

Chapter 5
Biodiversity

5.0 BIODIVERSITY

5.1 INTRODUCTION

This section of the EIAR has been prepared by Pádraic Fogarty of OPENFIELD Ecological Services. Pádraic Fogarty has worked for 25 years in the environmental field and in 2007 was awarded an MSc from Sligo Institute of Technology for research into Ecological Impact Assessment (EcIA) in Ireland. OPENFIELD is a full member of the Institute of Environmental Management and Assessment (IEMA) and an affiliate member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

Under the EIA Directive as well as best practice methodology from the EPA, the analysis of impacts to biodiversity is an essential component of the EIA process, and so is a required chapter in any EIAR.

Under Article 6(3) of the Habitats Directive an ‘appropriate assessment’ of projects must be carried out to determine if significant effects are likely to arise to the integrity of Natura 2000 sites. An Appropriate Assessment Screening Report has been prepared as a separate stand-alone report.

5.2 STUDY METHODOLOGY

The assessment was carried out in accordance with the following best practice methodology: ‘Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland’ by the Institute of Ecology and Environmental Management (IEEM, 2016) and ‘Guidelines on the information to be contained in Environmental Impact Assessment Reports by the Environmental Protection Agency (EPA, 2017).

A site visit was carried out on the 17th of October 2018 and February 10th 2020 in fair weather. The site was surveyed in accordance with the Heritage Council’s Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2010). Habitats were identified in accordance with Fossitt’s Guide to Habitats in Ireland (Fossitt, 2000).

The nomenclature for vascular plants is taken from *The New Flora of the British Isles* (Stace, 2010) and for mosses and liverworts *A Checklist and Census Catalogue of British and Irish Bryophytes* (Hill et al., 2009).

October and February lie outside the optimal survey period for general habitat surveys (Smith et al., 2010) but it was possible to classify all habitats on the site to Fossitt level 3. October and February lie outside the optimal season for surveying breeding birds and bats while February is within the optimal season for surveying amphibians and Badgers. However, given the urban context of the site, this was not a constraint to a full ecological assessment.

5.3 EXISTING RECEIVING ENVIRONMENT

5.3.1 Zone of Influence

Best practice guidance suggests that an initial zone of influence be set at a radius of 2km for non-linear projects (IEA, 1995). However, some impacts are not limited to this distance and so sensitive receptors further from the project footprint may need to be considered as this assessment progresses. This is shown in Figure 5.1.



Figure 5.1: Site location showing local water courses and areas designated for nature conservation (from www.epa.ie).

There are a number of designations for nature conservation in Ireland including National Park, National Nature Reserve, RAMSAR site, UNESCO Biosphere reserves, Special Protection Areas (SPA – Birds Directive), Special Areas of Conservation (SAC – Habitats Directive); and Natural Heritage Areas. The mechanism for these designations is through national or international legislation. Proposed NHAs (pNHA) are areas that have yet to gain full legislative protection. They are generally protected through the relevant County Development Plan. There is no system in Ireland for the designation of sites at a local, or county level. The following areas were found to be located within an approximate 2km radius of the application site:

South Dublin Bay SAC (side code: 0210). It has one qualifying interest (i.e. feature which qualifies the area as being of international importance) which is mudflats and sandflats not covered by seawater at low tide.

South Dublin Bay and Tolka Estuary SPA (side code: 4024) is concentrated on the intertidal area of Sandymount Strand, to the south of the city, as well as the Tolka Estuary. The North Bull Island SPA (site code: 0206) is largely coincident with the North Dublin Bay SAC with the exception of the terrestrial portion of Bull Island. Table 5.2 lists the features of interest for these SPAs.

Bird counts from BirdWatch Ireland are taken from Dublin Bay as a whole and are not separated between the two SPAs in this area.

Dublin Bay is recognised as an internationally important site for water birds as it supports over 20,000 individuals. Table 5.1 shows the most recent count data available (Lewis et al., 2016).

Table 5.1: Annual count data for Dublin Bay from the Irish Wetland Birds Survey (IWeBS)

Year	2010/11	2011/12	2012/13	2013/14	2014/15	Mean
Count	27,931	30,725	30,021	35,878	33,486	31,608

There were also internationally important populations of particular birds recorded in Dublin Bay (i.e. over 1% of the world population): Light-bellied brent geese *Branta bernicula hrota*; Black-tailed godwit *Limosa limosa*; Knot *Calidris canutus* and Bar-tailed godwit *L. lapponica*.

Table 5.2: Features of interest for the South Dublin Bay and Tolka Estuary SPAs in Dublin Bay (EU code in square parenthesis)

Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]
Oystercatcher (<i>Haematopus ostralegus</i>) [A130]
Ringed Plover (<i>Charadrius hiaticula</i>) [A137]
Grey Plover (<i>Pluvialis squatarola</i>) [A140]
Knot (<i>Calidris canutus</i>) [A143]
Sanderling (<i>Calidris alba</i>) [A144]
Dunlin (<i>Calidris alpina</i>) [A149]
Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]
Redshank (<i>Tringa totanus</i>) [A162]
Black-headed Gull (<i>Croicocephalus ridibundus</i>) [A179]
Roseate Tern (<i>Sterna dougallii</i>) [A192]
Common Tern (<i>Sterna hirundo</i>) [A193]
Arctic Tern (<i>Sterna paradisaea</i>) [A194]
Wetlands & Waterbirds [A999]

South Dublin Bay pNHA (site code: 0210). This area is coincident with the SAC, indeed the SAC designation would supersede this older designation.

The NPWS web site (www.npws.ie) contains a mapping tool that indicates historic records of legally protected species within a selected Ordnance Survey (OS) 10km grid square. The Frascati site is located within the square O22 and six species of protected flowering plant are highlighted. These species are detailed in Table 5.3. It must be noted that this list cannot be seen as exhaustive as suitable habitat may be available for other important and protected species.

Table 5.3: Known records for protected species within the O22 10km square

Species	Habitat ¹	Current status ²
<i>Cinopodium acinos</i> Basil Thyme	Field margins and sandy or gravelly places	Record pre-1970
<i>Galeopsis angustifolia</i> Red Hemp-nettle	Calcareous gravels	
<i>Puccinellia fasciculata</i> Borrer's salt-marsh grass	Muddy inlets on the coast	
<i>Misopates orontium</i> Lesser Snapdragon	Arable fields	
<i>Viola hirta</i> Hairy Violet	Sand dunes, grasslands, limestone rocks	

¹ Parnell et al., 2012

² www.bsbi.com

<i>Cervus nippon</i> Sika Deer	Coniferous woodland and adjacent heaths	Current
<i>Lutra lutra</i> Otter	Rivers, coasts and wetlands	Current
<i>Sciurus vulgaris</i> Red Squirrel	Woodlands	Current

In summary, it can be seen that of the five species none remains current according to the Botanical Society of the British Isles.

Water quality in rivers, canals and estuaries is monitored on an on-going basis by the Environmental Protection Agency (EPA). They assess the pollution status of a stretch of river by analysing the invertebrates living in the substrate as different species show varying sensitivities to pollution. They arrive at a 'Q-Value' where Q1 = grossly polluted and Q5 = pristine quality (Toner et al., 2005). The subject lands are not in the catchment of any significant water course. The Priory Stream is culverted underneath the north-western portion of the site and is not impacted by the proposed residential development (see Land and Soils and Water chapters). This is a short stream that runs from east of the Stillorgan bypass to the Irish Sea at the park in Blackrock. The river is highly modified and is culverted for much of its length. The Brewery Stream flows c.530m to the south-east. The EPA have no monitoring points along these water courses and they are not assessed under the Water Framework Directive. These data are taken from the ENVision mapping tool on www.epa.ie.

In 2013 a flora and fauna chapter was prepared to inform an EIS for the rejuvenation project of the Frascati Centre, which is now substantially complete. This study found a range of highly modified, artificial habitats, albeit with pathways to area of high ecological value in Dublin Bay.

5.3.2 Stakeholder Consultation

Consultation with the NPWS and Inland Fisheries Ireland was carried out between 2011 and 2013 for a previous development on these lands. This highlighted that the Priory Stream is not of salmonid status (i.e. not suitable for fish such as Atlantic Salmon or Trout). Because of this available information, and the low ecological sensitivity of the site, further observations from third parties were not sought.

5.3.3 Site Survey

Aerial photography from the OSI and historic mapping shows that this area has long been a part of the built environment of Dublin City. The site itself has been home to a shopping centre for many decades. The immediate vicinity is largely composed of buildings and artificial surfaces and areas of open green space or clusters of mature trees are confined to residential gardens.

5.3.3.1 Flora

The subject site is entirely composed of **buildings and artificial surfaces – BL3** which comprises car parking areas and buildings associated with the shopping centre. As such there is minimal presence of vegetation. It is a habitat of negligible biodiversity value.

The surveys undertaken in 2018 and 2020 confirmed that no plants listed as alien invasive under Schedule 3 of SI No. 477 of 2011 are growing on the site.

5.3.3.2 Fauna

The site survey included incidental sightings or proxy signs (prints, scats etc.) of faunal activity, while the presence of certain species can be concluded where there is suitable habitat within the known range of that species. This included an inspection of the external surfaces (walls and roof space) and internal spaces which may be accessible (e.g. basement areas or roof cavities). Table 5.4 details those mammals that are protected under national or international legislation in Ireland. Cells are greyed out where suitable habitat is not present or species are outside the range of the study area.

Table 5.4: Protected mammals in Ireland and their known status within the O22 10km grid square³. Those that are greyed out indicate either that there are no records of the species from the National Biodiversity Data Centre. Since the site is not coastal the two Seal species are greyed out.

Species	Level of Protection	Habitat ⁴	
Otter <i>Lutra lutra</i>	Annex II & IV Habitats Directive; Wildlife (Amendment) Act, 2000	Rivers and wetlands	
Lesser horseshoe bat <i>Rhinolophus hipposideros</i>		Disused, undisturbed old buildings, caves and mines	
Grey seal <i>Halichoerus grypus</i>	Annex II & V Habitats Directive; Wildlife (Amendment) Act, 2000	Coastal habitats	
Common seal <i>Phocaena phocaena</i>			
Whiskered bat <i>Myotis mystacinus</i>	Annex IV Habitats Directive; Wildlife (Amendment) Act, 2000	Gardens, parks and riparian habitats	
Natterer's bat <i>Myotis nattereri</i>		Woodland	
Leisler's bat <i>Nyctalus leisleri</i>		Open areas roosting in attics	
Brown long-eared bat <i>Plecotus auritus</i>		Woodland	
Common pipistrelle <i>Pipistrellus pipistrellus</i>		Farmland, woodland and urban areas	
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>		Rivers, lakes & riparian woodland	
Daubenton's bat <i>Myotis daubentonii</i>		Woodlands and bridges associated with open water	
Nathusius' pipistrelle <i>Pipistrellus nathusii</i>		Parkland, mixed and pine forests, riparian habitats	
Irish hare <i>Lepus timidus hibernicus</i>		Annex V Habitats Directive; Wildlife (Amendment) Act, 2000	Wide range of habitats
Pine Marten <i>Martes martes</i>			Broad-leaved and coniferous forest
Hedgehog <i>Erinaceus europaeus</i>	Wildlife (Amendment) Act, 2000	Woodlands and hedgerows	
Pygmy shrew <i>Sorex minutus</i>		Woodlands, heathland, and wetlands	
Red squirrel <i>Sciurus vulgaris</i>		Woodlands	
Irish stoat <i>Mustela erminea hibernica</i>		Wide range of habitats	

³ From the National Biodiversity Data Centre, excludes marine cetaceans

⁴ Harris & Yalden, 2008

Badger <i>Meles meles</i>		Farmland, woodland and urban areas
Red deer <i>Cervus elaphus</i>		Woodland and open moorland
Fallow deer <i>Dama dama</i>		Mixed woodland but feeding in open habitat
Sika deer <i>Cervus nippon</i>		Coniferous woodland and adjacent heaths

Although a number of mammals are known to be present in Dublin city, most notably Fox *Vulpes vulpes*, there are no habitats on the site which are suitable for the majority of these species. The buildings were assessed for the suitability to host bat roosts. The lack of semi-natural vegetation in the immediate vicinity of the site is considered to be a significant limiting factor in this location while obvious roof cavities etc. are absent. A bat survey was carried out as part of a previous development application in 2011 and found no evidence of feeding or commuting bats. Buildings on the site can be considered to be of low roost potential (Hundt, 2013). For this reason, and given the ongoing construction activities on the site, a dedicated bat survey is not considered necessary and was not carried out for this study.

No birds were recorded during the site surveys and habitats are not suitable for nesting countryside birds.

There are no suitable habitats on the site for amphibians or fish. The Priory Stream is culverted for a significant length and is entirely buried where it passes under the site, as provided for under the rejuvenation permission. This severely limits the value of the water course for aquatic life.

Most habitats, even highly altered ones, are likely to harbour a wide diversity of invertebrates. In Ireland only one insect is protected by law, the Marsh Fritillary butterfly *Euphydryas aurinia*, and this is not to be found on built up sites. Other protected invertebrates are confined to freshwater and wetland habitats and so are not present on this site.

5.3.4 Overall Evaluation of the Context, Character, Significance and Sensitivity of the Proposed Development Site

In summary it has been seen that the application site is within a built-up area of Blackrock. There are no examples of habitats listed on Annex I of the Habitats Directive or records of rare or protected plants. There are no species listed as alien invasive as per SI 477 of 2011 or as ‘most unwanted’ by Invasive Species Ireland.

The building is not home to breeding birds.

Significance criteria are available from guidance published by the National Roads Authority (NRA, 2009). These are reproduced in Table 5.5. From this an evaluation of the various habitats and ecological features on the site has been made and this is shown in Table 5.6.

Table 5.5: Site evaluation scheme taken from NRA guidance 2009

Site Rating	Qualifying criteria
A - International importance	<p>SAC, SPA or site qualifying as such. Sites containing ‘best examples’ of Annex I priority habitats (Habitats Directive).</p> <p>Resident or regularly occurring populations of species listed under Annex II (Habitats Directive); Annex I (Birds Directive); the Bonn or Berne Conventions.</p> <p>RAMSAR site; UNESCO biosphere reserve;</p> <p>Designated Salmonid water</p>
B - National importance	<p>NHA. Statutory Nature Reserves. Refuge for Flora and Fauna. National Park.</p> <p>Resident or regularly occurring populations of species listed in the Wildlife Act or Red Data List</p> <p>‘Viable’ examples of habitats listed in Annex I of the Habitats Directive</p>
C - County importance	<p>Area of Special Amenity, Tree Protection Orders, high amenity (designated under a County Development Plan)</p> <p>Resident or regularly occurring populations (important at a county level, defined as >1% of the county population) of European, Wildlife Act or Red Data Book species</p> <p>Sites containing semi-natural habitat types with high biodiversity in a county context, and a high degree of naturalness, or populations of species that are uncommon in the county</p>
D - Local importance, higher value	<p>Sites containing semi-natural habitat types with high biodiversity in a county context, and a high degree of naturalness, or populations of species that are uncommon in the locality</p> <p>Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.</p>
E - Local importance, lower value	<p>Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;</p> <p>Sites or features containing non-native species that are of some importance in maintaining habitat links.</p>

Table 5.6: Evaluation of the importance of habitats and species on the site

Buildings and artificial surfaces – BL3	Negligible ecological value
---	-----------------------------

5.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposal is for the provision of 57 no. additional apartments, above the permitted podium car park, to the north west of the centre, as a Phase 2 residential development. It is also proposed to make alterations to the Phase 1 permission for 45 no. apartments (Reg. Ref.: D17A/0950 & ABP Ref.: 300745-18), from second to fourth floor levels of the rejuvenated Frascati Centre. The subject application therefore relates to a total of 102 no. residential units. The proposal will be an extension of the Rejuvenation Scheme which is substantially complete.

The development will result in the loss of no semi-natural habitat. Connections to foul and surface water drainage already exist (see Chapter 8- Water).



Figure 5.2: Development layout (Source: RA+U Architects)

5.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

This section provides a description of the potential impacts that the proposed development may have on biodiversity in the absence of mitigation. Table 3.3 of the EPA guidance note sets out the criteria for determining the significance of impacts. This based on the valuation of the ecological feature in question and the scale of the predicted impact. In this way it is possible to assign an impact significance in a transparent and objective way. Table 5.8 summaries the nature of the predicted impacts.

5.5.1 Construction Phase

The following potential impacts are likely to occur during the construction phase in the absence of mitigation:

1. The removal of buildings and artificial surface habitats.

This is a habitat of negligible biodiversity value and is not home to any protected species.

This impact is **neutral, imperceptible, likely** and **permanent**.

2. The direct mortality of species during demolition.

Since there are no bird nesting locations on this building there are not expected to be impacts to biodiversity associated with this phase.

This impact is **neutral, imperceptible, likely** and **permanent**.

3. Pollution of water courses through the ingress of silt, oils and other toxic substances.

The distance of the site from Dublin Bay (c220m) means that there is a buffer between potential pollution sources and this sensitive receptor. However, sediment is not a pollutant in coastal areas in the way it is in rivers (and where sediment can spoil fish spawning habitat). Estuaries and intertidal habitats, on the other hand, depend upon large quantities of sediment for the function and structure.

Surface water from the site leads to the Priory Stream. Three separate oil interceptors are already in place, as provided for under the implemented Rejuvenation permission, and so would capture any accidental oil leak which could arise during the construction phase.

This impact is **negative, imperceptible, likely** and **permanent**.

Operation Phase

The following potential impacts are likely to occur during the operation phase in the absence of mitigation:

4. Pollution of water from foul wastewater arising from the development.

Wastewater will be sent to the municipal treatment plant at Ringsend. Upgrade works are needed as the plant is not currently meeting its requirements under the Urban Wastewater Treatment Directive. Pollution effects are most acute in freshwater systems where the capacity for dilution is low and the consequent risk of eutrophication is high. The Ringsend WWTP discharges into Dublin Bay which is currently classified as 'unpolluted' by the EPA despite long-running compliance issues at the plant. There is currently no evidence that non-compliance issues at the WWTP are having negative effects to features of high ecological value (e.g. wading birds or intertidal habitats). In April 2019 Irish Water was granted permission to upgrade the Ringsend plant. This will see improved treatment standards and will increase network capacity by 50%, to be completed on a phased basis.

This impact is **negative, imperceptible, likely** and **permanent**.

5. Pollution of water from surface water run-off.

The Greater Dublin Strategic Drainage Study (2005) identified issues of urban expansion leading to an increased risk of flooding in the city and a deterioration of water quality. This arises where soil and natural vegetation, which is permeable to rainwater and slows its flow, is replaced with impermeable hard surfaces. The site is currently entirely of hard standing and the proposed residential extension cannot affect the quantity or quality of surface water run-off. The introduction of SUDS methods, in particular a green roof, will enhance the run-off characteristics from this site.

This impact is **neutral, imperceptible, likely** and **permanent**.

6. Impacts to protected areas.

No impacts are predicted to Natura 2000 sites (SACs or SPAs) in Dublin Bay, principally due to the separation distance between the site and these areas. A full assessment of potential effects to these areas is contained within a separate Screening Report for Appropriate Assessment.

This impact is **neutral, imperceptible, likely** and **permanent**.

Table 5.7: Significance level of likely impacts in the absence of mitigation

Impact		Significance
Construction phase		
1	Loss of habitat	neutral, imperceptible, likely and permanent
2	Mortality to animals during construction	neutral, imperceptible, likely and permanent
3	Pollution of water during construction phase	negative, imperceptible, likely and permanent
4	Wastewater pollution	neutral, imperceptible, likely and permanent
5	Surface water pollution	neutral, imperceptible, likely and permanent
6	Impacts to protected areas	neutral, imperceptible, likely and permanent

Overall it can be seen that one potential significant impact is predicted to occur as a result of this project in the absence of mitigation.

5.5.2 Cumulative impacts

A number of the identified impacts can also act cumulatively with other impacts from similar developments in this area of Dublin. These primarily arise through the additional loading to the Ringsend Wastewater Treatment Plant. It is considered that this effect is not significant due to the planned upgrading works that will bring it in line with the requirement of the Urban Wastewater Treatment Directive.

In this instance the incorporation of SUDS attenuation measures into a brown-field site is contributing to the cumulative positive effective of reducing rainwater run off to the municipal treatment plant.

The construction of the structural elements of the permitted Phase 1 residential development commenced in March 2020. These structural works are expected to be largely complete prior to construction commencing for the Phase 2 residential element. The biodiversity impacts discussed above include those associated with the construction of Phase 1 and Phase 2 residential elements concurrently and hence include for the cumulative impacts from these two phases.

The permitted upgrade works to Blackrock Shopping Centre (Planning Reg. Ref.: D17A/0644) are at an advanced stage and are expected to be largely complete once Phase 2 residential development commences on site. There are no significant cumulative impacts in respect to biodiversity associated with this development on an existing centre to the east.

Construction of the five-storey office development at Enterprise House, opposite Frascati Shopping Centre, (Ref.: D16A/0418 and ABP PL06D.247702, as amended under Reg. Ref.: D18A/0211) is nearing completion with remaining construction works largely associated with internal fit out elements. There is no expected overlap between any construction phases associated with this development and the Phase 2 residential element that has potential to result in cumulative impacts in respect to biodiversity.

There are no other effects which could act in a cumulative way to result in significant impacts to flora and fauna.

5.6 DO NOTHING IMPACT

The site can be considered to have minimal ecological value. This will not change in the absence of this project.

Water quality may improve throughout the Liffey/Tolka/Dodder catchments with the implementation of the Water Framework Directive however its target of 'good ecological status' for all water bodies by 2015 was not met. In 2018 a second River Basin Management Plan was published which highlights 190 'priority areas for action' where resources will be focussed during the 2018-2021 period. The Tolka and Dodder, as well as the upper Liffey are among those areas where improvements are expected.

5.7 AVOIDANCE, REMEDIAL AND MITIGATION MEASURES

These measures include avoidance, reduction and constructive mitigation measures as set out in Section 4.7 of the Development Management Guidelines. Under the EIA Directive, where significant negative effects are predicted to arise from a project then mitigation measures are required.

This report has identified no impacts that were assessed as significant and therefore mitigation is not required.

5.8 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

This section allows for a qualitative description of the resultant specific direct, indirect, secondary, cumulative, short, medium and long-term permanent, temporary, positive and negative effects as well as impact interactions which the proposed development may have, assuming all mitigation measures are fully and successfully applied.

No negative effects to biodiversity are predicted to arise from this project and for this reason mitigation measures have not been recommended. While there are sensitive ecological receptors within the zone of influence (i.e. protected areas in Dublin Bay) there are no aspects of the project which could result in significant negative impacts, primarily due to the project being located above the rejuvenated Frascati Centre and associated podium car park.

5.9 MONITORING

Monitoring is required where the success of mitigation measures is uncertain or where residual impacts may in themselves be significant.

No further monitoring is required.

5.10 REINSTATEMENT

No reinstatement works are required for ecological features.

5.11 INTERACTIONS

This section provides a description of impact interactions together with potential indirect, secondary and cumulative impacts

The key environmental interaction with Biodiversity is Water. A series of mitigation measures are proposed in Chapter 8 – Water of this EIAR document to ensure the quality (pollution and sedimentation) and quantity (surface run-off and flooding) is of an appropriate standard.

5.12 DIFFICULTIES ENCOUNTERED IN COMPILING

This section provides an indication of any difficulties encountered by the environmental specialist in compiling the required information.

Because of the artificial nature of the habitats on this site, no difficulties were encountered in carrying out this assessment.

5.13 REFERENCES

Bullock C., Kretch C. & Candon E. 2008. *The Economic and Social Aspects of Biodiversity*. Stationary Office.

Colhoun K. & Cummins S. 2013. *Birds of Conservation Concern in Ireland 2014 – 2019*. Irish Birds. Volume 9 Number 4 pg523-541.

Cooney R. & Dickson B. 2005. *Biodiversity and the Precautionary Principle*. Earthscan.

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

Council Directive 97/11/EEC of 3rd March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment

Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy – more commonly known as the Water Framework Directive

Curtis T.G.F. & McGough H.N. 1988. *The Irish Red Data Book 1: Vascular Plants*. Stationary Office.

Department of Arts, Heritage and the Gaeltacht. 2011. *Actions for Biodiversity 2011 – 2016. Ireland's National Biodiversity Plan*.

DG Environment. 2010. *Natura 2000 European Commission Nature and Biodiversity Newsletter*. Number 28. June 2010. ISSN: 1026-6151.

Doogue D., Nash D., Parnell J., Reynolds S., & Wyse Jackson P. 1998. *Flora of County Dublin*. The Dublin Naturalists' Field Club.

EPA. 2002. *Guidelines on the information to be contained in Environmental Impact Statements*.

EPA, 2003. *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)*

Fitter R., Fitter A. & Farrer A. 1984. *Grasses, sedges, rushes and ferns of Britain and Northern Europe*. Collins.

Fossitt J. 2000. *A Guide to Habitats in Ireland*. Heritage Council.

Harris S. & Yalden D.W. 2008. *Mammals of the British Isles: Handbook, 4th Edition*. The Mammal Society.

Heritage Council. 2002. *Draft Habitat Survey Guidelines*. The Heritage Council.

Hill M.O., Blackstock T.H., Long D.G. and Rothero G.P 2008. *A Checklist and Census Catalogue of British and Irish Bryophytes*. British Bryological Society.

Hundt L. 2012. *Bat Surveys: Good Practice Guidelines. 2nd Edition*. Bat Conservation Trust.

IEEM. 2016. *Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland*. Institute of Ecology and Environmental Management.

Institute of Environmental Assessment, 1995. *Guidelines for Baseline Ecological Assessment'*

Johnson O. & More D., 2004. *Tree Guide'*, Collins

Mason C.F. 1996. *Biology of Freshwater Pollution*. Longman.

Morris P. & Therivel R., 2001. *Methods of Environmental Impact Assessment*, Spon Press

NRA. 2009. *Guidelines for Assessment of Ecological Impacts of National Road Schemes*. National Roads Authority.

Parnell J. & Curtis T. 2012. *Webb's An Irish Flora*. Cork University Press.

Preston C.D., Pearman D.A. & Dines T.D. 2002. *New Atlas of the British & Irish Flora*. Oxford University Press.

Rich C. & Longcore T. Editors. 2006. *Ecological Consequences of Artificial Night Lighting*. Island Press.

Sargent G. & Morris P. 2003. *How to Find & Identify Mammals*. The Mammal Society.

Smith G. F., O'Donoghue P., O'Hora K. and Delaney E. 2010. *Best Practice Guidance for Habitat Survey and Mapping*. Heritage Council.

Stace C. 2010. *New Flora of the British Isles*. Cambridge University Press

Statutory Instrument No. 94 of 1999. Flora (Protection) Order

Treweek J., 1999. *Ecological Impact Assessment*, Blackwell Science.

United Nations. 1992. *Convention on Biological Diversity*