin city in the 9th century, forming the Dubh Linn (dark lake) after which it is named. However, as the city expanded the river was modified extensively, including culverting under roads and residential areas, and re-alignment along property boundaries. The most significant change was the enclosure of the lower section of the river under Dublin city centre, comprising approximately 2 – 2.5km of continuous culvert between Harold's Cross and Wellington Quay. Five other sections of the river have been culverted under residential developments, each of between 100 and 500 m length. The most extensive re-alignments were at the source of the river in Tallaght,

where it was re-routed along property boundaries in an industrial estate, and in Tymon Park, where it was widened to form a series of ponds / lakes.

The extensive modification of the river has significantly reduced its ecological value. It is understood that the river has no populations of salmonids or any other fisheries interests (*pers. comm.* Inland Fisheries Ireland), and that the culvert in the lower section of the river is impassable to any migratory species (*e.g*. Atlantic salmon or sea trout).

7.3.1.2 Water Quality

The River Poddle is not monitored under the Water Framework Directive Status Assessments 2010-2015. However, considering the extensive hydro-morphological changes to the river, it is likely that it would have a classification of 'poor' or 'bad' status under the WFD monitoring scheme.

Some water quality data obtained from South Dublin County Council is presented in the Integrated Constructed Wetland report (Vesi Environmental Ltd, 2019) that accompanies this application. The levels of both nitrates and phosphorous exceeded the limits for "Good" water status as defined in the Surface Water Regulation (S.I. 272/2009). Some water quality monitoring was carried out by the EPA at the Priory Road in Kimmage on one occasion in 2007[1], and a Q-value of 3 was recorded, which is indicative of poor water quality. In summary, water quality in the River Poddle is currently considered to be poor, due to elevated levels of nutrients, and to extensive modification of the watercourse.

Further downstream, the transitional / estuarine waters of the River Liffey are of moderate status, and coastal waters in Dublin Bay are of good status (Water Framework Directive Status Assessments 2010-2015) [2].

7.3.2 Designated Sites

The proposed development site is not located within or adjacent to any European sites, so there is no risk of direct impacts (*e.g*. habitat loss or fragmentation) on any sites. Potential indirect impacts on distant sites were considered within a zone of influence of 5km, and along associated watercourses (the River Poddle and River Liffey). The locations of designated sites are shown in **Figure 7-1**, and details of each site are provided in **Table 7-3**.

[1] Water sampling carried out by the EPA as part of the National Rivers Monitoring Programme (now replaced by the Water Framework Directive (WFD) Monitoring Programme). Data obtained at gis.epa.ie [accessed August 2019].

[2] Environmental Protection Agency, Liffey Catchment Assessment (2010 – 2015), November 2018, version no. 3. https://bit.ly/2EOnYJY [accessed 31/05/19].

Table 7-3: Designated sites of relevance to the proposed development site

Site Name	Distance [3]	Qualifying Interests
Grand Canal pNHA (2104)	Overlap	Freshwater canal and associated semi-natural vegetation, with high biodiversity, and value as an ecological corridor.
Dodder Valley pNHA (991)	0.8 km south	The last remaining stretch of natural river bank vegetation on the River Dodder before it enters Dublin city. The site is of importance for riparian woodland and its diversity of bird species, including kingfisher and sand martins
Glenasmole Valley SAC, pNHA (1209)	4.5 km south	**Annex I habitats:** semi-natural dry grasslands and scrubland facies on calcareous substrates, *Molinia* meadows, petrifying springs with tufa formation (Cratoneurion) **Annex II species:** none
Royal Canal pNHA (2103)	3.3 km north	Freshwater canal and associated semi-natural vegetation, with high biodiversity, and value as an ecological corridor.
South Dublin Bay and River Tolka Estuary SPA (site code 4024)	10km	**Habitats:** coastal wetlands **Special conservation interests:** light-bellied brent goose, oystercatcher, ringed plover, grey plover, knot, sanderling, dunlin, bar-tailed godwit, redshank, black-headed gull, arctic tern, roseate tern, and common tern
South Dublin Bay SAC (210)	10 km	**Annex I habitats:** inter-tidal mudflats / sandflats (including patches of *Salicornia* and other annuals), annual vegetation of drift lines, embryonic shifting dunes **Annex II species:** none
North Dublin Bay SAC (206)	10 km	**Annex I habitats:** inter-tidal mudflats / sandflats (including patches of *Salicornia* and other annuals), *Spartina* swards, salt marshes, annual vegetation of drift lines, embryonic shifting dunes, white dunes, grey dunes, dune slacks **Annex II species:** petalwort *Petalophyllum ralfsii*
North Bull Island SPA (4006)	10 km	**Habitats:** coastal wetlands **Special conservation interests:** wintering populations of light-bellied brent goose, shelduck, teal, pintail, shoveler, oystercatcher, golden plover, knot, sanderling, dunlin, black-tailed godwit, bar-tailed godwit, curlew, redshank, turnstone, black-headed gull

7.3.2.1 Identification of Potential Impact Pathways

Indirect impacts on designated sites can occur if there is a viable pathway between the source (the proposed development site) and the receptor (the habitats and species for which a site has been designated). The most common pathway for impacts is surface water, for example if a pollutant is washed into a river and carried downstream into a designated site in coastal areas. Other potential pathways are groundwater, air (*e.g*. sound

[3] Some of the potential pathways for impacts on European sites are *via* intervening watercourses (River Poddle and River Liffey), so distances are measured along the length of connecting waterways rather than at the nearest point.

waves or airborne dust), or land (*e.g*. flow of liquids, vibration). The zone of effect for hydrological impacts can be several kilometres, but for air and land it is rarely more than one hundred metres. The magnitude of impacts (*e.g*. the concentration of pollutants) usually decreases as the distance between source and receptor increases. An appraisal of potential pathways between the proposed development and the designated sites listed in **Table 7-3** is provided below.

The Glenasmole Valley SAC and Dodder Valley pNHA are located in a separate river catchment (the River Dodder), so surface water is not a potential pathway for indirect impacts. Both are located more than 500 m from the indicative working area, and are at higher elevations, so groundwater would not provide a viable pathway. The distances involved are also too great for impacts *via* air or land pathways. Therefore, all potential pathways to these designated sites can be screened out.

In **Figure 7-1** it appears that the River Poddle intersects with the Grand Canal pNHA to the north of Harold's Cross. However, the river is culverted in this location, and passes underneath the bed of the canal. The canal is a self-contained hydrological feature that has no interaction with surrounding surface water or ground water. Therefore, there is no hydrological connection with the proposed development, and the enclosure of the culvert prevents any pathways *via* air or land, so all potential pathways to the pNHA can be screened out.

The Royal Canal pNHA is located several kilometres to the north of the site, and has no association with the River Poddle catchment, so all potential pathways can be screened out.

There is a distant hydrological connection to four Natura 2000 sites in Dublin Bay *via* the River Poddle and River Liffey. The connection is considered to be rather tenuous, because the nearest Natura 2000 site – the *South Dublin Bay and River Tolka Estuary* SPA – is more than 10 km downstream of the proposed development site. Nonetheless, it does provide a potential hydrological pathway for impacts, and will be discussed further in **Section 7.5** of this chapter. All other potential pathways can be screened out, because the distances involved are too great for impacts *via* groundwater, air or land pathways.

Potential impacts on the Natura 2000 sites in Dublin Bay are considered in the *Natura Impact Statement* (NIS) that accompanies this application (refer to **Part 4** of the planning documentation). The NIS concludes that the proposed development will not adversely affect the integrity of any European site, either alone or in-combination with other plans or projects, once the mitigation as detailed in the NIS are implemented in full.

7.3.3 Desktop Records of Flora and Fauna

Records of flora and fauna in the vicinity of the proposed development site were obtained from the Scientific Unit of the National Parks and Wildlife Service (NPWS) *via* a data request. Records on the National Biodiversity Data Centre website were also reviewed. The former are from the NPWS' internal databases of rare and protected species, and the latter are public records from a range of verified sources (*e.g*. BSBI tetrad data for Ireland). The NPWS records were filtered for protected and priority species, and an edited list is provided in **EIAR Volume 4, Appendix 7-3**.

It is important to note that these records do not provide a definitive confirmation of the presence or absence of these species in the study site or the surrounding area. Most records are from national distribution atlases that are based on representative sampling

at a few randomised sites, so the true distribution of these species (and also species not included on this list) may be much higher than recorded. Conversely, the distribution of some species may have decreased since the latest record, and some may have become locally extinct. The list should be interpreted in this context.

7.4 Field Survey Results

7.4.1 Habitats and Flora

Habitats within the proposed development site were classified using *A Guide to Habitats in Ireland* (Fossitt, 2000). Descriptions of each habitat type are provided in this section, and a list of habitats within the development footprint is provided in **Section 7.5.1**, **Table 7.6**. A map of habitats in Tymon Park is provided in **Figure 7-2**; all other locations have only one or two habitat types that are easily distinguishable, so habitat maps are not considered necessary.

These habitat descriptions are based on field surveys carried out by NM Ecology Ltd. in September 2018 and August 2019, with reference to the summer habitat surveys carried out by Malgorzata Goska Wilkowska within the Dublin City Council area in early August 2018 (**EIAR Volume 4, Appendix 7-1**), and the winter habitat survey carried out by Roughan & O'Donovan Consulting Engineers in Tymon and Bancroft Parks between January and April 2018 (**EIAR Volume 4, Appendix 7-1)**.

7.4.1.1 Lowland Watercourse (FW2)

The River Poddle has a relatively slow flow in most of the study area, although there are some small waterfalls and/or riffles in places. The channel is typically about 1 - 2m wide and 0.1 – 0.3m deep, although it is slightly broader and deeper towards its north-eastern end as the water volume increases. The substrate is sand and gravel, with occasional cobbles, and some patches of fine silt in slow-flowing sections. There is litter / refuse in many locations, particularly near bridges and public footpaths.

Fast-flowing sections of river channel are typically unvegetated, but there are patches of dense aquatic vegetation in slow-flowing sections during summer months, including water-cress *Rorippa nasturtium-aquaticum*, Nuttall's waterweed *Elodea nuttallii*, spiked water-milfoil *Myriophyllum spicatum*, pink water-speedwell *Veronica catenata* and some patches of pondweed *Potamogeton* sp. (not accessible for identification) In Tymon Park, some sections of river support reedbeds and tall-herb swamps, which are discussed separately below.

Some patches of flowering-rush *Butomus umbellatus* are found on the edge of the river in Tymon Park; this is discussed in the 'rare flora' section below.

With the exception of flowering-rush, all other plant species in this habitat are common and widespread in Ireland. However, there are only a small number of urban watercourses in south-west Dublin city, and the river has secondary value as an ecological corridor and a habitat for fauna, so it is considered to be of Local ecological value.

7.4.1.2 Artificial Lakes and Ponds (FL8)

There are a number of artificial waterbodies in Tymon Park, which can be referred to as either ponds or lakes. These waterbodies vary in size from approximately 0.2ha to 1.8ha in surface area and appear to be more than 1m deep in places. The three ponds in Tymon

Park are linked, but the eastern pond (which will be used for flood storage) is approximately 1 – 1.5m lower in elevation than the two westerly ponds.

The water in all ponds was quite opaque, and rafts of algae were observed in some places, indicating that the waters are eutrophic. Litter / refuse was observed in some of the ponds. Some submerged aquatic vegetation was observed (*e.g*. spiked water-milfoil, waterweed), but floating vegetation was not abundant. All ponds are surrounded by reedbeds and tall-herb swamps, which are discussed separately below.

Large ponds are relatively rare in Dublin City, particularly ponds with mature reedbeds and tall-herb swamps. They also have secondary value as a habitat for fauna, particularly waterfowl and bats. Therefore, the complex of lakes and associated vegetation in Tymon Park is considered to be of County ecological value.

7.4.1.3 Reed Swamps (FS1) and Tall-herb Swamps (FS2)

Although these are discrete habitats, they are described here in combination, as they frequently co-exist in close proximity. Extensive and species-rich habitats occur around the edges of the ponds / lakes in Tymon Park and their associated streams, including along the associated streams. There are also some small, localised patches of these habitats elsewhere along the River Poddle, although they do not have the same value as those in Tymon Park.

Reedbeds occur in some places around the margins of the ponds, particularly the south-eastern corner of the largest pond (Tymon Lake), and the majority of the most-northerly pond. Common reed *Phragmites australis* is the dominant species, with patches of bulrush *Typha latifolia*, lesser bulrush *Typha angustifolia*, common club-rush *Schoenoplectus lacustris*, and Reed Canary-grass *Phalaris arundinacea*. Galingale *Cyperus longus* (which we consider likely to be an introduced species at this location) is locally abundant in the northern pond and associated stream. Some herbaceous species are frequent to occasional in the reedbed habitat, including great willowherb *Epilobium hirsutum*, marsh-bedstraw *Galium palustre*, marsh marigold *Caltha palustris* and brooklime *Veronica beccabunga*.

Other parts of the lake (and associated streams) have localised patches of the reeds and cyperaceous species mentioned above, but also support a range of herbaceous plants. Great willowherb and yellow iris *Iris pseudacorus* are abundant, meadowsweet *Filipendula ulmaria* and nettle *Urtica dioica* are frequent, marsh marigold and wild angelica *Angelica sylvestris* are occasional, and purple-loosestrife *Lythrum salicaria* is rare. In some places bittersweet *Solanum dulcamara* and/or patches of brambles *Rubus fruticosus* agg. are abundant. The habitat grades into dry meadow (usually the species-poor variant) on the upper banks.

There are some occasional trees around the margins of the lakes, predominantly willows (*Salix alba, S. fragilis, S. viminalis*), with some alder *Alnus glutinosa* and ash *Fraxinus excelsior*. The island in Tymon Lake supports dense scrub / immature woodland of less than 5m height, including frequent pine *Pinus* cf *nigra*, alder and horse-chestnut *Aesculus hippocastanum*, occasional willow and downy birch *Betula pubescens*, and rare pedunculate oak *Quercus robur*. Some giant-rhubarb *Gunnera tinctoria* was found at the western end of Tymon Lake; this is discussed in the 'Invasive Plant Species' section below.

Reedbeds and tall-herb swamps of this size and diversity are relatively rare in Dublin City. The habitat is species rich, and also has secondary value as a habitat for fauna. Therefore,

the complex of lakes and associated vegetation in Tymon Park are considered to be of County ecological value.

7.4.1.4 Dry meadow (GS2)

This habitat refers to areas of grassland that are infrequently (or never) mowed. It can be sub-divided into two categories: species-rich grasslands that are managed for wildlife by SDCC, and species-poor areas that are unmanaged.

The species-rich habitat occurs in many of the grassland areas to the north and east of Tymon Lake. Grasses and perennial species are left to grow during the summer, and the habitat is then mowed in late summer after plants have spread seed. Of the grasses, Yorkshire-fog *Holcus lanatus*, false oat-grass *Arrhenatherum elatius* and cock's-foot *Dactylis glomerata* are abundant, crested dog's-tail *Cynosurus cristatus* common bent *Agrostis capillaris*, red fescue *Festuca rubra* and perennial rye-grass *Lolium perenne* are frequent, Italian rye-grass *Lolium multiflorum* is occasional, and common couch *Elytrigia repens* is rare. Among the broadleaved species, the following are frequent: ribwort plantain *Plantago lanceolata*, creeping buttercup *Ranunculus repens*, meadow buttercup *Ranunculus acris*, red clover *Trifolium pratense*, common bird's-foot-trefoil *Lotus corniculatus*, creeping cinquefoil *Potentilla reptans*. The following are occasional: common knapweed *Centaurea nigra*, creeping thistle *Cirsium arvense*, hawkweeds *Hieracium* spp, common ragwort *Senecio jacobaea*, creeping bent *Agrostis stolonifera*, red bartsia *Odontites vernus*, yellow-rattle *Rhinanthus minor*, common mouse-ear *Cerastium fontanum*, great willowherb, field horsetail *Equisetum arvense* and heath groundsel *Senecio sylvaticus*. Rare species include: broad-leaved dock *Rumex obtusifolius*, an unidentified orchid (probably common spotted-orchid *Dactylorhiza fuchsii*), hairy sedge *Carex hirta*, selfheal *Prunella vulgaris*, bush vetch *Vicia sepium*, and greater stitchwort *Stellaria holostea*. Some of the grassland on lower-lying ground near Tymon Lake (which may be subject to occasional flooding) has some species typical of wet grassland habitats, including abundant silverweed *Potentilla anserina* and frequent hard rush *Juncus inflexus*. In total this habitat has at least 9 grass species and 25 broadleaf species, which is considered to be particularly rich for a habitat of this type.

Some of the species-rich meadow has scattered trees, notably to the east of Tymon Lake. Many of the trees are relatively small, and were planted approx. 5 – 10 years ago. The most abundant species is pedunculate oak, but there are also some elms *Ulmus* sp, sweet chestnut *Castanea sativa*, small-leaved lime *Tilia cordata* and turkey oak *Quercus cerris*.

The species-poor habitat occurs in areas that are never mown, notably those along the banks of rivers and ponds, and in the grassland area at Whitehall Park. These habitats are typically dominated by false oat-grass, with local abundance of bindweed and brambles. Yorkshire-fog, cock's-foot, cleavers *Galium aparine* and nettle are frequent, while greater willowherb, common hogweed *Heracleum sphondylium*, common ragwort, bush vetch, ribwort plantain and wild angelica are occasional, and there are some small localised patches of winter heliotrope *Petasites fragrans* and butterfly-bush *Buddleja davidii*.

The species-rich variant is rare in Dublin, and typically only occurs in public parks that are managed appropriately, so we consider it to be of Local value. The species-poor variant is common and widespread in Dublin, and the habitat has little or no value for fauna, so it is considered to be of Negligible ecological value.

7.4.1.5 Amenity grassland (GA2) / Scattered trees and parkland (WD5)

Patches of amenity grassland are found in a number of public parks along the river corridor, notably Wainsfort Manor Crescent, Ravensdale Park, St. Martin's Drive and Mount Argus Close. The key difference from the dry meadows described above is that amenity grassland is mowed regularly, which prevents the establishment of broadleaf herbaceous species.

The grassland is dominated by perennial rye-grass *Lolium perenne*, with frequent daisy *Bellis perennis*, dandelion *Taraxacum officinale* ag., creeping buttercup *Ranunculus repens*, common bent *Agrostis capillaris* and annual meadow-grass *Poa annua*. All vegetation is kept at a low height by regular mowing during summer months.

These habitats often have some occasional planted trees, so they can also be classified as 'scattered trees and parkland'. This is particularly notable in Ravensdale Park, but also occurs to a lesser extent in other locations. Tree species include ornamental cherries *Prunus* spp., maples (*Acer pseudoplatanus, A. platanoides, A. campestre*), small-leaved lime, silver birch *Betula pendula* and copper beech *Fagus sylvatica 'purpurea'*.

All of these plant species are common and widespread in Ireland, and mowed grassland has little or no value for fauna, so the amenity grassland is considered to be of Negligible ecological value. Trees may be of Local value where they adjoin woodland or riparian habitats, but isolated trees are usually of Negligible value.

7.4.1.6 Mixed broadleaved woodland (WD1)

Patches of broadleaf woodland are found at a number of locations along the river corridor, particularly in parks and public areas. These woodlands all appear to have been planted, and to have been managed, so they are described here as 'modified' woodland rather than as semi-natural habitat. However, many areas have had little or no management for a sustained period of time, and now have a relatively natural character. The woodlands in Tymon Park are particularly diverse, although the trees are immature or semi-mature, and were planted approx. 10 – 20 years ago.

The most abundant species are sycamore *Acer pseudoplatanus* and ash *Fraxinus excelsior*. Other species include beech *Fagus sylvatica*, poplars (*Populus nigra*, *P. alba, P. tremula*) willows *(Salix alba, S. fragilis, S. cinerea, S. alba chrysocoma)*, pedunculate oak, silver birch, downy birch *Betula pubescens*, alder, lime *Tilia* sp., horse-chestnut, European Larch *Larix decidua* and elm *Ulmus sp*. The shrub layer is often quite sparse, but some areas have occasional elder *Sambucus nigra*, hawthorn *Crataegus monogyna*, holly *Ilex aquifolium*, hazel *Corylus avellana*, cherry laurel *Prunus laurocerasus* and snowberry *Symphoricarpos albus*. The ground layer often supports abundant ivy *Hedera hibernica,* brambles *Rubus fruticosus* ag and nettles *Urtica dioica*. Woodland ground-flora is abundant in places, including alexanders *Smyrnium olusatrum*, lesser celandine *Ficaria verna,* pendulous sedge *Carex pendula*, and occasional hairy-brome *Bromopsis ramosa*, wood avens *Geum urbanum*, common hogweed, cleavers and cow parsley *Anthriscus sylvestris*. Common figwort *Scrophularia nodosa* and water figwort *Scrophularia auriculata* are found in isolated patches along the river bank.

All species within the habitat are common and widespread in Ireland. It is also noted that the habitat is somewhat fragmented along the banks of the River Poddle, often separated by large patches of grassland habitat. However, broadleaf woodlands are relatively uncommon in urban areas, particularly when associated with watercourses. They also have

secondary value as an ecological corridor, and as habitat for a range of fauna. For these reasons, the woodland is considered to be of Local ecological value.

7.4.1.7 Wet willow-alder-ash woodland (WN6)

Some of the ponds in Tymon Park are surrounded by willows *Salix* spp and alder *Alnus glutinosa*, and thus are considered to be semi-natural 'wet willow-alder-ash woodland'. These areas grade into mixed broadleaved woodland away from the water's edge, and much of the ground flora is the same. This habitat is also considered to be of Local ecological value.

7.4.1.8 Treeline (WL2)

In some places the mixed broadleaved woodland is restricted to a linear strip of planted trees – particularly of beech, aspen *Populus tremula* and other poplars *Populus* spp – so it is more accurate to describe them as treelines. All other aspects of the habitat are as described above for mixed broadleaved woodland, and the habitat is also considered to be of Local ecological value.

The ESB compound in Tymon Park (refer to **Drawing No. 08133** of the planning drawings) is surrounded on all sides by lines of dense cypress trees *Cupressus leylandii*. These non-native conifers are considered to be of negligible value for habitats and flora, although it is noted that they may have secondary value for fauna such as nesting birds.

7.4.1.9 Hedgerow (WL1)

Some short sections of hedgerow are found in Tymon Park, including along the bank of the river to the south-west of Tymon Lake. The most abundant species are hawthorn, blackthorn *Prunus spinosa* and hazel, while dog-rose *Rosa canina* is frequent, and ash, wych elm, rowan *Sorbus aucuparia* and spindle *Euonymus europaeus* are occasional. One short section of hedgerow at the western end of Whitehall Park consists entirely of immature sycamore trees. Most hedgerows are square in profile and appear to be cut on an annual basis. These habitats consist of common and widespread species, but they have secondary value as ecological corridors and habitat for a range of fauna, so they are considered to be of at least Local ecological value.

Elsewhere, sections of hedgerow have been planted as screening along the boundaries of residential properties. They typically consist of a single species of non-native shrub such as cherry laurel or *Griselenia littoralis*, and the ground flora is very limited. All non-native hedgerows are considered to be of negligible value for habitats and flora, although they may have secondary value for fauna such as nesting birds.

7.4.1.10 Recolonising bare ground (ED3)

This habitat occurs at one location – Fortfield Road – at which ruderal vegetation has partially colonised a former track used for the maintenance of the river. It occurs underneath a treeline and adjacent to scrub and species-poor dry meadow, and shares many of the plant species described in other habitats above. However, a number of other ruderal species were recorded, including frequent wood avens, Herb-Robert *Geranium robertianum*, lesser trefoil *Trifolium dubium*, cow parsley and yarrow *Achillea millefolium*, and occasional greater plantain *Plantago major*, traveller's-joy *Clematis vitalba*, tutsan *Hypericum androsaemum*, creeping cinquefoil, dandelion, bittersweet, Canadian fleabane *Conyza canadensis*, nipplewort *Lapsana communis*. Rare species include broad-leaved

helleborine *Epipactis helleborine*, meadow vetchling *Lathyrus pratensis*, fern-grass *Catapodium rigidum*, wood millet *Milium effusum* and feverfew *Tanacetum parthenium*.

The habitat consists of a range of common ruderal species, and is considered to be of Negligible ecological value. However, one rare plant species – broad-leaved helleborine – is of Local value, and is discussed in greater detail under 'Rare or Protected Flora' below.

7.4.1.11 Scrub (WS1)

In many places the banks of the river are lined by dense linear strips of overgrown scrub, particularly in areas that are not accessible to the public. It is typically dominated by bramble, with other shrubs including snowberry, dog-rose, hawthorn, garden exotics, and tree saplings. There are some occasional emergent trees, notably ash and sycamore, and smaller numbers of willows and alder. The ground layer includes nettles, bindweed *Calystegia sepium*, winter heliotrope *Petasites fragrans*, horsetails *Equisetum* spp, great willowherb, false oat-grass *Arrhenatherum elatius*, cock's-foot *Dactylis glomerata*, hogweed *Heracleum sphondylium* and broad-leaved dock *Rumex obtusifolius*.

All of these plant species are common and widespread in Ireland. However, as part of the longer riparian corridor associated with the River Poddle, the habitat has secondary value for ecological connectivity, and for a range of fauna. For these reasons, all scrub is considered to be of local ecological value.

7.4.1.12 Rare or Protected Flora

No protected or red-listed plant species were encountered during field surveys, including any of the species listed in **EIAR Volume 4, Appendix 7-3**. However, three species were recorded that are relatively rare within Dublin city, and they are described below.

Flowering rush *Butomus umbellatus* is found within the river channel near Tymon Lake, particularly in the section downstream of Tymon Lake. This species does not receive any legal protection in Ireland and is not included on the red list of flowering plants (Wyse-Jackson *et al.* 2016). However, it is rare in Dublin city, as it is only found along the River Liffey valley, in Tymon Park, and in the campus of University College Dublin (based on online mapping from the BSBI and NBDC[4]).

Galingale *Cyperus longus* is also found around Tymon Lake, particularly in the northern pond and stream. This species is not listed in *An Irish Flora* (Parnell & Curtis, 2012) nor in the Irish Red List for Vascular Plants. In *Grasses, Sedges, Rushes and Ferns of the British Isles and North-western Europe* (Rose 1989), its distribution is described as "*Br Isles: England, Kent to Cornall, and S Wales only. Eur: W to SW France; very local and rare.*" On this basis, and following a review of records on the BSBI and NBDC databases, the ponds in Tymon Park appear to be the only record of this species on the island of Ireland. Considering that the ponds in Tymon Park were only created in the 1980s / 1990s, the presence of galingale at this location is likely to be a recent introduction, either planted as part of the landscaping of the park, or introduced accidentally in imported materials. Nonetheless, as a rare species, and the only national record, it is considered to be of botanical importance.

A small patch (four stems) of broad-leaved helleborine *Epipactis helleborine* was found in a patch of recolonising bare ground near Fortfield Road. Similarly, this species is not

[4] Online records of the Botanical Society of the British Isles [available at https://bsbi.org/maps], and the National Biodiversity Data Centre [https://maps.biodiversityireland.ie/Map]

protected or red-listed, but it is rare in Dublin City, restricted primarily to the River Dodder valley, with some scattered records near Sandyford.

All of these species are considered to be of Local ecological value. In the interests of clarity, it is noted that none of these species is legally protected, nor are listed as endangered on the Irish Red List for Vascular Plants.

7.4.1.13 Invasive Plant Species

Three invasive plant species listed on the third schedule of the *European Communities (Birds and Natural Habitats) Regulations* 2011 (SI 477/2011, as amended) were recorded in the study area: giant-rhubarb *Gunnera tinctoria*, Japanese Knotweed *Fallopia japonica* and Nuttall's waterweed *Elodea nuttallii*.

Three patches of giant-rhubarb were found in the west of Tymon Lake (the largest of the three ponds) in September 2018, near the inflows from the other two ponds. When the site was revisited in August 2019, the plants had been removed, although some immature remnant growth was observed in the former locations, possibly from fragments of rhizome left after removal. Although giant-rhubarb is listed as a legally-restricted invasive plant, there is no sign that they have spread around Tymon Lake. This is expected, because giant-rhubarb is only invasive on the western coast of Ireland (particularly Mayo, Galway and Kerry), and it is rarely problematic in other parts of Ireland. Therefore, the plants are not considered to be invasive in Tymon Park, although the legal restrictions on this plant are still applicable.

A small patch of Japanese knotweed was found in the north-west of Tymon Park. It is located more than 250 m from the proposed working areas, so there is no risk that it would be affected during construction works. Therefore, it is not considered to be an 'important ecological feature' for the purposes of this impact assessment.

Nuttall's waterweed was recorded in the channel of the River Poddle, notably within Tymon Park. Patches of the plant were observed, but it was not considered to be particularly dense, or to obstruct the channel. Nonetheless, the legal restrictions on this plant still apply.

Some other plant species recorded during habitat surveys are non-native and can be invasive in places, notably cherry laurel, snowberry, winter heliotrope and pendulous sedge. However, these species do not have any legal restrictions, and none appeared to be highly invasive within the study area. Therefore, these plants are not considered to be 'important ecological features' for the purposes of this impact assessment.

7.4.2 Fauna

Descriptions of rare and protected fauna observed in the vicinity of the proposed development site are outlined below. For some nocturnal or secretive species, an appraisal of habitat suitability is provided.

7.4.2.1 Fish

The River Poddle does not currently support any salmonid species, nor any large coarse fish (pers. comm. Inland Fisheries Ireland). This is mainly due to the extensive culverting of the river, particularly the lower sections underneath Dublin city centre, which prevents fish from migrating from the River Liffey into the River Poddle. Other reasons include poor water quality throughout the river, and the relatively small size of the watercourse.

The only species known to use the river are three-spined stickleback *Gasterosteus aculaeatus* and minnow *Phoxinus phoxinus* (pers. comm. Inland Fisheries Ireland). These species are common and widespread throughout Ireland and are present in almost all watercourses. Therefore, the River Poddle is considered to be of Negligible ecological value for fish.

7.4.2.2 Otters

Otters are regularly recorded on the River Dodder and Grand Canal, and there have been some occasional sightings on the River Poddle (NBDC online databases, and pers. comm. SDCC Heritage Officer), particularly in Tymon Park. A series of otter surveys were carried out within the zone of influence of the flood alleviation scheme in 2018 and 2019, as follows:

- Surveys of Bancroft and Tymon Parks were carried out by ecologists of Roughan & O'Donovan Consulting Engineers between January and April 2018;
- Surveys of river bank within the boundary of Dublin City Council were carried out by Brian Keeley (Principal Ecologist of Wildlife Surveys Ireland) in September 2018;
- All of the study area was resurveyed by NM Ecology Ltd in October 2018 and March 2019.

No otter holts, nor any other evidence of otter, was found during any of the field surveys. Therefore, although it is possible that the River Poddle is used occasionally by otters, it does not support a resident or regularly-occurring population. Due to the impoverishment of fish populations in the river, it is unlikely to have enough food stocks to sustain even a single individual. On this basis, the study area is considered to be of Negligible importance for otters.

7.4.2.3 Badgers

As noted above, badger surveys of the study area were undertaken on a number of occasions by ecologists of Roughan & O'Donovan Consulting Engineers, Wildlife Surveys Ireland, and NM Ecology Ltd. There are records of badgers in the surrounding 10km square (National Biodiversity Data Centre online data viewer), including a number of records around Tymon Park.

Two badger setts were recorded in Tymon North by ecologists of Roughan & O'Donovan Consulting Engineers in early 2018: an active, nine-entrance main sett, and an inactive, two-entrance outlier sett. The locations of the setts are not shown in this chapter in order to avoid the risk of persecution, but they are located approximately 500m and 150m (respectively) from any aspect of the proposed development. Therefore, they are considered to be outside the zone of influence of the proposed development. On this basis, the study area is considered to be of Negligible importance for badgers.

7.4.2.4 Other Terrestrial Mammals

No mammals were observed during field surveys. Records of the following protected mammals were obtained from the National Biodiversity Data Centre online database in the surrounding 10km square (refer to **EIAR Volume 4, Appendix 7-3**): sika deer, pine marten, red squirrel, stoat, hedgehog, brown hare, Irish hare, and pygmy shrew. Almost all of these records are from Tallaght and/or Ballyboden; none were from the River Poddle or its surroundings.

Sika deer *Cervus nippon*, pine marten *Martes martes* and red squirrel *Sciurus vulgaris* are primarily associated with woodland / forest habitats, and parts of the woodland and scrub habitat would be suitable for all three species. However, woodland along the River Poddle is highly fragmented, and any animals moving along the river corridor would need to cross a number of roads, because the culverts are largely impassable. No signs of any of these species were found during site surveys, and no breeding or resting places were observed in any trees. Therefore, the proposed development site is of Negligible importance for these species.

The Irish hare *Lepus timidus* subsp. *hibernicus* and brown hare *Lepus europaeus* are common and widespread in Ireland. Hares may use parts of the proposed development site on an occasional basis, but in practice it is highly unlikely that any would be present, due to the high levels of disturbance by humans and dogs. No hares were encountered during the surveys, so the site is of Negligible importance for them.

Hedgehog, pygmy shrew and stoat are also widespread in Ireland, and are occasionally found in hedgerow, woodland or scrub habitats in urban regions. It is possible that some or all of these species would use the proposed development site on an occasional basis, so on a precautionary basis the site is considered to be of Local value for these species.

7.4.2.5 Bats

Foraging and commuting habitats

A bat survey of the river corridor within the boundary of Dublin City Council (i.e. works areas between Mount Argus Close and Ravensdale Park) was carried out by Brian Keeley in September 2018 using handheld bat detectors. The results were noted as follows:

> *"Three species of bat were in evidence within this survey. Of these, the most common species was the common pipistrelle. This is the most common species in Ireland and it is found throughout Dublin city. This species is a regular house-dweller and it is probable that the bats noted [may roost] in houses and other buildings relatively close to the Poddle. Soprano pipistrelle activity was also noted at Mount Argus. This species is more strongly associated with water courses and water bodies than common pipistrelles. The third species - Leisler's bat - was seen and heard flying over the Park early in the survey period."*

A separate survey within the boundary of South Dublin County Council (works areas between Fortfield Road and Tymon Park) was carried out by NM Ecology Ltd. in August 2019. A high level of bat activity was recorded around Tymon Lake, with constant activity by common pipistrelles, frequent activity by soprano pipistrelles, and single records of Leisler's bat and a *Myotis* species (cf *M. daubentonii*). The areas of highest feeding activity were around the reedbeds and tall-herb vegetation around the margins of the lakes / ponds, but bats were also active above the water. Bat activity was much lower in the remainder of the survey area, with only occasional passes by pipistrelles and Leisler's bats along the section of river to the east of Tymon Lake (the proposed location of the Integrated Constructed Wetland), as well as Tymon North, Whitehall Park, Wainsfort Manor Crescent and Fortfield Road. Maps of these bat records are provided in **Figure 7-3 to 7-7**.

The three main species – common pipistrelle, soprano pipistrelle and Leisler's bats – represent the typical bat assemblage in Dublin. They are common and widespread throughout Dublin City, particularly in areas with mature trees and water. The River Poddle

and its associated lake / pond, woodland and scrub habitats are likely to be a key foraging and commuting area for bats in the south-west of Dublin city, so the site is considered to be of Local importance for these three species. All other works areas are considered to be of Negligible importance for foraging / commuting bats.

Daubenton's bats are frequently recorded on some of the major watercourses in Dublin City, including the River Liffey, River Dodder and River Tolka, and some suburban sections of the Grand Canal and Royal Canal. Daubenton's bats were not recorded by Brian Keeley in September 2018, and only a single Myotis bat (likely to be a Daubenton's bat) was recorded by NM Ecology Ltd in August 2019. It is noted that Daubenton's bats typically favour relatively large watercourses with sections of flat water, so the River Poddle is considered to be of low suitability for this species. On this basis, the River Poddle is considered to be of Negligible value for Daubenton's bats.

No Nathusius' pipistrelle bats were recorded by Brian Keeley in September 2018, and there are no prior records of this species on the NBDC database within 1 km of the River Poddle. The other bat species known to occur in Dublin – brown long-eared bat, Natterer's bat and whiskered bat – are rarely recorded in urban areas, as they usually avoid brightly-lit areas. They have been recorded in Phoenix Park and Marlay Park, but not within 1km of the River Poddle. Therefore, the River Poddle is considered to be of Negligible value for these species.

Potential roost features

Bats typically roost in buildings, bridges and mature trees. There are a large number of buildings in the vicinity of the proposed development, but all are considered to have negligible or low suitability for roosting bats (as per the classification system in Collins, 2016). Some old buildings in the broader surroundings (*e.g*. Kimmage Manor, Mount Argus Church) are considered to have moderate or high suitability for roosting bats, but none of these structures are within 100 m of the study area.

All bridges within the zone of influence were inspected, but none had any crevices or cavities that would be suitable for roosting bats. The footbridge in Ravensdale Park (which is within the proposed working area) is constructed of a concrete arch with masonry sides and is considered to have negligible suitability for bats.

Tree removal will be required at a number of the proposed working areas. Preliminary ecological appraisals (i.e. ground-level visual inspections) were carried for all trees that would be removed as part of the proposed development, but none were considered to have any suitability for roosting bats. All were immature or semi-mature, with intact trunks and branches, and no cavities, crevices or major wounds. Some old trees with moderate or high suitability for bats were found in Mount Argus Park and the grounds of Kimmage Manor, but none of these trees are within 100m of the study area.

In summary, all buildings, bridges and trees in the vicinity of the proposed development are considered to be of negligible suitability for bats.

7.4.2.6 Birds

Brent geese and other over-wintering waterfowl

Tymon Park has previously been used by light-bellied brent geese *Branta bernicla hrota* as a feeding area. This species spends the winter in Ireland (typically between September / October and March / April), and then migrates to the high Arctic during summer months

to breed. Dublin Bay and the surrounding area supports several thousand brent geese in winter months. They feed in coastal areas at low tide, but at high tide they often fly inland to feed on grasslands. There are a number of urban parks and sports fields in Dublin city that are used by geese, but Tymon Park has previously been used in significant numbers. There are anecdotal records of 1,200 brent geese in the park in 2008[5], and 700 geese in 2009[6].

Weekly surveys of over-wintering birds were carried out in Tymon Park between January and mid-April 2018 by ecologists of Roughan & O'Donovan Consulting Engineers, comprising 14 surveys in total. Brent geese were a particular focus of the survey, and the traditional feeding areas for this species in the north-west of the park were included in the survey area. Brent geese were observed flying over the park (but not landing) during one of the surveys in January and are believed to have landed in Greenhills Park to the north of the site. However, brent geese were not observed during any of the other 13 surveys. The ecologists made some notes about sources of disturbance in the park, as follows: "*Brent Geese have not used Tymon Park in recent years as a result of constant disturbance by dogs. In addition, a dog park was built next to the area that was used by Brent Geese in the fields at the north end of Tymon Park East.*" Therefore, it was concluded that Tymon Park was not used as a feeding area for Brent Geese between January and mid-April 2019.

A flock of brent geese was observed by the SDCC Heritage Officer on the 4th of February 2019 (*pers. comm.*) on playing fields in the north-west of the park. The playing fields were subsequently surveyed by NM Ecology Ltd. in early March 2019 to search for goose droppings or other signs of activity, but no evidence was found.

In summary, Tymon Park was an important feeding area for brent geese approximately ten years ago, but it now appears to be used very infrequently. This is almost certainly due to disturbance from dogs (*e.g*. in the dog enclosure in the north-west of the park), which typically causes geese to take flight, even at distances of several hundred metres. Therefore, Tymon Park is no longer considered to be an important feeding area for brent geese.

All other areas of grassland along the River Poddle (*e.g*. Ravensdale Park) are considered to be of negligible value for brent geese, because they are small in size, surrounded by dense vegetation, have trees overhead (thus obstructing flight paths for geese), and are frequented by dog walkers.

Other over-wintering waterfowl

A total of 19 bird species were recorded during the winter bird surveys by ecologists of Roughan & O'Donovan Consulting Engineers between January and April 2018. Mallard, wigeon, teal, northern shoveller, tufted duck, little grebe, coot, moorhen, mute swan, grey heron and little egret were all recorded at the ponds. Large numbers of gulls (notably black-headed gulls and common gulls) were recorded in other parks, including the playing fields, Castletymon car park, and the ponds. Peak counts for all species are provided in **Table 7-4**, which is reproduced from the report by Roughan & O'Donovan Engineers in 2018.

[5] 'Eye on Nature' column in the Irish Times, 08 March 2008. Available online at www.irishtimes.com/news/eye-on-nature-1.901390

[6] 'Dublinbirding' Archive, 21st December 2009. Available online at www.dublinbirding.ie/pages/archive/December2009.htm

Table 7-4: Peak counts of birds recorded in Tymon Park in Jan – Apr 2018

Common Name	Scientific Name	Peak Count
Mute Swan	*Cygnus olor*	17
Brent Goose (w)	*Branta bernicula*	10
Wigeon (w)	*Anas Penelope*	23
Teal (w)	*Anas crecca*	5
Mallard	*Anas platyrhynchos*	126
Tufted Duck	*Aythya marila*	15
Northern Shoveler (w)	*Anas clypeata*	9
Little Grebe	*Tachybaptus ruficollis*	9
Grey Heron	*Ardea cinerea*	8
Little Egret	*Egretta garzetta*	1
Coot	*Fulica atra*	60
Moorhen	*Gallinula chloropus*	39
Black-headed Gull	*Chroicocephalus ridibundus*	356
Common Gull	*Larus canus*	234
Feral goose	*Anser sp.*	3
Feral duck	*Anas sp.*	6
Herring Gull	*Larus argentatus*	79
Lesser Black-backed Gull	*Larus fuscus*	3
Snipe (w)	*Gallinago gallinago*	1

In summary, the ponds in Tymon Park are used by a number of waterbirds, including several winter migrants. There are relatively few ponds of comparable size in the south-west of Dublin city, so the site is considered to be of local importance for breeding waterfowl.

Other sections of the River Poddle are considered to be of little importance for over-wintering birds, because the river corridor is relatively narrow and subject to frequent disturbance. Therefore, all other areas are considered to be of negligible importance for wintering birds.

Breeding waterfowl

A number of birds nest around the ponds of Tymon Park in summer months, including mute swan, mallard, coot and moorhen. Birds are often territorial during their nesting season, so most of the ponds only support a small number of pairs (1 – 2) of birds. For example, each of the three ponds in the north of Tymon Park supports a single pair of nesting mute swans. The number of nesting birds, and the locations of nests, typically varies slightly between years. However, it is assumed for the sake of this assessment that several species of waterfowl will breed at the lake / ponds in Tymon Park each year.

Coot and mute swan are currently considered to be 'amber list' species of conservation concern in Ireland (Culhoun & Cummins 2013). For coot, this is because their over-wintering population is highly localised, and because there are moderate declines in their over-wintering populations, and a moderate decline in their breeding range. For mute swan, it is because Ireland supports a significant percentage (defined as more than 20%)

of both the over-wintering and breeding populations of this species in Europe. Mallard and moorhen are not considered to be of conservation concern in Ireland.

In summary, the ponds in Tymon Park are used on an annual basis as nesting sites by mute swan, mallard, coot and moorhen. Considering the lack of other nesting sites for many of these species in the surrounding area, these ponds are considered to be of Local importance for breeding waterfowl.

It is highly unlikely that these species nest elsewhere on the River Poddle, because the river channel is quite narrow (*e.g*. 1 – 2m), few species nest on moving water, and because of the high levels of disturbance by humans and dogs along most sections of the river. Therefore, all other sections of the river are considered to be of Negligible value.

Other bird species

Grey wagtail *Motacilla cinerea* were observed feeding along the river channel on a number of occasions. Dipper *Cinclus cinclus* were not observed, but are common on watercourses in the Dublin area, and are likely also to use the River Poddle on occasion. Both species nest adjacent to rivers, often in bridges or other man-made structures. The grey wagtail is currently of conservation concern in Ireland, due to rapid declines in their breeding population, but dipper are not of conservation concern. As there are only a small number of watercourses in Dublin, the River Poddle is considered to be of Local value for these species.

Grey heron *Ardea cinerea* and little egret *Egretta garzetta* were observed feeding in the river on occasion. However, the relatively small size of the watercourse and the high levels of disturbance in some areas (e.g. by domestic dogs) reduces the suitability of the watercourse for these species. No nesting colonies (heronries) were observed in the study area, although it is possible that individual birds may nest in trees in the study area. Both species are common and widespread in Ireland, and they are not of conservation concern. However, as there are only a small number of watercourses in Dublin, the River Poddle is considered to be of Local value for these species.

No kingfishers *Alcedo atthis* were observed during the survey, nor any vertical earth banks suitable for their nesting burrows. There are no desktop records of kingfishers on the River Poddle. Therefore, the river is of Negligible value for this species.

A number of other common urban / garden birds were recorded in woodland / scrub vegetation alongside the river, including robin, wren, chaffinch, blackbird, song thrush, blue tit, great tit, rook, jackdaw and hooded crow. It is highly likely that some of these species will nest in riverside vegetation. No rare bird species were recorded in the area, and there is extensive nesting habitat in the surrounding area, so the vegetation along the banks of the River Poddle is considered to be of Negligible ecological value for these species. Nonetheless, all birds (including nests, eggs and chicks) receive protection under the Wildlife Act 1976 (as amended).

7.4.2.7 Reptiles and Amphibians

No reptiles or amphibians were observed during the site survey. The ponds in Tymon Park and Mount Argus may be suitable breeding sites for smooth newts *Triturus vulgaris* and common frogs *Rana temporaria*. On a precautionary basis the site is considered to be of Local value for both species.

Common lizards *Zootoca vivipara* occur at a very low density in Ireland and are usually only recorded in upland heath / bog habitats and sand dunes, so the River Poddle and associated habitats are considered to be of Negligible value for this species.

7.4.2.8 Terrestrial Invertebrates

Some of the dry meadow habitat in Tymon Park is managed for pollinators and other invertebrates, and a broad diversity of species was observed during habitat surveys. The reedbeds and tall-herb communities around the lakes / ponds in Tymon Park also supported a diverse range of invertebrates. Detailed invertebrate surveys were not undertaken as part of this assessment, but due to the diversity of species observed, the dry meadow, reedbed and tall-herb habitats are considered to be of Local importance for invertebrates. All other habitats in the survey area are common and widespread in urban areas, and are considered to be of Negligible importance for invertebrates.

7.4.3 Potential Limitations and Information Gaps in this Study

Habitat surveys were carried out in summer months (August 2018, May and August 2019), which are ideal periods for botanical surveying. Bat surveys were carried out in September 2018 and August 2019, which is within the ideal survey period. Surveys for mammal breeding resting places (*e.g*. badger setts and otter holts) were carried out in winter and spring, which is the ideal survey period. Bird surveys were undertaken throughout the year. Therefore, the data presented in this chapter is not considered to have any significant limitations or information gaps.

7.4.4 Identification of Important Ecological Features

Summaries of the ecological valuation and legal / conservation status of habitats and fauna are provided in **Tables 7-5** and **7-6**. For the purposes of this impact assessment, any features that are valued at Local importance or higher, and/or that receive legal protection, are considered to be 'important ecological features', and will be included in the impact assessment. Features of Negligible value and without legal protection (e.g. three-spined stickleback and minnow) are not included in the impact assessment.

Table 7-5: Identification of important ecological features: designated sites, habitats and flora

Ecological feature	Ecological Valuation	Important Ecological Feature?
Natura 2000 sites	International	Yes
Natural Heritage Areas	National	No
Lowland watercourse (FW2)	Local	Yes
Artificial lakes and ponds (FL8)	County	Yes
Reed swamps (FS1) and Tall-herb Swamps	County	Yes
Mixed broadleaved woodland (WD1)	Local	Yes
Wet willow-alder-ash woodland (WN6)	Local	Yes
Treeline (WL2) / Native hedgerows (WL1)	Local	Yes
Scrub (WS1)	Local	Yes

Ecological feature	Ecological Valuation	Important Ecological Feature?
Recolonising bare ground (ED3)	Local	Yes
Species-rich dry meadow (GS2)	Local	Yes
Species-poor dry meadow (GS2)	Negligible	No
Artificial surfaces (*i.e.* footpaths, walls, BL3)	Negligible	No
Amenity grassland (GA2) / Scattered trees and parkland (WD5)	Negligible	No
Rare plants (flowering rush, galingale and broad-leaved helleborine)	Local	Yes
Invasive plant (Giant rhubarb, Nuttall's waterweed)	-	Yes

Table 7-6: Identification of important ecological features: fauna

Ecological feature	Ecological valuation	Legal protection*	Important Ecological Feature?
Fish	Negligible	-	No
Common pipistrelle, soprano pipistrelle and Leisler's bats	Local	HR	Yes
Hedgehog, pygmy shrew and stoat	Local	WA	Yes
Badgers	Negligible	WA	No
Otters	Negligible	WA	No
Other terrestrial mammals	Negligible	WA	No
Winter birds in Tymon Park	Local	HR	Yes
Brent geese	Negligible	HR	No
Breeding birds in Tymon Park	Local	HR	Yes
Grey wagtail, dipper, grey heron, little egret	Local	HR	Yes
All other nesting birds	Negligible	WA	Yes
Kingfisher	Negligible	HR	No
Smooth newt and common frog	Local	WA	Yes
Common lizard	Negligible	WA	No
Invertebrates (Tymon Park)	Local	Various	Yes

** WA: Wildlife Act 1976 (as amended), HR: European Communities (Birds and Natural Habitats) Regulations 2011 (as amended)*

In summary, the important ecological features for this assessment are:

- Natura 2000 sites in Dublin Bay

- Habitats: rivers, ponds / lakes, reedbeds and tall-herb swamps, woodland, treelines / hedgerows, scrub, species-rich dry meadow and recolonising bare ground
- Rare flora: flowering rush, galingale, broad-leaved helleborine
- Invasive species: giant rhubarb, Nuttall's waterweed
- Mammals: three bat species (common pipistrelle, soprano pipistrelle and Leisler's bats) and three other terrestrial mammals (hedgehog, pygmy shrew and stoat)
- Wintering and breeding birds in Tymon Park
- Aquatic birds (grey wagtail, dipper, grey heron, little egret) and other nesting species throughout the study area
- Smooth newt and common frog
- Invertebrates: pollinators and other species in selected habitats in Tymon Park

7.5 Potential Impacts

7.5.1 Construction Phase

7.5.1.1 Designated Sites

The River Poddle is a tributary of the River Liffey, which provides a hydrological pathway to four Natura 2000 sites in Dublin Bay. There is a considerable distance between the proposed development site and the nearest downstream Natura 2000 site, with approximately 10km of intervening watercourse from the nearest point of the proposed development (at Merchant's Quay), and approximately 15km from the farthest point (Tymon North). Considering the dilution effect of the intervening rivers and coastal waters, it is considered highly unlikely that any pollutants generated by the proposed development could reach the Natura 2000 sites in high-enough concentrations to affect the qualifying interests of any site.

However, adopting a precautionary approach (implicit in the EU Habitats Directive and confirmed by European Court judgments), it is possible in a worst-case scenario that a large-scale pollution event could cause adverse effects on the conservation status of the qualifying interests of European sites. Therefore, in accordance with best practice, it is recommended that appropriate mitigation measures are employed during construction in order to avoid or reduce the potential impacts of pollution incidents. Further details are provided in the Natura Impact Statement that accompanies this application.

7.5.1.2 Habitats

A summary of permanent and temporary impacts on habitats within the footprint of the development is provided in **Table 7-7**. Column 1 refers to the planning drawing number (refer to **Part 2, Planning Drawings** of the Planning Documentation), column 2 to the proposed works that will be carried out, column 3 to the nature of impacts, and column 4 to the ecological value of each habitat.

Table 7-7: Habitats within the development footprint

Planning Drawing No. and Location	Proposed works	Impacts on Habitats	Valuation
Drawing No. 08132 Tymon North)	Construction of an embankment	Permanent removal of mixed broadleaved woodland (mainly poplar and sycamore) Temporary river crossing and scrub removal Temporary access track *via* existing footpaths and amenity grassland	Local Local Negligible
Drawing No. 88133 (Tymon North, ESB substation)	Construction of an embankment	Permanent removal of a non-native treeline (Leyland cypress) Temporary access track *via* existing roads and footpaths	Negligible Negligible
Drawing No. 08140 (Tymon Park)	Temporary site compound	Temporary disturbance of species-rich dry meadow	Local
Drawing No. 08140 (Tymon Park)	Temporary storage areas	Temporary disturbance of amenity grassland and species-poor dry meadow. Permanent removal of a short section (*e.g.* up to 5m) of hedgerow	Negligible
Drawing No. 08141 (Tymon Park, west of woodland)	Construction of an embankment	Permanent removal of an existing footpath and adjacent amenity grassland, but also two small patches of immature broadleaved woodland (ash, pedunculate oak, *etc.*) Temporary access track *via* existing roads and footpaths	Negligible (footpath and grassland), Local (woodland) Negligible
Drawing No. 08142 (Tymon Park, east of woodland)	Construction of an embankment	Permanent removal of some mixed broadleaved woodland (mostly ash) and species-rich dry meadow Temporary access track *via* existing roads and footpaths	Local (woodland and meadow) Negligible
Drawing No. 08143 (Tymon Park, east of lake)	Construction of an embankment and flow control structure	Permanent removal of species-rich dry meadow, a small patch of immature broadleaved woodland, and some scattered immature trees Temporary access track *via* existing roads and footpaths	Local (meadow, woodland and trees) Negligible
Drawing No. 08146 (Tymon Park)	Integrated constructed wetland	Permanent removal of species-rich dry meadow Temporary access track *via* existing footpaths and some species-rich dry meadow	Local Negligible (paths), Local (meadow)
Drawing No. 08151 (Whitehall Park)	River re-alignment	Permanent removal of a section of existing river channel	Local

Planning Drawing No. and Location	Proposed works	Impacts on Habitats	Valuation
		Permanent removal of species-poor dry meadow, and construction of a new river channel Temporary access *via* species-poor dry meadow	Negligible Negligible
Drawing No. 08152 (Wainsfort Manor Crescent)	Replacement / reinforcement of an existing retaining wall	Permanent removal of a semi-mature treeline (willow, sycamore, lime, *etc*.) Temporary site compound on amenity grassland, and temporary access *via* existing roads and footpaths	Local Negligible
Drawing No. 08155 (Fortfield Road)	Replacement / reinforcement of an existing retaining wall	Replacement / reinforcement of an existing wall Temporary access may disturb an existing treeline and recolonising bare ground	Negligible Local (treeline and recolonising bare ground)
Drawing No. 08160 (Ravensdale Park)	Construction of a concrete retaining wall and pedestrian bridge	Permanent removal of amenity grassland and some treelines (Norway maple and lime trees) Temporary set down area and access on existing footpaths and amenity grassland	Local (treeline) Negligible
Drawing No. 08165 (St Martins Drive)	Construction of a concrete retaining wall	Permanent removal of a treeline (ash, sycamore, field maple) and some amenity grassland Temporary set down area and access *via* existing roads and amenity grassland	Local (treeline) Negligible (amenity grassland) Negligible
Drawing No. 08170 (Mount Argus Close)	Construction of a concrete retaining wall	Permanent removal of amenity grassland, and some temporary disturbance	Negligible
Drawing Nos. 08250 & 08251 (Various locations)	Sealing manholes	Temporary disturbance of existing roads and some species-poor dry meadow	Negligible

In summary, the proposed development will have permanent impacts on areas of species-rich dry meadow, broadleaved woodland and treeline habitats, all of which are of Local value. There will also be temporary impacts on species-rich dry meadow, treeline, recolonising bare ground and the River Poddle, which are also of Local value. In all cases, the extent of impacts will affect only a small proportion of habitats within the study area. However, due to the extent and duration of impacts, they are considered to be Significant impacts in the context of EIA (as per EPA Guidelines). All other habitats in the footprint of the proposed development are of Negligible value. There will be no loss of the County-value habitats around Tymon Lake.

The permanent impacts are considered to be unavoidable, because the locations for proposed works are spatially constrained, *e.g*. in topographical depressions. Trees are widespread along the river corridor, and are often growing in close proximity to existing retaining walls that require reinforcing / replacement, so it would not be possible to implement the proposed development without removing some trees. However, the project has been designed with the aim of removing trees only where necessary. In addition, the ecologist liaised with engineers regarding the areas for temporary works (*e.g*. access routes and spoil storage areas), in order to highlight habitats that should be protected. Therefore, some temporary impacts on habitats of Local value have been avoided.

Where habitat loss was unavoidable, measures have been taken to reinstate or provide replacement habitat. A range of landscape enhancement measures are outlined in the accompanying report, which are considered to be a component of the design of the proposed development. Where embankments will be constructed on species-rich dry meadows in Tymon Park, the existing topsoil will be stripped and re-laid on the surface of the embankment, allowing species-rich meadow to re-establish in these areas. New areas of species-rich meadow will also be created toreplace similar habitat which is lost in the footprint of the integrated constructed wetland; suitable locations are in Tymon Park or Whitehall Park, but the final location will be determined at the detailed design stage.

Replacement tree and woodland planting in Tymon Park, Ravensdale Park and St Martins Drive will be provided for the loss of broadleaved woodland and treeline habitats with two trees planted for every tree that will be removed. All temporarily-disturbed habitats will be re-instated to match the baseline habitats. Further details of these proposals are provided in the landscape mitigation plan for the proposed development (Refer to **EIAR Volume 3** - *Landscape Mitigation*). Overall, the total extent of dry meadow, broadleaved woodland and treeline habitats following the implementation of the landscape mitigation plan will be equal to, or slightly higher than, the baseline scenario. It will take 1 – 2 years for the meadows to re-establish, and 10 – 20 years for the trees to re-establish, but after this lag period there will be a neutral impact on these habitats.

It is also important to note that the integrated constructed wetland will enhance the ecology of the area, complementing the species-rich reedbeds and tall-herb swamps around Tymon Lake. Some additional patches of marginal wetland vegetation will also be planted around Tymon Lake. It will take up to 5 years for the vegetation to fully establish, but after this lag period it will have a positive ecological impact of Local significance.

The re-alignment of river at Whitehall Park will result in the loss of an existing section of river habitat, and the construction of a section of new channel. The new channel will be constructed in accordance with best practice, and will incorporate a graded profile with a basal width of 3 m. This is approximately equal to the existing channel width, so there will not be a significant change in the flow rate or dynamics of the watercourse at this location. It will take up to five years for the vegetation to fully establish in the new channel, but after this lag period there will be a neutral impact on this habitat.

Subject to the habitat mitigation measures outlined above, all temporary and permanent impacts on habitats would be reduced to Not Significant or Imperceptible.

7.5.1.3 Rare flora

Flowering rush is present in the channel of the River Poddle immediately downstream of Tymon Lake (the largest of the ponds in Tymon Park). The integrated constructed wetland will be developed along this section of the river, and will involve some modification of the

river banks and channel. Most of the flowering rush plants in the channel will be retained in their current positions, but it is possible that some plants adjacent to the river bank will be disturbed. If this is the case, there could be Slight to Moderate impacts on these plants, which are of Local value.

A small patch of broad-leaved helleborine was found in a patch of recolonising bare ground near Fortfield Road. The plants are growing on the edge of an access track beside the river, in an area that is likely to be used by construction vehicles during the construction of an adjacent retaining wall. The permanent loss of these plants would have a Slight to Moderate impacts, on features that are of Local value

Galingale is present around some of the ponds adjacent to Tymon Lake. None of these locations are within the footprint of construction works, and there will be no direct or indirect impacts on this species.

7.5.1.4 Invasive species

Some patches of giant rhubarb were found in the west of Tymon Lake. Mature plants were recorded in 2018, but in 2019 it appears that they were removed, leaving only some immature remnant growth, possibly from fragments of rhizome left after removal. This species is listed on the third schedule of the *European Communities (Birds and Natural Habitats) Regulations 2011)*, under which it is an offence to intentionally cause it to spread. There will be no construction work in the vicinity of the giant rhubarb plants, so there will be no fragmentation or movement of any part of the plants. This species is not invasive in the east of Ireland, and there is no evidence that it is spreading in its current location, either around the pond or further downstream. Overall, there is no risk that any invasive plant material will be spread during construction works, nor does there appear to be any risk of spread if the plant is left in its current location.

Nuttall's waterweed occurs in the channel of the River Poddle, notably within Tymon Park. Some patches are in the vicinity of the proposed integrated constructed wetland, and it is possible that they may be disturbed during construction works. If any plants were spread, it would constitute an offence under the *EC (Birds and Natural Habitats) Regulations 2011*.

7.5.1.5 Bats

Foraging and commuting bats

Bat activity was relatively low in most of the areas that were surveyed, and almost all records were of species that are common and widespread in Dublin city: soprano pipistrelle, common pipistrelle and Leisler's bats. Overall, the River Poddle is considered to have relatively low value for bats, due to fragmentation effects caused by artificial lighting, and gaps in tree cover. The only location in which bats were recorded in significant numbers was at Tymon Lake, where soprano pipistrelles were abundant, with moderate numbers of common pipistrelles, and single records of Leisler's and Daubenton's bats. Small numbers of pipistrelles were recorded in Mount Argus Park, Ravensdale Park, Fortfield Road and Wainsfort Manor Crescent.

There will be no change to the habitats used by bats at Tymon Lake, so there will be no direct or indirect impacts at this location. The integrated constructed wetland is likely to increase the foraging resource for bats at this location, and thus could have a Slight positive impact. Some trees will be removed at Ravensdale Park, Wainsfort Manor Crescent and St Martin's Drive, which may partially sever some commuting routes or feeding areas

for bats. However, it has been shown that pipistrelle and Leisler's bats will readily cross gaps of several metres, so small-scale tree removal would have an Imperceptible effect on foraging or commuting bats.

Potential roost features

No potential roost features were identified within any of the working areas. All of the trees in the footprint of works were inspects by the ecologist, and none had any crevices or cavities that would be suitable for roosting bats. Therefore, there will be no direct impacts on bats or bat roosts, and no offence under the *European Communities (Birds and Natural Habitats) Regulations 2011* (as amended) and the *Wildlife Act 1976* (as amended).

7.5.1.6 Terrestrial mammals (hedgehogs, stoats, pygmy shrew)

These species may occur at low densities in the scrub and woodland alongside the river. They are all highly mobile and would be able to move away from the area during construction works. However, when rearing young (typically during spring and summer months), it is possible that these species may have reduced mobility, and that they could be killed or injured during site clearance works. Depending on the species and numbers involved, it could have a Significant negative impact on their local populations.

7.5.1.7 Winter Birds

The ponds in Tymon Park are used by a number of migratory birds during winter months, including wigeon, teal and shoveller. The largest pond – Tymon Lake – will be used as a floodwater storage area, so it is likely that water levels will fluctuate, particularly during periods of heavy rainfall. However, this would have no impact on winter birds, as the birds would easily adapt to changes in water level. Therefore, there is not considered to be any risk of impacts on winter birds.

7.5.1.8 Breeding Birds

If trees and shrubs are cleared during the bird nesting season (usually between March and August, inclusive), it is possible that active nests could be destroyed. This also applies to the removal or replacement of riverside walls and bridges, which can be used as nesting sites by grey wagtail and dipper. No nests of grey wagtails, dippers, grey herons or little egrets were observed during baseline surveys, but it is possible that these species may nest in the area in the future. The killing of any birds or the disturbance of their breeding / resting places would constitute an offence under the *Wildlife Act* 1976 (as amended).

It is noted that construction works at the ponds within Tymon Lake will almost entirely be located on dry land, with no significant works in any areas likely to be used by nesting birds. Therefore, it is highly unlikely that there will be any direct impacts on breeding waterfowl (notably mute swans, mallard, moorhens and coot) around these ponds.

7.5.1.9 Non-breeding Birds

Birds are not considered to be vulnerable to impacts when they are not nesting. Some birds may be temporarily displaced during construction works, but there is alternative habitat in the surrounding area. It is noted that the proposed works will only affect a small proportion of the watercourse, so there will be alternative areas of undeveloped habitat for aquatic birds (notably grey wagtail, dipper, grey heron, little egret) throughout the

construction period. Therefore, there will be an Imperceptible impact on birds during their non-breeding periods.

7.5.1.10 Smooth newts and common frogs

As noted above, the construction works at the ponds within Tymon Lake will almost entirely be located on dry land, with no significant works within the pond. The dry meadow in the footprint of works is unlikely to be used by hibernating newts or frogs during winter months. Therefore, it is highly unlikely that there will be any direct impacts on either species.

7.5.1.11 Invertebrates

The species-rich dry meadow, reedbed and tall-herb habitats in Tymon Park are considered to be of Local importance for invertebrates. The proposed development will involve no change to these wetland habitats, and the loss of dry meadow habitat will comprise only a small proportion of the available habitat, so there will be an Imperceptible effect on invertebrate populations.

7.5.2 Operational Phase

The proposed development will require little or no human intervention during the operational period, other than some occasional maintenance work, including periodic clearing of debris from the channel and culvert screens and cutting trees and vegetation. Therefore, there is not expected to be any impact on designated sites, rare flora, invasive species, bats, terrestrial mammals or wintering / non-breeding birds. However, it is possible that fluctuating water levels could have impacts on aquatic habitats and species, as outlined below.

7.5.2.1 Habitats

No further removal of habitats will take place during the operation of the proposed development. Habitats will be managed for ecological and amenity purposes, as outlined in the landscape mitigation plan. The flood storage area in Tymon Lake may experience fluctuating water levels during periods of very high rainfall, potentially causing temporary inundation of habitats around the margins of the lake. However, the reedbed and tall-herb swamp habitats are adapted to fluctuations in water levels, and can easily survive periods of temporary inundation. Therefore, there is not considered to be any risk of direct or indirect impacts on these habitats during the operational phase.

7.5.2.2 Breeding waterfowl in Tymon Park

A number of species nest around the ponds in Tymon Park each year, including mute swan, mallard, moorhen and coot. The largest pond – Tymon Lake – will be used as a floodwater storage area, so it is likely that water levels will fluctuate, particularly during periods of heavy rainfall in winter months. However, it is possible that there could be periods of unseasonably high rainfall in spring / summer months (during the nesting season for many birds), and thus that water levels may rise significantly, which may cause the inundation of nests. If eggs or chicks are inundated, it is highly likely that they would die.

It is important to note that the proposed floodwater storage pond is approximately 1 – 1.5m lower in elevation than the two ponds immediately to its north and west. Therefore, fluctuations in water level would only affect Tymon Lake, and there would be little or no

fluctuations at either of the two adjacent ponds, or at any ponds in Tymon Park West. Tymon Lake usually supports a single mute swan nest, and small number of mallard, coot and moorhen nests.

In most years it is unlikely that there would be significant rainfall events during the nesting season, so impacts from inundation would probably only occur infrequently, *e.g*. once every five years. Chicks and eggs would be affected, but adult birds would easily be able to escape the rising water levels. The chicks of most waterbirds emerge from the nest soon after hatching (*e.g*. 1 – 2 days for mute swans), so the main risk of impacts would occur during the egg development phase, which lasts for up to 40 days in all relevant species. If one clutch of eggs failed, it is possible that birds would attempt to lay another clutch of eggs soon afterwards. Mute swans typically only have one brood in each year, but moorhen and coot have 2 – 3 broods per year.

Overall, it is considered unlikely that flood waters would fluctuate to such an extent that they would inundate nests, but it may occur in some years. If this was the case, it is possible that single broods of mute swan, mallard, coot and moorhen may be lost. This would only occur in the largest pond (Tymon Lake), and there would be no fluctuation of water levels in any of the other ponds. In a worst-case scenario, the loss of some broods could have slight impacts on local populations of breeding waterfowl, but would not have a significant effect on local populations.

7.5.2.3 Water quality, and aquatic ecology

The integrated constructed wetland has been designed to remove nutrients and other pollutants. The following is stated in the report that accompanies this application "*It is expected that given the current receiving water quality and flows the proposed ICW will reduce pollutant concentrations to align more with Surface Water Regulations 'Good status' (Ammonia* $\bar{x} \leq 0.065$*mg/l, BOD* $\bar{x} \leq 1.5$*mg/l, and Molybdate Reactive Phosphorus* $\bar{x} \leq 0.035$*mg/l).*" The improvement of water quality will have a significant positive effect on the aquatic ecology downstream in the waterbody, including fish, aquatic invertebrates and vegetation.

After flood events the river water will be naturally turbid and will contain suspend solids and silt from the surrounding land in the catchment (refer to **Chapter 8 Hydrology and Hydromorphology**). This would have a moderate short-term negative impact on the water quality in the river. However, this is a natural, stochastic event that occurs in the baseline scenario, and the development will not significantly the likelihood or magnitude of its occurrence. Smooth newts and common frogs

The ponds in Tymon Park are likely to be used as breeding sites by smooth newts and common frogs. As noted above, it is expected that there will be fluctuations in water levels in Tymon Lake at some times of the year, potentially including the spring months in which amphibians lay their eggs. However, as the eggs of both species are laid underwater, they would not be affected by temporary changes in water level. Therefore, there will be no direct or indirect impacts on newts or frogs during construction works.

7.5.3 Cumulative Ecological Impacts

Some other developments in the vicinity of the River Poddle are discussed in **Section 7.1.5**. However, considering the relatively small scale of these developments, and their distance from the River Poddle, they would not increase the magnitude of the potential impacts on described above.

7.5.4 *'Do Nothing Scenario'*

If the proposed development does not take place, the habitats, flora and fauna of the site would remain in a similar condition to the baseline environment. The river would continue to flood in some years.

7.6 Mitigation Measures

7.6.1 Engagement of an Ecological Clerk of Works

A number of sensitive habitats and species were recorded in the vicinity of the proposed development site, and some of these mitigation measures require specialist skills. Therefore, the contractor will employ an Ecological Clerk of Works (ECoW) to oversee the implementation of the mitigation measures outlined below. The ECoW will be required to provide reports and written correspondence to the Employers' Representative as requested, in order to demonstrate compliance with the measures outlined in this report.

7.6.2 Pollution Prevention Measures (Construction phase)

A range of pollution-prevention measures for the construction phase of the proposed development are described in the Outline Construction and Environmental Management Plan (Outline CEMP) contained in **EIAR Volume 4, Part II, Appendix 5-1**. All are established measures that are widely used in construction projects, and there is a high degree of confidence in their success. The contractor will be required to employ an Environmental Manager and ECoW to assist with preparing a detailed CEMP and its implementation, and to advise on all works in close proximity to the river.

The pollution prevention measures included in the Outline CEMP are summarised as follows:

- All work within 50m of the river corridor will be planned in accordance with the contractor's ECoW and recorded in a method statement. The ECoW will give a toolbox talk in advance of works, and all working areas will be marked out clearly in advance of work;
- Silt-management measures will be implemented for all groundworks in order to prevent the release of suspended solids into the watercourse;
- The main site compound at Tymon Park will include a bunded area for the storage of pollutants, with additional areas for the stockpiling of materials, and drainage control for the washing area;
- Hazardous materials (*e.g*. fuel, cement, *etc.*) will be stored at least 50m from the river;
- Vehicles will be refuelled over drip trays;
- Spill kits will be kept in the site compound and all mobile vehicles; and
- Any concrete required for construction work will be ordered ready-mixed. Vehicles will be cleaned off site.

The re-alignment of the river at Whitehall Park will involve in-stream works, including the creation of a new section of channel, diversion of the river to the new channel, and the infilling of the existing channel. Temporary crossings of the River Poddle will be required to facilitate works in some locations, notably Tymon North and Tymon Park. In these cases, all in-stream works will comply with current best practice, notable the Inland Fisheries

Ireland *Guidelines on protection of fisheries during construction works in and adjacent to waters* (IFI, 2016) and Transport Infrastructure Ireland's *Guidelines for the crossing of watercourses during the construction of national road schemes* (TII 2008), as outlined in the CEMP. It is noted that the River Poddle is of relatively low sensitivity for aquatic ecology, as it does not support salmonids, or protected species.

Reference should also be made to the measures as outlined **Section 6.8** of **Chapter 6** of the EIAR.

7.6.3 Habitat enhancement measures (Construction phase)

Impacts on habitat will be mitigated by re-instating disturbed areas with an equivalent habitat type, *e.g*. species-rich dry meadow or a treeline. The majority of new tree and shrub planting will be of native species, complemented by some common ornamental species, *e.g*. beech, chestnut, walnut, cherries and limes.

Species-rich dry meadow will be re-instated on the surface of new embankments in Tymon Park, and in the footprint of the temporary construction compound. At the outset of construction works, all topsoil will be stripped in these areas to a depth of 200 mm, stockpiled during construction works (stored separately from other materials), and then spread in a thin layer across surface of the final areas. The stripped topsoil will provide a seed source for the re-establishment of meadows in these areas. No grass-seed should be spread in these areas, and they should not be fertilised. They will be managed in the same manner as the wildflower meadow to the north of Tymon Lake. Scattered trees may be planted in some areas, but no trees or shrubs will be planted on the embankment adjacent to Tymon Lake, because wildfowl typically prefer areas with a broad field of view.

In woodland areas some of the felled trees will be left in-situ to provide dead-wood habitat for invertebrates. New specimen trees will be planted in Tymon Park, Ravensdale Park and St Martins Drive, accounting for twice the number of trees that will be removed. Methods for the planting and maintenance of these trees are outlined in the landscaping plans that accompany this application.

7.6.4 Protection of rare flora (Construction phase)

Two species of rare plant were recorded in, or adjacent to, the footprint of proposed works: flowering rush in the channel of the River Poddle adjacent to the location of the integrated constructed wetland, and broad-leaved helleborine in a patch of recolonising bare ground adjacent to the river channel at Fortfield Road. It is noted that neither species receives legal protection, nor are they included in the red list of terrestrial plants, but both are relatively rare in Dublin city, so they are considered to be of local importance.

To ensure the protection of these species, the contractor's ECoW will review all construction works in the vicinity of these plants and will implement appropriate measures to protect them. In all instances, the priority will be to leave the plants in-situ in order to avoid or minimise disturbance, but where this is not feasible, the plants may be translocated. The approach should be as follows:

- At the outset of construction works, the contractor's ECoW will survey the affected areas in order to map all individual plants of flowering rush and broad-leaved helleborine. The survey should be carried out during the growing season for these species (May to September, inclusive)

- The ECoW will review the proposed working areas with the contractor, in order to determine whether the rare plants will be disturbed
- Where possible, plants will be left in-situ and protected during construction works. Robust measures will be taken to protect the plants, including the use of temporary fences or other similar measures
- Where such impacts are unavoidable, the plants will be translocated to a similar habitat nearby (*e.g*. shallow flowing water for flowering rush, or broadleaf woodland for broad-leaved helleborine). The ECoW should liaise with a landscape contractor regarding suitable techniques for translocation, in order to maximise chances of survival. The ECoW will also consider options for the collection and dispersal of seed if any plants are in flower

7.6.5 Control of Nuttall's waterweed (Construction phase)

Some patches of Nuttall's waterweed were observed in the channel of the River Poddle adjacent to the proposed site of the integrated constructed wetland. It is possible that some waterweed plants could be spread during construction works, which would constitute an offence under the *EC (Birds and Natural Habitats) Regulations 2011*.

Prior to the commencement of construction, the contractor's ECoW will survey the affected section of channel to map the distribution of Nuttall's waterweed. If any waterweed is observed in the footprint of works, the ECoW will prepare an Invasive Species Management Plan, which will set out the contractor's strategy to ensure compliance with the law during construction works. The plan should include measures to avoid the accidental spread of waterweed plants during construction works, and to manually remove (and dispose of) any plants within or adjacent to the proposed working area. A derogation licence will be required from the Department of Culture, Heritage and the Gaeltacht.

7.6.6 Protection of nesting birds and terrestrial mammals (Construction phase)

Under Sections 22 and 23 of the *Wildlife Act* 1976 (as amended), it is an offence to kill or injure a protected bird or mammal, or to disturb their breeding / resting places. Most birds nest between March and August (inclusive), and the peak breeding period of most small mammals is similar. It is strongly recommended that any tree or shrub removal is carried out between September and February (inclusive). If this is not possible, an ecologist will survey relevant vegetation in advance in order to determine whether any protected fauna are present. If any are encountered, the vegetation clearance will be delayed until the protected fauna have moved away from the area, *e.g*. when chicks have fledged and a nest has been abandoned.

Tree protection zones will be marked out for all retained trees and hedgerows in the vicinity of working areas.

7.6.7 Installation of nesting platforms in Tymon Lake (Operation phase)

In recognition of the risk to nesting birds in Tymon Lake (which will be used for flood storage), two floating nest platforms will be installed on the Lake. These platforms will rise and fall as water levels fluctuate, and therefore will provide a safer nesting site for species like mute swan. Research in the UK has shown that a range of waterfowl will readily use nesting rafts, particularly when rafts are surfaced with vegetation (Burgess & Hirons

1992). Refer to **EIAR Volume 4, Appendix 7-4** for more information on the construction and benefits of nesting platforms, and an example of its successful application in Co. Clare.

It is intended that the nesting platforms will be approximately 1m x 1m in size and surfaced with sods of grass or reeds. They will be constructed on stable, floating platforms, but anchored to the ground to prevent them from drifting. Advice will be sought from specialists in the design of the rafts in order to maximise the likelihood of their success.

7.6.8 Provision of nesting sites for sand martins and kingfisher

An optional measure for ecological enhancement would be the construction of artificial nesting tunnels for sand martins and/or kingfisher. These species typically nest in shallow burrows in vertical sand / mud banks on river banks. No suitable habitat for either species was observed along the River Poddle during the baseline surveys for this assessment.

The details of these features could be agreed at the design stage, but some principles are outlined below. Artificial nesting banks can be created from concrete and clay / polyethylene pipes[7], or purchased as pre-fabricated wooden boxes. Nesting sites should be located on or beside the river bank, with a minimum height of 1.5m above water level, and a length of at least 5m. The following sites would be suitable:

- The western edge of Tymon Lake, on the steep section of bank between the two streams
- The southern bank of the river downstream of Tymon Lake, immediately opposite the ICW
- The north bank of the realigned section of watercourse at Whitehall Park.

7.7 Residual Impacts

The mitigation measures outlined in **Section 7.6** will avoid or minimise impacts from the proposed development. Habitat reinstatement or replacement, including trees and woodlands, are proposed to mitigate unavoidable impacts. The implementation of these measures will be overseen by an ECoW.

The proposed pollution prevention measures will prevent fine sediments, concrete/cement, hydrocarbons and other pollutants from reaching the river and downstream designated sites. Subject to the successful implementation of these measures, the proposed development, either alone or in combination with other developments, will not adversely affect the integrity of any European sites, either directly or indirectly. A Natura Impact Statement accompanies this application.

The clearance of proposed working areas will have a slight negative impact on woodland, treeline and meadow habitats. This impact is an inevitable consequence of the development and cannot be avoided or mitigated. However, working areas will be reinstated to resemble the original habitat as closely as possible, including replacement planting of trees and meadows. In woodland areas some of the felled trees will be left in-situ to provide dead-wood habitat for invertebrates. It will take at least ten years for woodland and treeline habitats to re-establish to their baseline condition, so this will

[7] Guidelines on sand martin nesting habitat are available online: https://www.rspb.org.uk/our-work/conservation/conservation-and-sustainability/advice/conservation-land-management-advice/sand-martin-nest-sites/ or http://downloads.gigl.org.uk/website/artificial_bank_creation.pdf

remain as a Slight residual impact on the local status of these habitats in the short term, but in the medium term the impacts will be neutral.

It is noted that replacement tree planting will not be implemented at Ravensdale Park or Wainsfort Manor Crescent. However, these areas are small in extent and the habitats are urban parkland of Negligible ecological value, so the removal of small numbers of trees will have an Imperceptible effect. Considerations of the aesthetic or amenity value of these trees are made in the Tree Survey and Arboricultural Assessment that accompanies this application (see **EIAR Volume 4, Appendix 5-2** and **EIAR Volume 3**). Replacement tree planting elsewhere in the study area will more than offset the loss of at these locations.

The integrated constructed wetland will improve water quality in downstream sections of the river, and will provide additional habitat for fauna, notably aquatic habitats, breeding birds and foraging bats. This will have a positive ecological effect of Local importance.

Rare plants will be protected during construction works, either in-situ or by translocating them to a suitable receptor site. Subject to these measures, there should be an Imperceptible impact on these species.

Some Nuttall's waterweed is present in the river channel adjacent to the proposed integrated constructed wetland. The contractor will ensure that they avoid spreading the plant during construction works, and if required, will acquire a derogation licence from the Department of Culture, Heritage and the Gaeltacht. This will ensure that waterweed is not spread, and that the contractor complies with the *EC (Birds and Natural Habitats) Regulations 2011*.

The retained trees and shrubs will be protected during construction work using tree-protection zones. Trees will be felled and cleared outside the season of peak breeding seasons of birds and terrestrial mammals, or the area will be surveyed by an ecologist to confirm that no protected fauna were present. As a result, there would be no significant impact on nesting birds or terrestrial fauna in these habitats, and no legal offence under the Wildlife Act 1976.

Two floating nesting platforms will be installed in Tymon Lake to increase the diversity of nesting options for waterfowl, and to provide locations that are protected from fluctuations in water levels. On this basis, the residual impact on nesting waterfowl in Tymon Lake will be imperceptible. Artificial nesting banks for sand martins and/or kingfisher could also be provided, although this is an optional measure.

Subject to the successful implementation of these measures, it is concluded that the proposed development will not cause any significant negative impacts on designated sites, habitats, protected species, or any other features of ecological importance.

Table 7-8 provides a summary of potential impacts to biodiversity as a result of the proposed development, along with the mitigation measures that are proposed, and any residual impacts.

Table 7-8: Summary of residual impacts

Feature	Potential impacts	Proposed mitigation	Residual impact
Designated sites	Significant effect: Pollution of watercourses could affect fauna within designated sites	Implementation of pollution-prevention measures	No impact
Habitats	Significant effect: Permanent loss and/or temporary disturbance of small patches of woodland, treeline and meadow. This will be mitigated by a range of habitat reinstatement, replacement and enhancement measures	Details of habitat enhancement and re-instatement measures are outlined in the landscape plan	Unavoidable Slight negative impact on local status of woodland, treeline and meadow habitats in the short term, but neutral impact in the medium term
Water quality and aquatic ecology	Positive effect: Addition of an integrated constructed wetland, which will improve downstream water quality	N.A.	Significant positive effect on water quality and aquatic ecology
Rare flora	Slight / Moderate effect: Loss or disturbance of flowering rush and broad-leaved helleborine during construction works	Translocation of any plants that are at risk	Imperceptible effect
Invasive species	Legal offence: Nuttall's waterweed may be spread during the construction of the integrated constructed wetland	The contractor will prepare an Invasive Species Management Plan	No legal offence
Bats	Imperceptible effect: Disruption of foraging / commuting bats due to tree removal	N.A.	Imperceptible effect
Birds and terrestrial mammals	Significant effect: Clearance of vegetation during the breeding season	Restriction on timing of works, or pre-clearance survey	No impact
	Significant effect: Inundation of waterfowl nests in Tymon Lake	Provision of nesting platforms	Imperceptible impact
Winter / non-breeding birds	No impact	N.A.	No impact
Smooth newts and common frogs	No impact	N.A.	No impact
Invertebrates	No impact	N.A.	No impact

7.8 Monitoring

All working areas will be surveyed in the year following construction in order to assess the re-establishment of vegetation. If any areas are found not to be revegetating or are found to be susceptible to localised bank erosion, additional landscaping work will be carried out. If any replanted trees or shrubs fail to establish, they will be replaced with a suitable alternative. If Nuttall's waterweed or any other invasive species is found to have spread during construction works, the contractor will be required to eradicate any new growth.

Populations of rare flora will be monitored for the first three years after construction. If any populations are observed to be declining or in poor health, an ecologist will liaise with a landscape contractor regarding suitable methods to assist the plants.

The status of nesting birds in Tymon Lake will be assessed for three years following construction, including during any periods of high rainfall in the nesting season. If nests are being affected by inundation on an annual basis, then additional measures will be implemented, such as the provision of additional nesting rafts or modifications to the rafts.

Figure 7.1	Designated sites
Location	River Poddle Flood Alleviation Scheme
Applicant	SDCC / DCC
Date	25-11-2019

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Site location
- Indicative working area
- Buffer zones (1km, 5km)
- Rivers
- Culverted river
- Roads

Designated sites
- Special Areas of Conservation
- Special Protection Areas
- Natural Heritage Areas

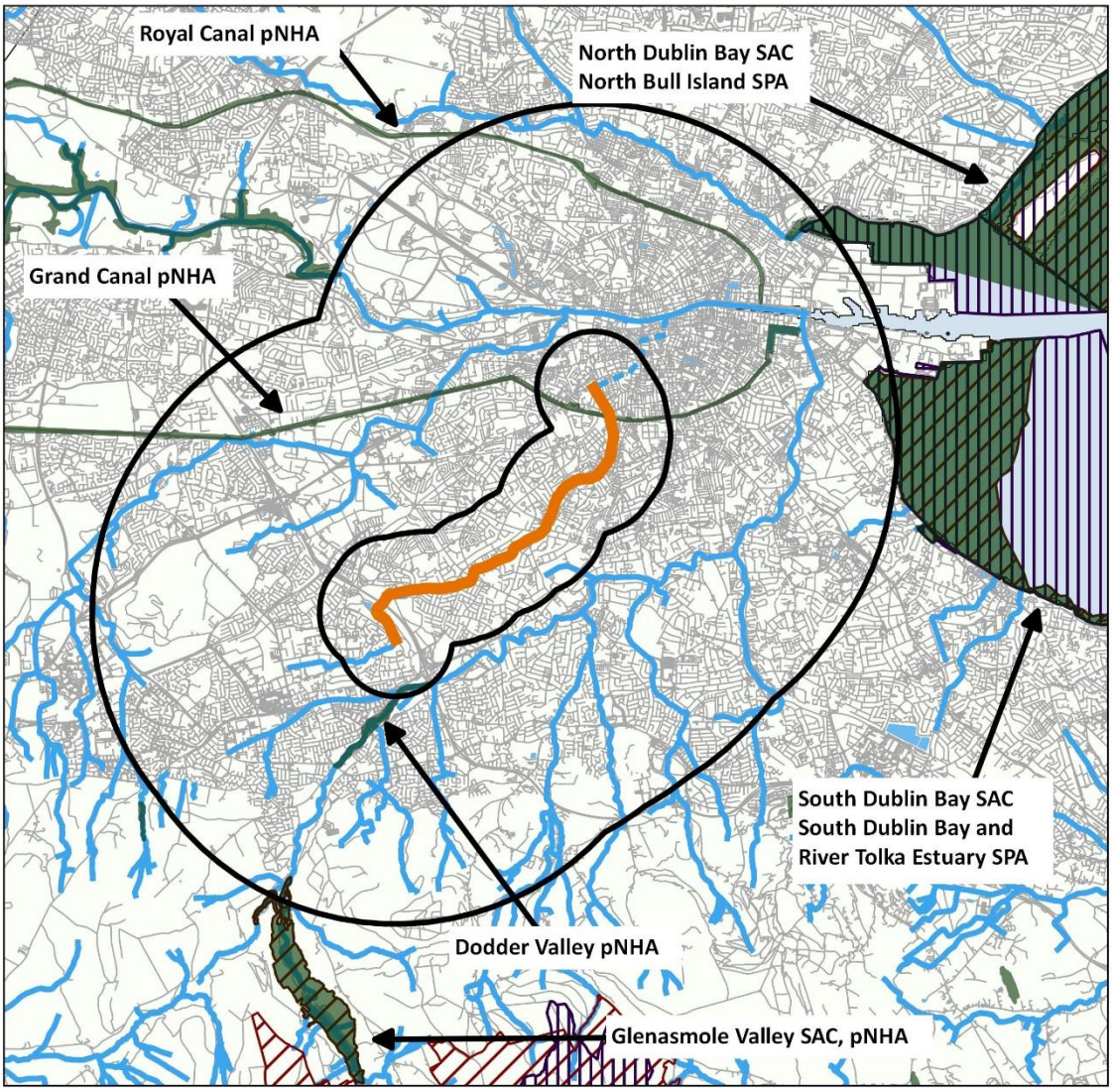

Figure 7-1: Designated Sites

Figure 7.2	Habitat map (Tymon Park)
Project	River Poddle Flood Alleviation Scheme
Applicant	SDCC / DCC
Survey date	August 2019

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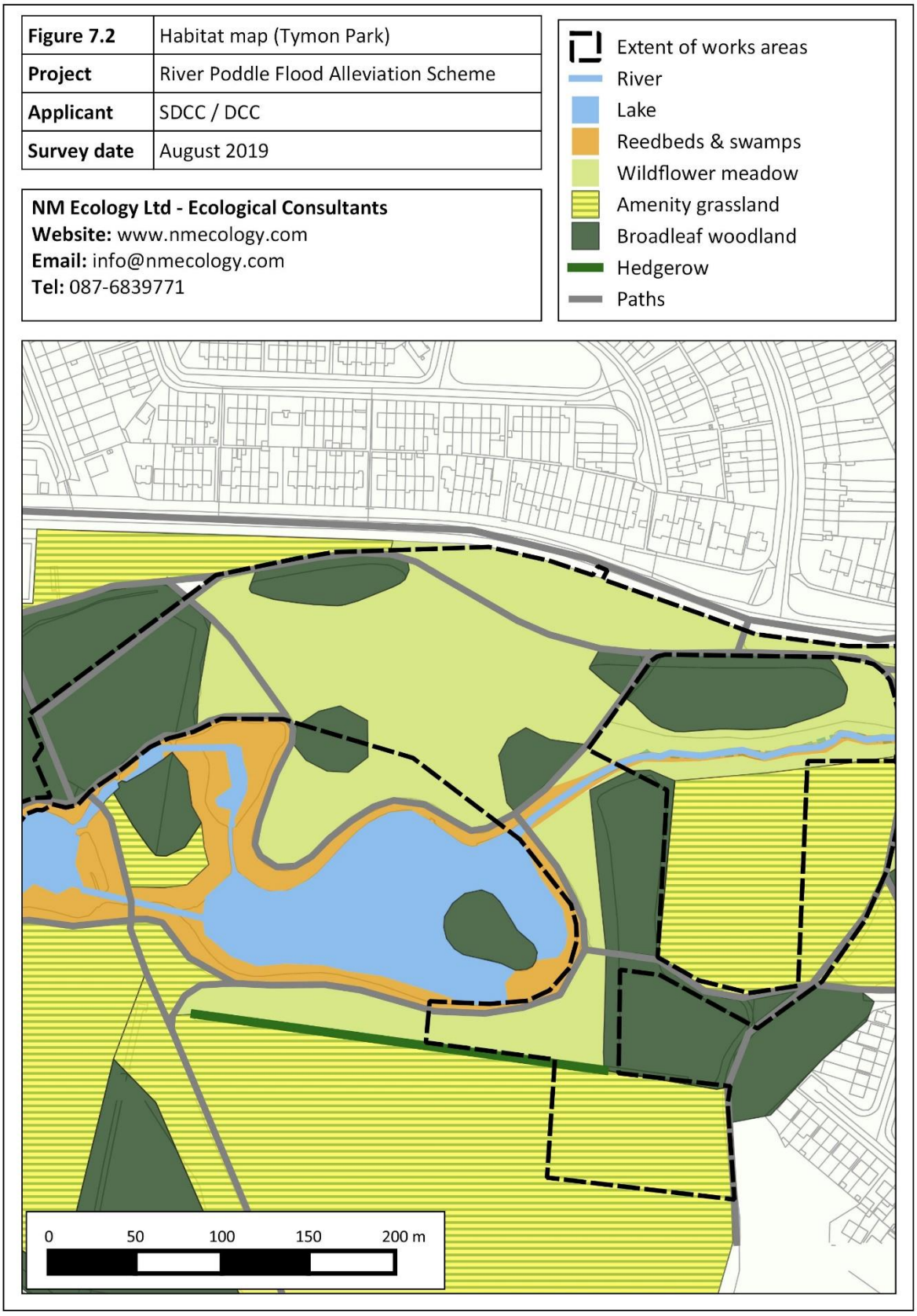

Figure 7-2: Habitat Map (Tymon Park)

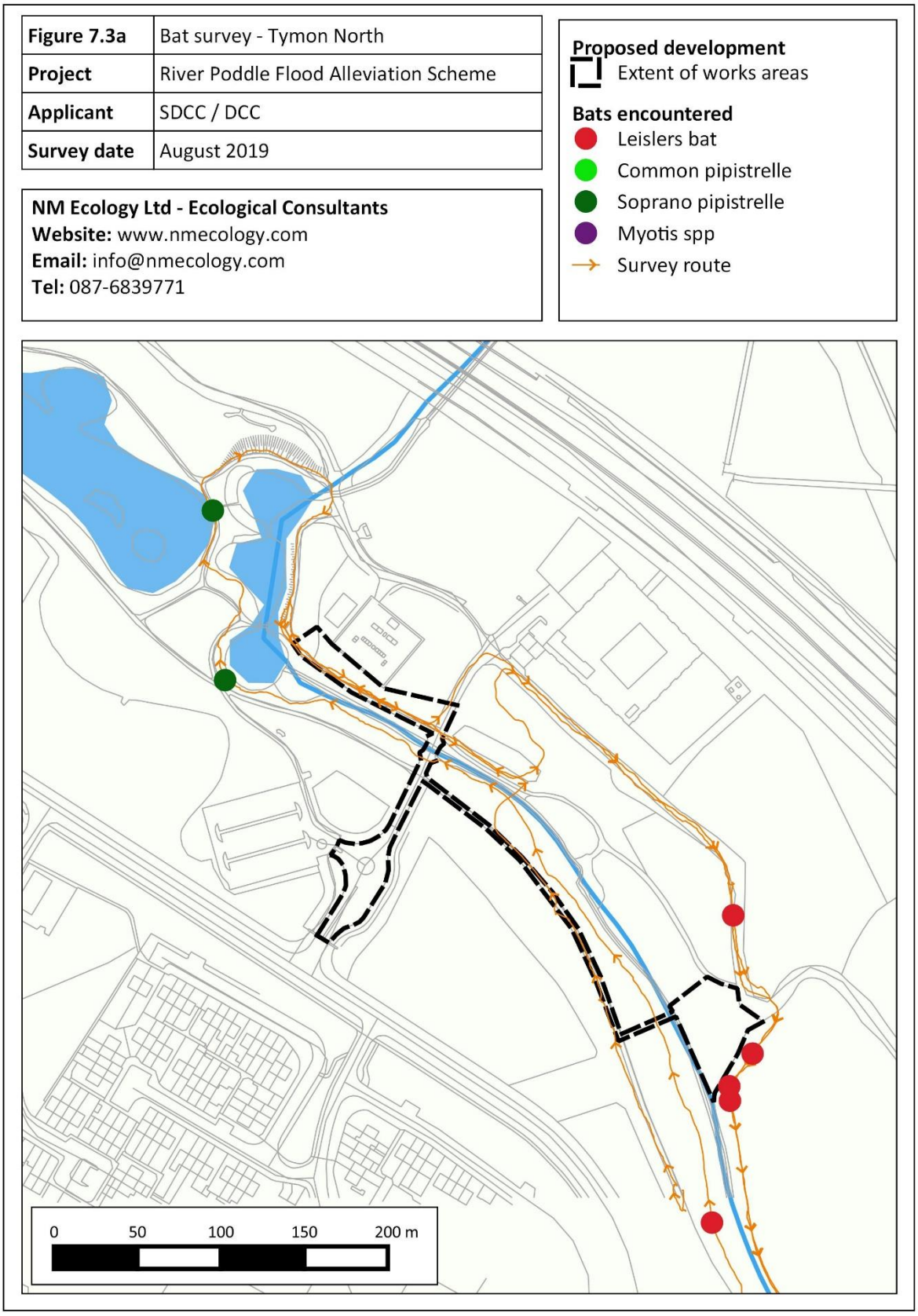

Figure 7-3: Tymon Survey - Tymon North

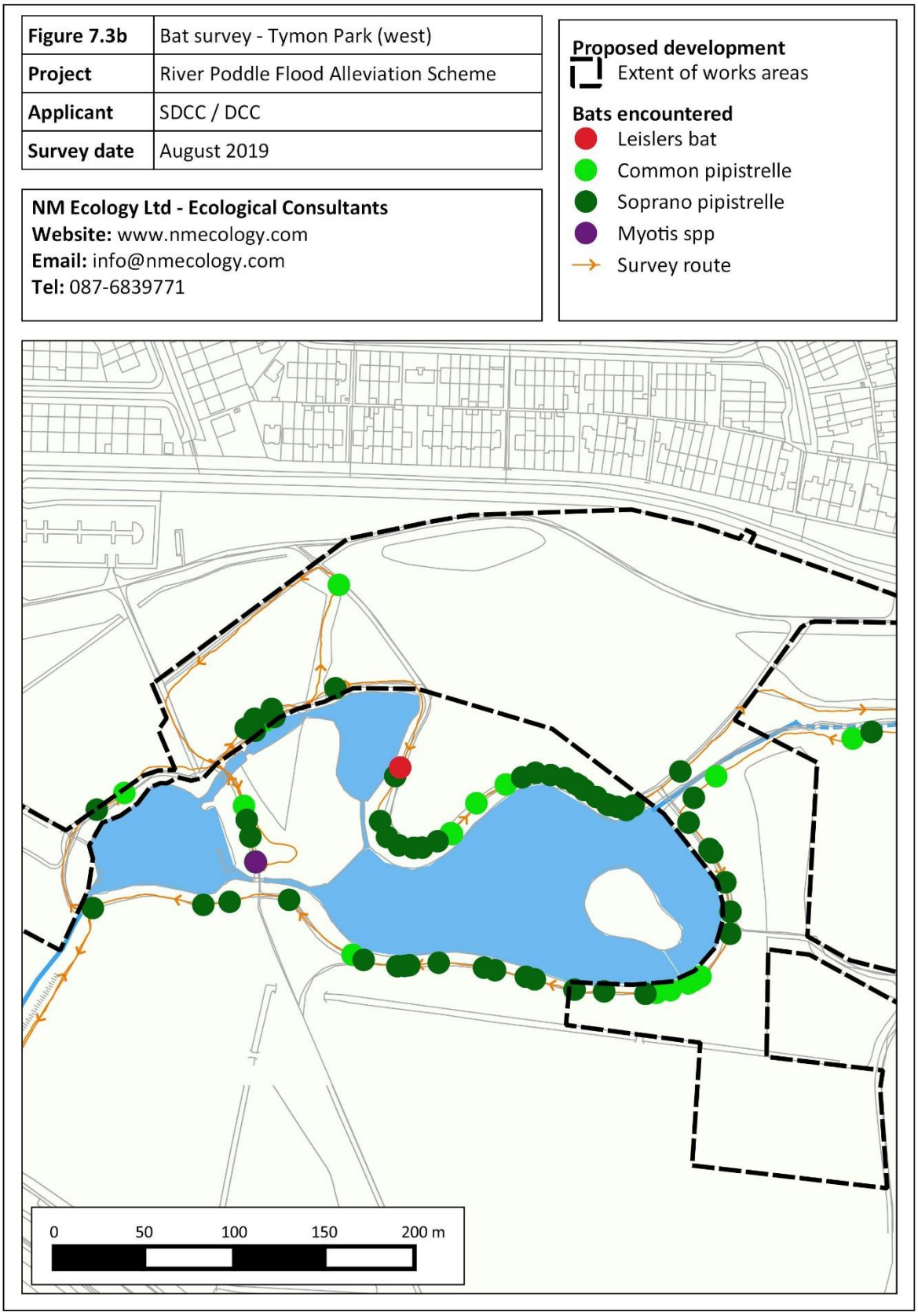

Figure 7-4: Tymon Park (west)

Figure 7.3c	Bat survey - Tymon Park (east)
Project	River Poddle Flood Alleviation Scheme
Applicant	SDCC / DCC
Survey date	August 2019

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Proposed development
Extent of works areas

Bats encountered
- Leislers bat
- Common pipistrelle
- Soprano pipistrelle
- Myotis spp
- Survey route

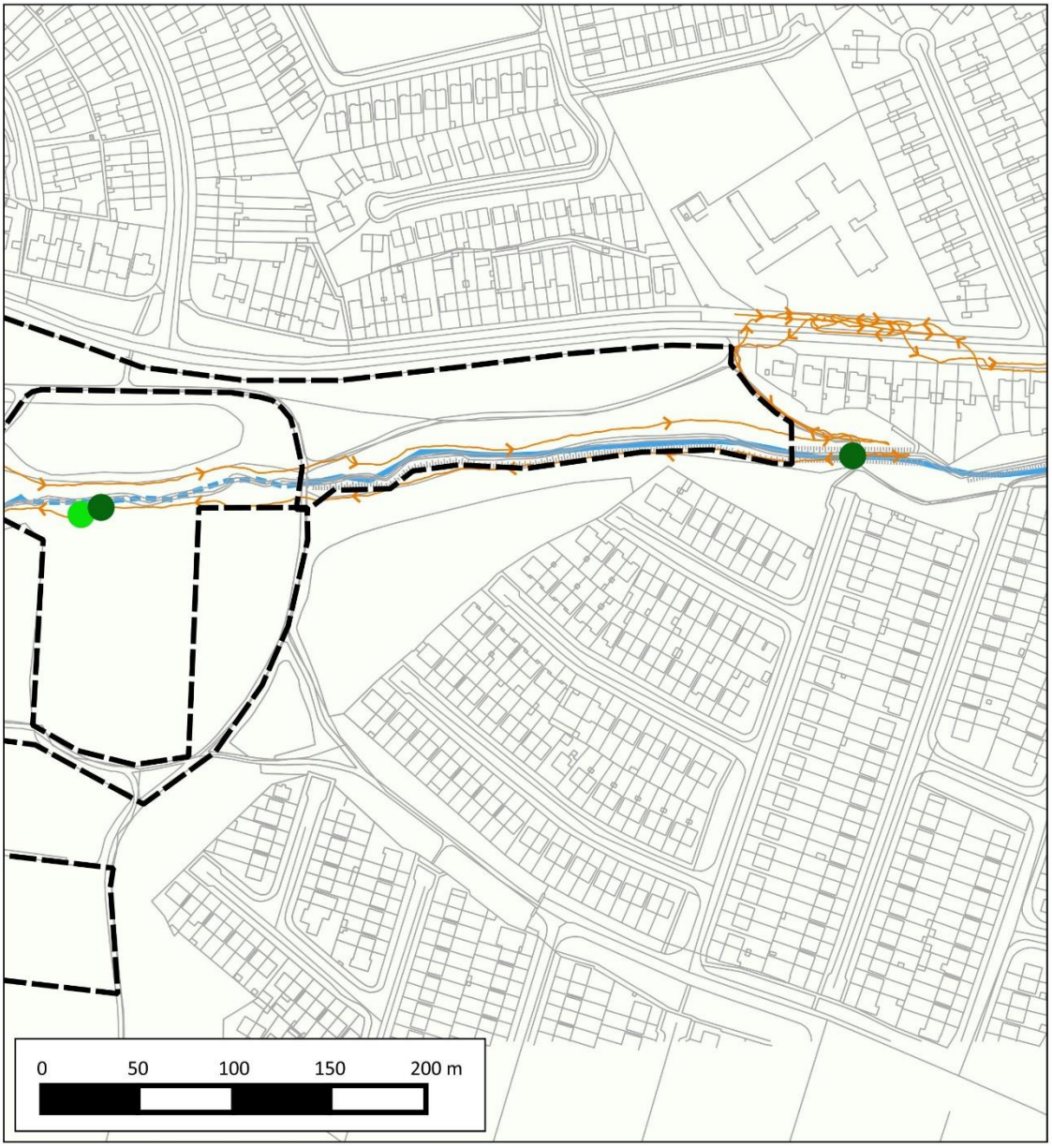

Figure 7-5: Bat survey – Tymon Park (east)

Figure 7.3d	Bat survey - Whitehall / Wainsfort Manor
Project	River Poddle Flood Alleviation Scheme
Applicant	SDCC / DCC
Survey date	August 2019

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Proposed development
Extent of works areas

Bats encountered
- Leislers bat
- Common pipistrelle
- Soprano pipistrelle
- Myotis spp
- Survey route

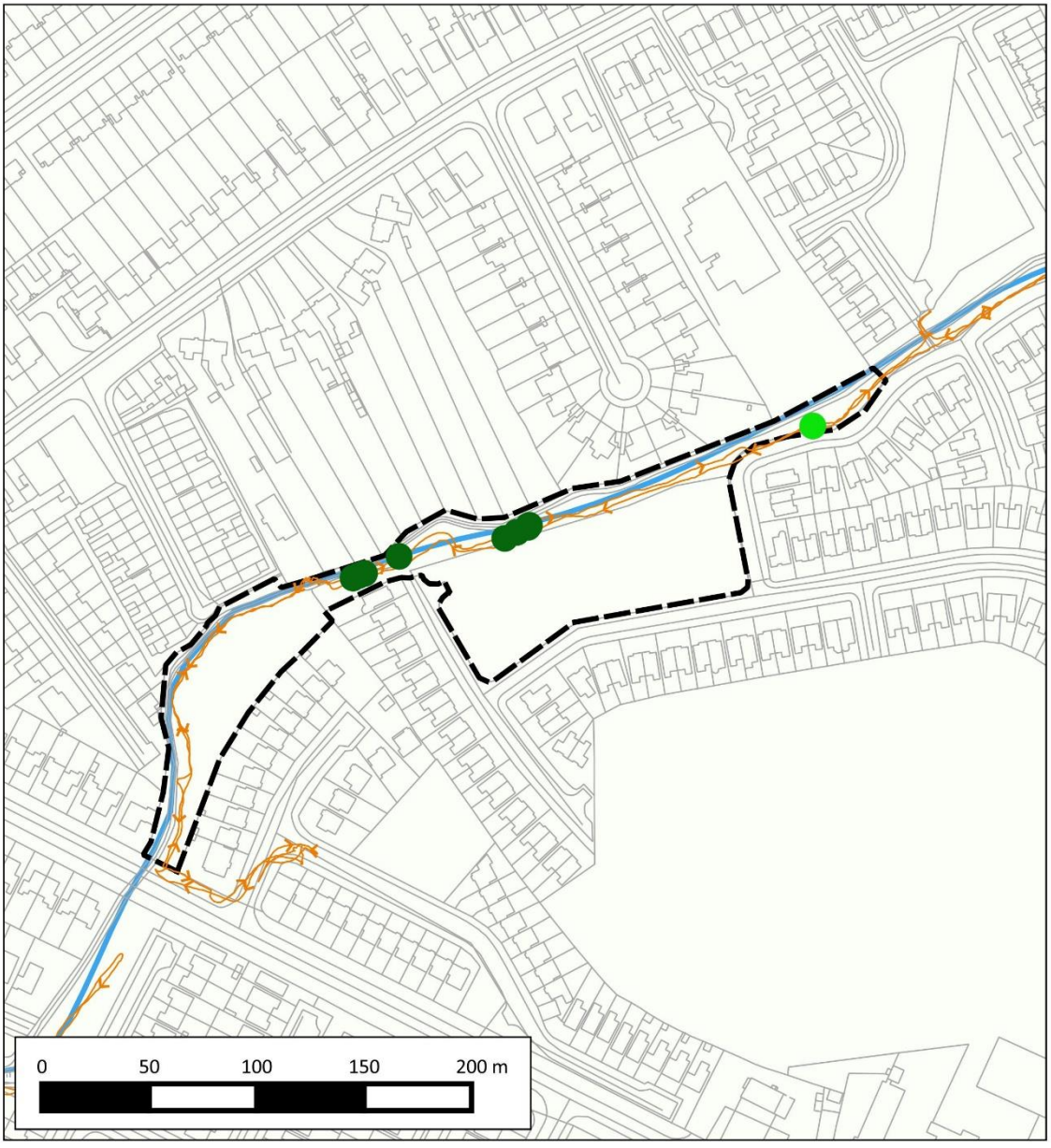

Figure 7-6: Bat Survey – Whitehall / Wainsfort Manor

Figure 7.3e	Bat survey - Fortfield Road / Ravensdale/td>
Project	River Poddle Flood Alleviation Scheme
Applicant	SDCC / DCC
Survey date	August 2019

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Bats encountered
- Common pipistrelle
- Soprano pipistrelle
- Survey route

Proposed development
- Extent of works areas
- Open watercourse
- Culverted watercourse

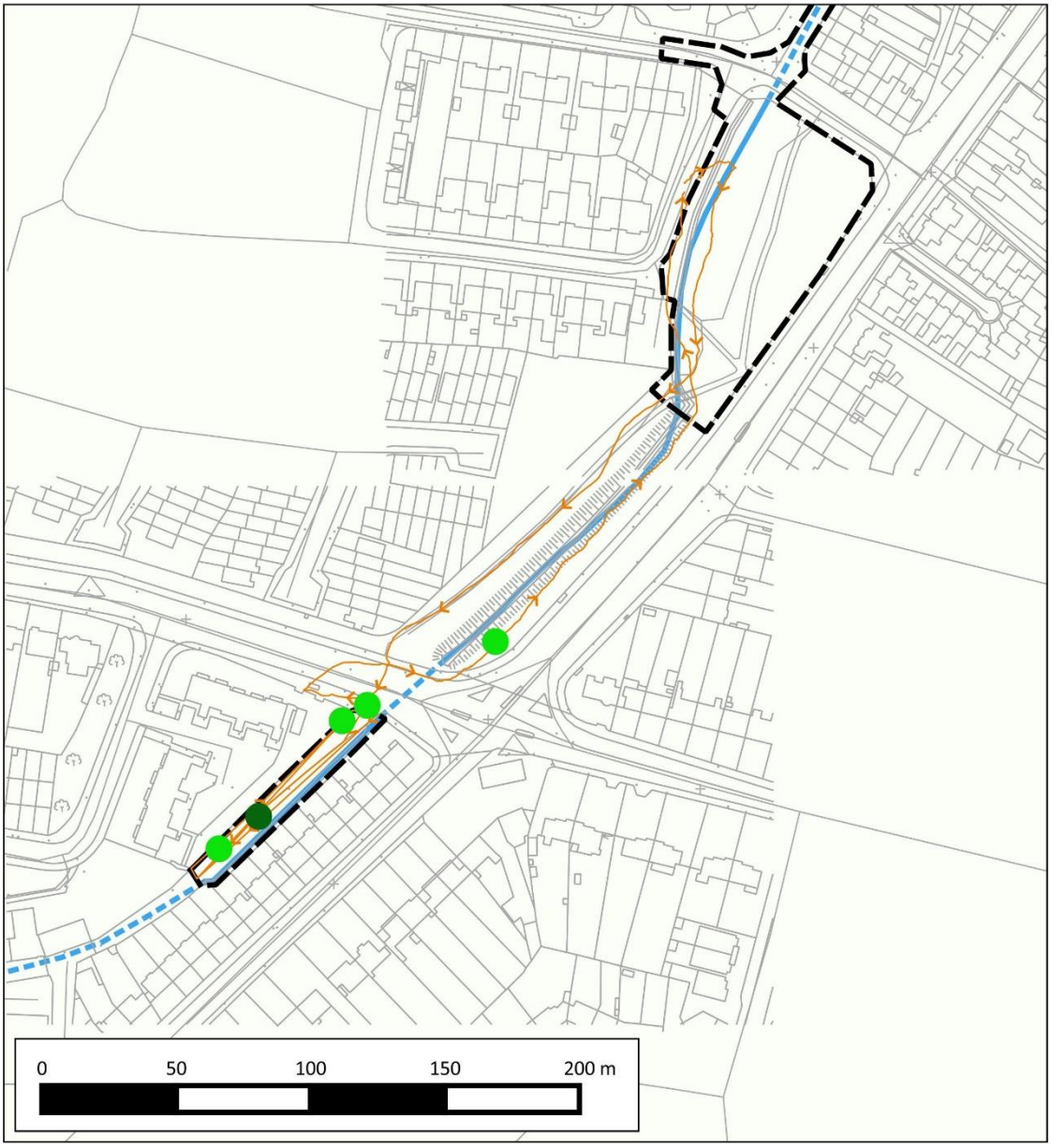

Figure 7-7: Bat Survey – Fortfield Road / Ravensdale