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Biodiversity Impact Assessment of Proposed National Roads, Greenways and Active Travel Projects - Standard

PE-ENV-07006

December 2025

GE General

Standards

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1. Introduction

Transport Infrastructure Ireland (TII)'s purpose is to provide sustainable transport infrastructure and services, delivering a better quality of life, supporting economic growth and respecting the environment.

TII produces and manages a wide range of standards and technical documentation related to its areas of responsibility. These, and other publications, are available to users through the TII publications system website.

1.1 Purpose of this Standard

This Standard Document PE-ENV-07006 sets out the required approach for Biodiversity Impact Assessment (BIA) of National Road Projects which can include motorways, service areas, tolled schemes and associated infrastructure, hereafter referred to as National Road Project(s).

When an Environmental Impact Assessment (EIA) is required, likely significant effects on biodiversity are usually required to be described as part of the EIA and, if so, shall be considered in accordance with this Standard during the planning and development of National Road Projects.

When a National Road project is not considered to be EIA development but has the potential to have adverse effects on biodiversity, then a proportionate assessment of the identified potential effects on biodiversity shall be carried out in accordance with this Standard.

The purpose of this Standard is to set out the required approach to the following:

- The application of Biodiversity Impact Assessment during the planning of National Road Projects.
- The provision of evidence-based information on the effects on biodiversity to decision makers during options selection and project determination, in accordance with the TII Project Management Guidelines (PMG) and TII Project Appraisal Guidelines (PAG).
- Robust and proportionate assessment of the effects on biodiversity resulting from National Road Projects in accordance with the PMG/PAG, EIA Directive (when required) and other relevant legislation, policies, guidelines and standards.
- Incorporation of appropriate avoidance, mitigation, compensation and enhancement measures to avoid, reduce or compensate for significant adverse effects and, where possible, improve outcomes for biodiversity.
- Production of documents and deliverables to meet the requirements of the PMG/PAG, EIA Directive and other relevant legislation (except Article 6(3) and 6(4) of the Habitats Directive, the Water Framework Directive, and the implementing legislation), policies, guidelines and standards.
- Consistency to the consideration of biodiversity during the planning of National Road Projects as set out in the PMG/PAG.

The Standard can also be used as guidance for other types of road projects, Greenways and Active Travel Projects.

1.2 Using this Standard

This Standard is to be used on TII National Road Projects. This Standard is specific to biodiversity and is informed by, and shall be used in conjunction with, existing TII environmental standards, technical documents and relevant guidelines including (but not limited to):

- TII Project Management Guidelines (PMG);
- TII Project Manager's Manuals (PMM);
- TII Project Appraisal Guidelines (PAG);
- Department of Transport (DOT) Transport Appraisal Framework (TAF); and
- Department of Public Expenditure, National Development Plan Delivery and Reform Infrastructure Guidelines (IG).

Other Standards, Technical Documents and Guidelines and that are relevant to biodiversity impact assessment are listed in Table 1-1.

Table 1-1 – Relevant Documents and Tools

Ref	Document	Reference
1	TII 2023 Biodiversity Plan. [1]	-
2	National Roads Authority, 2008. Environmental Impact Assessment of National Road Schemes – A Practical Guide. 2nd ed. [2]	PE-ENV-01114
3	Chartered Institute of Ecology and Environmental Management, 2024. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.3. [3]	-
4	Chartered Institute of Ecology and Environmental Management, 2019. Advice Note – On the Lifespan of Ecological Reports and Surveys. [4]	-
5	National Roads Authority, 2009. Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. [5]	PE-ENV-01113
6	Transport Infrastructure Ireland, 2020. The Management of Invasive Alien Plant Species on National Roads - Standard. [6]	GE-ENV-01104
7	Transport Infrastructure Ireland, 2021. Survey and Mitigation Standards for Barn Owls to inform the Planning, Construction and Operation of National Road Projects. [7]	PE-ENV-07005
8	Transport Infrastructure Ireland, 2017. Barn Owl Surveying Standards for National Road Projects. [8]	RE-ENV-07005
9	Transport Infrastructure Ireland, 2021. The Interactions between Barn Owls and Major Roads: Informing Management and Mitigation. [9]	RE-ENV-07004
10	National Roads Authority, 2006. Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. [10]	PE-ENV-01115
11	National Roads Authority, 2006. Guidelines for the Treatment of bats during the Construction of National Road Schemes. [11]	CC-ENV-01102

Ref	Document	Reference
12	National Roads Authority, 2005. Guidelines for the Treatment of bats prior to the Construction of National Road Schemes. [12]	Forthcoming
13	National Roads Authority, 2006. Guidelines for the Treatment of badgers prior to the Construction of National Road Schemes. [13]	CC-ENV-01103
14	National Roads Authority, 2006. Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes. [14]	CC-ENV-01104
15	Transport Infrastructure Ireland, 2018. Special Structures - Mammal Underpass General Layout. [15]	CC-SCD-02504
16	Transport Infrastructure Ireland, 2018. Special Structures - Mammal Underpass Long section. [16]	CC-SCD-02505
17	National Roads Authority, 2006. Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. [17]	CC-ENV-01101
18	Transport Infrastructure Ireland, 2020. Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) of Proposed National Roads - Standard. [18]	PE-ENV-01102
19	Transport Infrastructure Ireland, 2012. Guidelines on the Implementation of Landscape Treatment on National Road Schemes in Ireland. [19]	GE-ENV-01103
20	Transport Infrastructure Ireland, 2006. A Guide to Landscape Treatments for National Road Schemes in Ireland. [20]	GE-ENV-01102
21	National Roads Authority, 2006. Guidelines for the Protection and Preservation of Trees, Hedges and Scrub Prior to During and Post Construction of National Road Schemes. [21]	GE-ENV-01110
22	Transport Infrastructure Ireland, 2025. Air Quality Assessment of Proposed National Roads – Standard. [22] In Prep.	PE-ENV-01107
23	Transport Infrastructure Ireland, 2025. Noise Assessment of Proposed National Roads – Standard. [23] In Prep.	Forthcoming
24	Transport Infrastructure Ireland, 2025. Water Impact Assessment of Proposed National Roads – Standard. [24] in Prep.	Forthcoming
25	Transport Infrastructure Ireland, 2025. Water Impact Assessment for National Roads, Light Rail, Metro and Rural Cycleways – Overarching Technical Document. [25] in Prep.	Forthcoming
26	Transport Infrastructure Ireland, 2025. Biodiversity Metric Tool for Road, Greenway and Light Rail Projects – Technical Report. [26] In Prep.	RE-ENV-01113

The documents in Table 1-1 that were published before 2025 are summarised in the literature review that accompanies this Standard [27].

This Standard is intended for use by suitably qualified, competent and expert practitioners with appropriate knowledge and experience of biodiversity impact assessment, see Section 2.3. It may also be used by Project Managers, environmental/EIA co-ordinators, designers and sub consultants.

This Standard applies at PMG Project Phases 0 to 4. The application of this Standard to different TII Project Phases is described in Sections 3 and 4. See further detail on implementation in Section 1.3.

Biodiversity legislation, policy, guidance and science are complex and use many specialist terms. To assist, a glossary is provided in Section 5.

1.2.1 Biodiversity Impact Assessment

The Roads Act 1993, as amended, requires an EIA in respect of certain projects. However, other "sub-threshold" road projects, must be screened for likely significant effects on the environment [28]. If there are likely significant effects on the environment then the project should be subject to a scoping exercise, to determine which aspects of the environment are likely to be significantly affected. Depending on the outcome of screening and scoping, a biodiversity impact assessment may be carried out as part of the preparation of a statutory Environmental Impact Assessment Report (EIA Report) or as a contribution to the assessment of development proposals and consent applications (e.g. 177AE, Part 8 projects/Part 6 of the Planning and Development Act 2024).

In addition to this Standard, general guidance on the scope and detail of an EIA Report is available in the Environmental Protection Agency (EPA) *Guidelines on the information to be contained in Environmental Impact Assessment Reports* [29] (hereafter referred to as the EPA Guidelines) and two EC documents *Guidance on Scoping* [30] and *Guidance on the preparation of the Environmental Impact Assessment Report* [31]. TII also prepared RE-ENV-07008 *Environmental Planning of National Road and Greenway Projects* [32], which provides guidance on the application of environmental and planning law to TII projects throughout PMG Project Phases 0 to 5 and helps to navigate some of the environmental and planning law commonly encountered.

When a project has the potential to have adverse effects on biodiversity (including sites, habitats and species), a proportionate assessment of any identified potential effects on biodiversity shall be carried out in accordance with this Standard having regard to the appropriate statutory approval process (i.e. Section 51, 177AE, Part 8/ Part 6 of the Planning and Development Act 2024). Biodiversity Impact Assessment can also be carried out where the Project Manager deems it prudent, for example due to specific local issues and sensitivities. A biodiversity practitioner (ecologist) should be consulted before deciding not to do a BIA for any project.

Biodiversity Impact Assessment is the process of identifying, quantifying and evaluating the effects of a proposed development (or another type or project/activity) on biodiversity, including protected sites, habitats and species, with reference to environmental protection objectives, legislation and policy, and objectives and plans to restore biodiversity.

BIA is parallel to Ecological Impact Assessment (EcIA, see glossary) [3], adopting the same or similar definitions and approaches. BIA places emphasis on the need to consider biodiversity as a whole, the use of objectives to determine impact significance and the need to consider objectives and plans to restore biodiversity in the assessment. The final output is either the biodiversity chapter in an EIA Report or a standalone BIA Report. There is no requirement to carry out an EcIA as well as a BIA. This Standard replaces the previous NRA guidance on assessing the ecological impacts of National Roads [33].

Appropriate Assessment (AA) is a separate assessment which deals only with the effects of projects and plans on European designated sites, as required by Article 6 of the Habitats Directive and the implementing legislation. In Ireland, it is informed by a document called a Natura Impact Statement (NIS). There may often be separate requirements to carry out both a BIA and an NIS when a project could have an adverse effect on a European site. In this case, the BIA will draw on the assessment of effects on European sites presented in the NIS and the two assessments may share baseline

information and scientific assessments of the effects of the project on certain habitats and species [34]. This Standard does not address the requirements of an AA or NIS; this is covered by other guidance [35] [36] [37] [38].

1.2.1.1 Effects and Impacts

A requirement of the EIA Directive is to describe the likely significant environmental effects. Despite its name, limited reference is made to identifying impacts within the EIA Directive. The EPA guidelines use the terms 'effect' and 'impact' interchangeably and the use of this terminology may vary by discipline.

Hence, the terms 'effect' (and 'impact' if used) will be clearly defined when undertaking an environmental assessment. This should be done at the project outset and should be consistent across disciplines. An EIA Report should describe the likely significant environmental effects (rather than impacts).

Here, an impact is the change arising from a development and an effect is the result (consequence) of that change on biodiversity or one of its features.

1.2.2 Terms and Definitions

The following verbal forms are used to describe the requirements set out in this Standard.

- "Shall" or "will" indicates a requirement.

The following verbal forms are used to describe guidance set out in this Standard.

- "Should" indicates a recommendation.
- "May" indicates a permission.
- "Can" indicates a possibility or a capability.

Information marked as "Note" is for guidance and context to aid understanding of the associated requirement.

1.3 Implementation of this Standard

This Standard shall be used in the planning, design and construction of National Road Projects that:

a) Require approval under Section 51 of the Roads Act, 1993, as amended (proposed national road development subject to EIA).

b) Require approval under Section 177AE of the Planning and Development Act, 2000, as amended (certain local authority developments subject to Appropriate Assessment (AA) but not an EIA).

c) Are subject to the procedure established under Section 179 of the Planning and Development Act, 2000, as amended, and Part 8 of the Planning and Development Regulations, 2001, as amended (known as the 'Part 8' procedure).

d) Require approval under the Planning and Development Act 2024.

In relation to the:

- the planning, design and construction of National Road Projects; and,
- the maintenance of National Roads;

not subject to the above approvals (a, b) and procedure (c), and the planning, design and construction of Greenway Projects and Active Travel Projects, the contents of this Standard shall be:

- treated as advice and guidance;
- employed to the greatest extent reasonably practicable; and,
- applied in a proportionate manner, having regard to the characteristics and location of the project/maintenance works and the type and characteristics of potential impacts.

It is appropriate and necessary that this Standard is applied in a transitional manner. Where projects requiring approval under Section 51, Section 177AE or Part 8/ Part 6 of the Planning and Development Act 2024 have, at the date of publication of this Standard, commenced planning and design and, in particular, where technical advisor contracts have been executed, this Standard shall also be:

- treated as advice and guidance;
- employed to the greatest extent reasonably practicable; and,
- applied in a proportionate manner, having regard to the characteristics and location of the project/maintenance works and the type and characteristics of potential impacts.

2. Overview of the Biodiversity Impact Assessment Process

2.1 Background and Legislative/Policy Framework

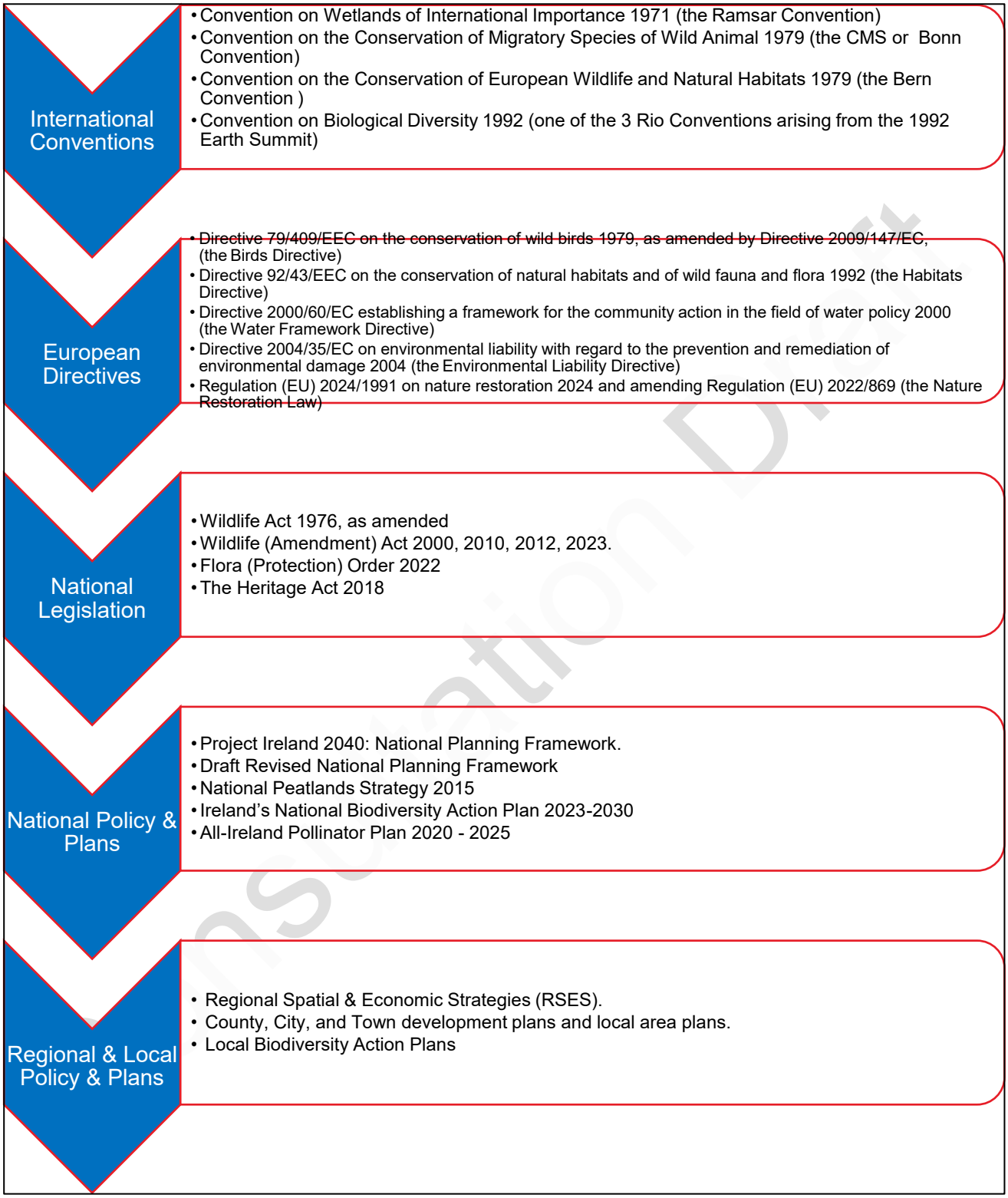
Biological Diversity, or Biodiversity, is the variety of living organisms in a certain place and the ecological complexes of which they are part. It includes the genetic diversity within the population of a species, and the diversity between species and of ecosystems. Biodiversity is being lost because of human activity and, in 2019, the Dáil declared a national climate and biodiversity emergency. At every level, from international to local, there are laws, policies, plans and targets to address the loss of biodiversity, as well as providing specific protection for designated sites, and some habitats and species.

Biodiversity is one of the environmental factors to be considered in a statutory EIA. When biodiversity has been scoped into the assessment (see Appendix B, Section B.2), the EIA must identify, describe and assess the direct and indirect significant effects of a project on biodiversity, with particular attention to species and habitats protected under the Habitats Directive 92/43/EEC and the Birds Directive 2009/147/EC. The EIA Directive states that the description of significant effects should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project. For projects not requiring a statutory EIA, a BIA may nevertheless be required to inform the project design and demonstrate how it accords with relevant legislation, policy, plans and Standards [3]. As a matter of policy, a BIA (or an ecological impact assessment) is likely to be required by the local planning authority for all projects requiring its consent.

Figure 2-1 lists some of the main legislation, policies and plans that pertain to biodiversity and the protection of wildlife. For clarity, it omits the legislation implementing the European Directives in Ireland. Legislation pertaining to general environmental assessment and protection is also omitted. A summary of the key legislation and policy pertaining to biodiversity is provided in Appendix A and a broader overview is provided in the accompanying literature review [27].

In summary, the legislation and policy provide the requirement to undertake a BIA and the matters that should be the focus of the assessment.

Figure 2-1: Key Legislation, Policies and Plans pertaining to Biodiversity & Wildlife Protection



2.2 Objectives of the Biodiversity Impact Assessment

The objectives of the Biodiversity Impact Assessment process are to:

- Comply with the relevant legislation such as the amended EIA Directive, Roads Act and the Planning and Development Act, for example, to describe the likely significant effects of projects on biodiversity.
- Demonstrate compliance with the relevant legislation, policy and plans for the protection and restoration of biodiversity and wildlife, such the Nature Restoration Law, the Habitats Directive (excluding Article 6(3) and 6(4)), the Wildlife Acts, planning policy, the National Biodiversity Action Plan and the TII Biodiversity Plan.
- Comply with the guidelines outlined within the TII PMGs, PAGs and other relevant guidelines and Standards.
- Determine biodiversity baseline conditions and ensure these are considered in the option selection, planning and development of National Road, Greenway and Active Travel Projects.
- Achieve robust and proportionate screening, scoping and assessment of likely significant effects on biodiversity, focusing on key issues.
- Explain the data, assumptions, uncertainties, limitations and basis of the assessment in order to ensure a transparent process and provide a rationale for conclusions and decisions.
- Ensure that appropriate measures are integrated into projects to avoid, reduce or offset (compensate for) significant adverse effects on biodiversity, in accordance with the mitigation hierarchy.
- Identify and consider enhancement measures to increase biodiversity.
- Determine the biodiversity outcomes for the projects, for example no net loss or net gain, using the TII Biodiversity Metric.
- Provide clear, evidence-based information to competent authorities on the likely significant effects of projects on biodiversity.

2.3 Requirements of the Competent Biodiversity Assessment Practitioner

The amended EIA Directive states that ‘Experts involved in the preparation of environmental impact assessment reports should be qualified and competent.’ Article 5(3)(a) of the amended EIA Directive states ‘the developer shall ensure that the environmental impact assessment report is prepared by competent experts’. Competent expertise is not defined in the Directive.

It is the responsibility of developers to ensure, to the satisfaction of the consenting authority, that the practitioners who undertake assessments are expert, qualified and competent. This Standard requires that Biodiversity Impact Assessments are carried out by suitably qualified and competent practitioners with previous experience in this field. Judgements on the qualifications and experience needed shall be taken on a case-by-case basis, taking into account the nature, scale and complexity of the project. Information shall be presented to decision makers to demonstrate the competence of the practitioner(s) leading the Biodiversity Impact Assessment.

It is recommended that the biodiversity practitioner(s) leading the preparation of the EIA Report and/or carrying out of the Biodiversity Impact Assessment in respect of National Road, Greenway and Active Travel Projects have one or more of the following qualifications:

- An honours degree (National Framework of Qualifications (NFQ) Level 8 (or equivalent level)) in ecology or closely-related subject; or,
- A master's degree in (NFQ Level 9 (or equivalent level)) in ecology or closely-related subject; or,
- A doctorate (NFQ Level 10 (or equivalent level)) in ecology or closely-related subject.

Further, biodiversity practitioner(s) should hold:

- Associate, Full or Fellow Membership of the Chartered Institute of Ecology and Environmental Management (CIEEM); or,
- Equivalent membership of an equivalent professional body that represents biodiversity practitioners.

In addition, biodiversity practitioner(s) should have:

- The appropriate level of competence in ecological assessment in accordance with the CIEEM Competency Framework for professional ecologists, which is at least 'Capable' for simpler/non-EIA projects and at least 'Proficient' for more complex/EIA projects [39].

The collection of baseline information, data analysis and reporting may involve a team of ecologists and other specialists. The ecologists undertaking each task should be able demonstrate the appropriate level of competence in accordance with the CIEEM Competency Framework [39] and, where relevant, the CIEEM specific guidance for surveys [40].

The requirements for those using the TII Biodiversity Metric are as set out in Section 1.6 of the User Guide for the TII Biodiversity Metric (GE-ENV-01112) [41].

2.4 Common Impacts arising from National Road Developments

National Road Projects can affect biodiversity during the site investigation, construction and operation (including maintenance) activities, see Table 2-1.

Table 2-1: Common Negative Impacts on Biodiversity arising from National Road Developments

Impact	Site Investigation*	Construction Activity	Operational Activity*
Direct mortality of animals	✓	✓	✓
Direct mortality of plants	✓	✓	
Disturbance of animals	✓	✓	✓
Loss of breeding, nesting, roosting or foraging sites**	✓	✓	
Changes in food availability		✓	✓
Barriers to animal movements		✓	✓
Damage of habitats	✓	✓	✓
Degradation of habitats	✓	✓	✓
Loss of habitats and populations**		✓	
Fragmentation of habitats and populations** (Plate 1)		✓	
Isolation of habitats and populations**		✓	
Reductions in air quality		✓	✓
Increases in noise pollution		✓	✓
Increases in light pollution		✓	✓
Shading of vegetation by structures**		✓	
Reductions in water quality (surface and ground water), including suspended solid pollution	✓	✓	✓
Changes in water quantity (surface and ground water)		✓	✓
Changes in watercourses including hydromorphology**		✓	
Increases in recreational activities			✓
Introduction or spread of invasive species	✓	✓	✓
Depositing waste materials in sensitive habitats		✓	✓
Soil compaction, erosion and degradation**	✓	✓	

Soil enrichment (Nitrogen deposition)			✓

* Maintenance works may have similar impacts to site investigation.

** Whilst the impact first occurs as a result of construction activity, its effects may be felt during the operation.

Plate 1: The M8 Rathcormac - Fermoy Bypass under construction, showing habitat fragmentation (Ballybrack Wood, Fermoy) in 2004

2.5 Biodiversity Impact Assessment Scope

The Biodiversity Impact Assessment shall focus on the effects of the project on biodiversity. It shall:

- Endeavour to meet the objectives set out in Section 2.2.
- Be undertaken by qualified and competent practitioners, as set out in Section 2.3.
- Be based upon an accurate description of the project, with the detail being appropriate to each Phase and Stage.
- Include consideration of site investigations, construction, operational and, if relevant, decommissioning activities, including, *inter alia*, enabling/advanced works, temporary works, maintenance works, storage of materials, re-distribution of soils, and transportation of workers and materials.
- Be an iterative process, with the assessments undertaken at Phases 1 to 3 informing options selection and the project design.
- For EIA projects, clearly set out the criteria for determining significance, taking into account the environmental protection objectives set by the European Union, Ireland and the local authority for biodiversity and Important Ecological Features (IEFs, see Appendix B, Section B.5.2.3).
- Consider the effects on biodiversity arising from changes in the environment, including air, water, noise and light, and the behaviour of people, such as recreation, with and without the project.
- Describe the current baseline and how this would change over time.
- Describe the significant cumulative effects of the project and other projects on biodiversity and the relevant Important Ecological Features, at any distance from the project.
- Be objective, transparent, systematic, quantified and based on scientific evidence, including recent high-quality data, with any limitations clearly identified and addressed by, for example, adopting the precautionary principle.
- Be presented clearly and concisely, with details on survey methods, datasets, mitigation plans, invasive species management, calculations and similar included as appendices.
- Include an assessment of compliance with relevant legislation, policy, plans and Standards protecting biodiversity and Important Ecological Features, including any requirements for derogations or licences.
- Include the outcome of the TII Biodiversity Metric supported by data and a plan for achieving the biodiversity targets set for the project.

Table 2-2 shows the key steps and activities for Biodiversity Impact Assessment, noting that:

- If required, formal EIA Screening and Scoping are likely to happen once, when there is a Preferred Option.
- At Phases 1 and 2, Key Steps 3 to 7 and 12 shall be implemented and to the levels described in Section 4.2 and 0. Steps 8 to 11 are omitted.
- At Phase 3, Key Steps 3 to 12 shall be implemented to the level described in Section 4.4.

- When a statutory EIA is required, the purpose of the BIA at Phase 3 is to provide the biodiversity component of Environmental Impact Assessment (EIA) and it is therefore focussed on 'likely significant effects'.
- When a statutory EIA is not required or biodiversity is scoped out of the EIA, the purpose of the BIA at Stage 3 is to demonstrate how a project accords with relevant legislation, policy, plans and Standards and it is therefore focused on compliance.

Table 2-2: Key Steps and Activities for Biodiversity Impact Assessment

Key Steps	Key Activities	EIA	Non-EIA*
1. Screening for EIA (sub-threshold projects only).	a) Gain a preliminary understanding of the nature of the project, its activities and potential impacts.	✓	✓
	b) Gain a preliminary understanding of the baseline conditions including reviewing existing biodiversity and relevant environmental data.	✓	✓
	c) Determine whether the project would be on a statutory designated site.	✓	✓
	d) Assess the project against the criteria in Annex III of the EIA Directive with respect to biodiversity (and other environmental factors).	✓	✓
2. Scoping for EIA (EIA projects only).	a) Determine the aspects of the environment which are likely to be significantly affected by the project.	✓	X
	b) Set out the scope of the BIA (Key Step 3) in a Scoping Report.	✓	X
3. Determine the scope of the BIA.	a) Gain a preliminary understanding of the nature of the project, its activities and potential impacts.	✓	✓
	b) Gain a preliminary understanding of the baseline conditions including reviewing existing biodiversity and relevant environmental data.	✓	✓
	c) Determine the preliminary 'Zone(s) of Influence' (ZoI).	✓	✓
	d) Determine which relevant features are to be included/excluded from detailed assessment, taking into account their Environmental Protection Objectives (EPOs), if any.	✓	✓
	e) Review the applicable legislation, policies, plans, guidance and Standards and collate their requirements.	✓	✓
	f) Identify all relevant EPOs, including any specific objectives for designated sites, and set the criteria for determining significance.	✓	X
	g) Determine the sources and proposed methods for gathering data and assessment.	✓	✓

Key Steps	Key Activities	EIA	Non-EIA*
	h) Determine the information required to inform the assessment on changes in the environment and human behaviour, and how this will be obtained.	✓	✓
	i) Gather baseline data as appropriate to the project Phase and Stage.	✓	✓
	j) Identify other projects to be included in the baseline conditions and assessment of cumulative effects.	✓	?
	k) Identify opportunities for avoiding significant and/or non-compliant effects, and the opportunities for mitigation, enhancement and compensation which could be included in the project.	✓	✓
	l) Consult with relevant stakeholders on the scope of the assessment, the criteria for determining significance, their objectives for biodiversity, and ways of mitigating and compensating for any significant adverse and/or non-compliant effects on biodiversity.	✓	?
4. Define the project.	a) Define the project (option) and activities (from site investigation to decommissioning), including temporary and permanent works, that is to be assessed. Include location(s), timings, and methods of construction.	✓	✓
	b) Quantity emissions to air, water and land, other environmental changes such as noise, light and water quantity.	✓	✓
	c) Identify and if possible, quantify the use of resources that may impact biodiversity (if scoped into the EIA).	✓	X
	d) Determine potential for major accidents and disasters, accidental spills and suspended solid pollution of watercourses (if scoped into the EIA).	✓	X
	e) Determine the ZoI for each impact type.	✓	✓
5. Describe the baseline conditions.	a) Gather (more) baseline data (existing data and from surveys) from within the ZoI.	✓	✓
	b) Describe and quantify the biodiversity baseline, including the relevant 'Important Ecological Features' (IEFs), the quality of the environment and the environmental processes on which it depends.	✓	✓
	c) Identify the legislation and policy protection for biodiversity and the relevant IEFs.	✓	✓
	d) Define or confirm the EPOs/significance criteria for biodiversity and the selected IEFs.	✓	X

Key Steps	Key Activities	EIA	Non-EIA*
	e) Determine the conservation status of the IEFs with reference to their EPOs/significance criteria, if any.	✓	X
	f) Determine the 'sensitivity' of each feature to impacts and the geographic area to which this applies.	✓	✓
	g) Assign a level of value to each of the IEFs in accordance with the CIEEM geographic scale.	✓	X
	h) Identify existing pressures including from existing developments.	✓	X
	i) Predict how the baseline will evolve over time, considering any objectives to restore biodiversity and particular ecological features.	✓	X
	j) Calculate the biodiversity baseline in biodiversity units (BU) using the TII Biodiversity Metric (TII BM).	✓	✓
6. Identify (describe) the biodiversity that is likely to be significantly affected by the project and/or for which there is a risk of contravening legislation or policy protection.	a) Identify the biodiversity (regardless of other protections) that is likely to be affected by the project on its own and cumulatively with other developments, taking into account its EPO.	✓	X
	b) Identify the IEFs that could be significantly affected by the project on its own or cumulatively with other developments, taking into account the EPOs/significance criteria.	✓	X
	c) Identify the IEFs for which there is risk that the project, on its own or cumulatively with other projects, will contravene the law or policy protecting that feature.	✓	✓
	d) Identify the ecological and environmental processes that may be affected by the project.	✓	X
7. Describe the Likely Significant Effects of the defined project on biodiversity and/or the effects that could contravene the legislation and policy that protects biodiversity.	a) Considering the evolution of the baseline, systematically and scientifically describe how the project will impact biodiversity in general and the IEFs, during site investigation, construction, operational and, if relevant, decommissioning activity.	✓	✓
	b) Characterise the impacts.	✓	X
	c) Determine and, if possible, quantify the effects on biodiversity for both the project on its own and cumulatively with other developments, including impact interactions.	✓	✓
	d) Determine whether these effects would undermine (or support) the EPOs/significance criteria for biodiversity and the IEFs, and whether the effect would be significant.	✓	X

Key Steps	Key Activities	EIA	Non-EIA*
	e) Determine the geographic scale at which the effect would be significant based upon the value assigned to a feature.	✓	X
	f) Determine whether the impact or effect would contravene the relevant legislation, policy, plans and Standards protecting biodiversity or an ecological feature, and whether a derogation is available.	✓	✓
	g) Determine whether the project would result in the spread of legally controlled species including invasive alien species.	✓	✓
	h) If scoped into the BIA, determine whether the Project will use biodiversity as a resource (or resources that support biodiversity) for its construction or operation and, if so, assess the effects on biodiversity.	✓	X
	i) Calculate the change in biodiversity in BU resulting from the project using the TII BM.	✓	✓
8. Describe the forecasting methods or evidence, including difficulties	a) Summarise the methods used for surveys, modelling, predicting the evolution of the baseline and impact assessment.	✓	✓
	b) Describe the limitations in the methods used and the adequacy of the available evidence.	✓	✓
	c) Explain how this affected the assessment of effects and how this was addressed using the precautionary principle.	✓	✓
9. Describe the measures envisaged to avoid, prevent, reduce or, if possible, offset and monitor	a) Excluding alternative options and measures included in the design with certain outcomes, describe the measures to avoid or prevent likely significant adverse effects on biodiversity and/or effects that would contravene the relevant legislation, policy, plans and Standards.	✓	✓
	b) Similarly, describe the measures to reduce or mitigate likely significant adverse effects on biodiversity and/or effects that would contravene relevant legislation, policy, plans and Standards.	✓	✓
	c) For those likely significant adverse and /or non-compliant effects not fully avoided or mitigated, describe and quantify the measures to offset or compensate for adverse effects on biodiversity and comply with the relevant legislation, policy, plans and Standards, and achieve no net loss of biodiversity	✓	✓
	d) Describe and quantify the measures intended to enhance or provide a net gain for biodiversity.	✓	✓

Key Steps	Key Activities	EIA	Non-EIA*
	e) Identify any uncertainties if the efficacy of the measures proposed and any contingency measures which are proposed to address these uncertainties, and when these would be invoked.	✓	✓
	f) Set out the intended monitoring protocol.	✓	✓
	g) At Phase 3 or 4, provide a Schedule of Environmental Commitments and prepare strategies and plans for implementing these measures.	✓	✓
10. Explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, or enhanced/improved (residual effects).	a) Taking into account the measures to avoid and mitigate the adverse effects of the project on biodiversity, determine whether these effects remain significant and adverse, and to what degree.	✓	X
	b) Taking into account the measures to offset or compensate for significant adverse effects on biodiversity, explain to what degree these are compensated for.	✓	X
	c) Describe any effects on biodiversity and IEFs arising from the proposed mitigation and compensation measures, including that proposed to mitigate effects on other environmental factors.	✓	X
	d) Provide an overall statement on the outcomes for biodiversity and each of the IEFs arising from the project.	✓	X
	e) Provide a statement on compliance with relevant legislation, policy, plans and Standards.	✓	✓
	f) Re-calculate the change in biodiversity in BU using the TII BM.	✓	✓
11. Major accidents and/or disasters, if scoped into the BIA.	a) In consultation with the project team, determine the potential for accidents and disasters and the scenarios to be assessed.	✓	X
	b) Complete a proportionate Biodiversity Impact Assessment (BIA) for each of the identified scenarios.	✓	X
12. Input to the project design.	a) At Phases 0 to 3, feedback to the project design in accordance with the mitigation hierarchy.	✓	✓
	b) Revise the option or design to avoid or reduce the loss of biodiversity and significant adverse effects and/or effects that would contravene the relevant legislation, policy, plans and Standards as far as possible, taking into account other factors.	✓	✓
	c) Provide input to enhance the project design for biodiversity.	✓	✓

Key Steps	Key Activities	EIA	Non-EIA*
	d) Keep a record of the options considered and assessed.	✓	X

* where a choice is presented in the table, legislation, policy, plans and Standards (non-) compliance is the relevant option.

The output and documents describing Biodiversity Impact Assessment take several forms depending on the Phase and Stage and the requirement for an EIA. Information on this is provided in Sections 3 and 4.

This Standard includes assessments completed under EIA legislation and assessments completed for non-EIA projects which require a Biodiversity Impact Assessment (see Section 1.2.1). It does not cover assessments completed under Article 6(3) and 6(4) Habitats Directive, for which other guidance is available [35] [36] [37] [38]. It also does not cover ecosystem services and natural capital (beyond biodiversity accounting); these are generally completed by other specialist practitioners.

Other Standards and guidance that are relevant to the assessment are provided in Section 1.2. In addition to these, official guidance on the assessment of effects of development on the environment in general is provided by several publications. These include:

- EC (2017) Environmental Impact Assessment of Projects: Guidance on Screening. European Commission, Luxembourg [28].
- EC (2017) Environmental Impact Assessment of Projects: Guidance on Scoping. European Commission, Luxembourg [30].
- EC (2017) Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report. European Commission, Luxembourg [31].
- EC (2013) Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment. European Commission, Luxembourg [42].
- Department of Housing, Planning and Local Government (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Office of the Planning Regulator, Dublin [43].
- Environmental Protection Agency (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports. Environmental Protection Agency, Johnstown Castle [29].

This is supplemented by a range of guidance provided by other organisations including professional bodies and other non-governmental organisations. For summaries and references, see the accompanying literature review [27]. The principal guidance on ecological impact assessment is provided by the Chartered Institute of Ecology and Environmental Management [3] and on biodiversity net gain by CIRIA [44].

Key concepts related to Biodiversity Impact Assessment are set out in Appendix B and in the Glossary.

The biodiversity practitioner will need to work collaboratively (and vice versa) with the Project Manager, the project design team and the other environmental practitioners involved in the project design and assessment, see Section 2.7 and Appendix C, and stakeholders, see Section 2.8.

2.6 Avoidance, Mitigation and Compensation Measures

When impacts on biodiversity from the proposed project are unavoidable, a variety of measures can be introduced to reduce (mitigate), or as a last resort, compensate for these impacts. Examples are provided in Table 2-3. See also Appendix B, Section B.13.

Table 2-3: Examples of Avoidance, Mitigation and Compensation Measures

Measures	Examples
Avoidance	• Selecting an option which avoids an area of natural habitat. • Selecting an option which allows a habitat to be restored in the future.
Mitigation	• Fencing to protect a habitat during construction [21]. • Treatment of site run-off before it enters a watercourse. • Fencing to exclude animals from the road. [45] • Tunnels [16] [15] and bridges for wildlife. • Reducing light spill from artificial lighting [46]. • Reducing road noise with sound barriers.
Compensation	• Creating a new area of habitat to replace one that is lost or degraded. • Providing new nesting or roosting boxes to replace lost natural sites.
Enhancement	• Adding habitats to the design which are not adversely affected. • Providing new nesting or roosting boxes when none are lost.
Net Gain	• Providing more habitat than is required to compensate for significant adverse effects.

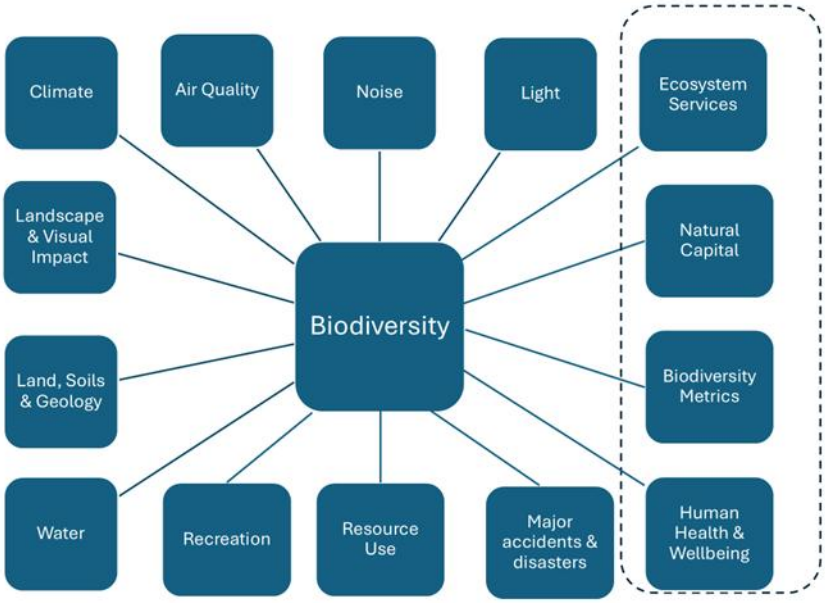
Avoidance and mitigation measures should be considered from the start of the TII PMG process and reviewed in all PMG Project Phases. Biodiversity practitioners shall demonstrate that sufficient measures are in place to avoid, mitigate and, if necessary, offset significant adverse effects on biodiversity. Specific guidance on mitigation measures for road schemes is available in TII documents (see Table 1-1) and elsewhere [47] [48].

Plate 2: Green Bridge to mitigate the effects of habitat fragmentation (A21 Lamberhurst Bypass, Kent, UK)

2.7 Consideration of other Environmental & Design Disciplines

Figure 2-2 presents the typical topics that will need to be engaged when undertaking biodiversity impact assessment, whether to collect primary data or to understand the impact of the project and how this can be mitigated, or for which outputs from the biodiversity impact assessments may be needed to inform that topic (within dashed line in Figure 2-2).

Figure 2-2 - Interaction and overlap with other factors



The amount of biodiversity, the presence of habitats and species, and the functioning of ecosystems depend upon the environment and its quality. This means that the Biodiversity Impact Assessment must consider the environmental changes arising from the project and the interaction between these environmental changes. Additional guidance on topic interactions is provided in Appendix C.

2.8 Consultation (non-statutory)

It is noted that the consultation discussed within this section is separate to the statutory consultation carried out with prescribed bodies during the planning decision process.

Consultation with relevant stakeholders will be led by the Project Manager, however the biodiversity practitioner(s) should be proactive in relation to their consultation needs. Further guidelines detailing the approach to consultation within TII's project planning and delivery framework can also be found in the PMG.

Consultation with relevant stakeholders shall start early in the project development and continue throughout the Project Phases. From a biodiversity perspective, the key objectives of stakeholder engagement and consultation are to:

- Advise stakeholders about the proposed National Road, Greenway or Active Travel Project and potential significant effects on biodiversity;
- Advise stakeholders about the biodiversity baseline, data sources, the intended 'Zone(s) of Influence', the features to be included in the assessment, the initial

assessment of likely significant effects and the proposed assessment methodology, including for surveys i.e. the scope of the assessment;

- Identify the relevant Environmental Protection Objectives, including any specific objectives for designated sites, and agree the criteria for determining significance;
- Obtain and verify any relevant information the stakeholders may hold privately (e.g. the local teams of the National Parks and Wildlife Service (NPWS);
- Identify any additional effects that require attention in the Biodiversity Impact Assessment;
- Identify the need for any additional surveys/data including issues to be addressed in the planning and execution of surveys;
- Identify the projects that should be included in the assessment of cumulative effects of the project with other developments;
- Obtain stakeholder views or recommendations regarding assessment methodology or possible avoidance and mitigation measures for potential effects identified as 'likely', 'adverse' and 'significant'; and
- Obtain stakeholder views or recommendations on the requirements for compensation and enhancement, including their objectives for biodiversity.

The above can be facilitated through an EIA Scoping process or similar.

In some cases, it may be appropriate or necessary for the biodiversity practitioner(s) to engage directly with stakeholders on specific biodiversity issues. In such cases, prior agreement shall be obtained by the biodiversity practitioner(s) from the Project Manager, including details of the purpose of the consultation and issues to be discussed.

The biodiversity assessments may overlap with other topics. Therefore, the biodiversity practitioner(s) shall liaise with other topics in particular those shown in Figure 2-2 where necessary to ensure a consistent approach and avoid duplication of consultation. Working with the Project Manager or project dedicated Communications Team, it is important that any initial consultation is followed up if a response to the initial consultation is not received. It is also advisable that direct contacts are sought, and departmental changes (as applicable) are reflected during the consultation process.

Guidance on Stakeholders that may require consultation as part of the biodiversity **assessment**

An indicative list of consultees that should be consulted in relation to the Biodiversity Impact Assessment includes (but is not limited to):

- National Parks and Wildlife Service (Development Applications Unit (DAU) and local teams).
- Inland Fisheries Ireland.
- Loughs Agency (in relevant locations)
- The relevant City or County Council(s) including biodiversity officers.
- Birdwatch Ireland.
- Bat Conservation Ireland.
- Irish Wildlife Trust.

- An Taisce - The National Trust for Ireland
- Environmental Protection Agency

3. Application of Biodiversity Impact Assessment to TII Road Projects Overview

This chapter provides an overview of the TII Project Phases, PMG and PAG process and deliverables, and the application of Biodiversity Impact Assessment and the associated outputs required for each as part of this Standard.

This Standard shall be applied to all proposed National Road Projects subject to the statutory approvals and procedure as outlined in Section 1.3. These National Road Projects shall be subject to a robust but proportionate appraisal of the effects of the project on biodiversity at an appropriate level of detail, taking into account their size and complexity of the project and the applicable statutory approval process. As such, this Standard shall be applied in a manner appropriate to the likely significant effects of the project on biodiversity and the applicable statutory approval process. This shall be determined by the Project Manager and, during the relevant later phases, by the biodiversity practitioner(s).

3.1 TII Project Management Guidelines, Project Manager's Manuals and Project Appraisal Guidelines

TII's suite of management and appraisal guidelines provide a framework for a phased approach to the management of the development and delivery of National Road, Greenway and Active Travel Projects. The assessments and deliverables required for different scales of these Projects are described in these guidelines. The guidelines are applicable to all projects that are funded through TII and/or where TII is the Sponsoring Agency. A key objective of the PMG, PMM and PAG is to ensure the efficient delivery of National Road, Greenway and Active Travel Projects in a manner which minimises adverse environmental effects (or provides an environmental benefit), while maximising the benefits of the new infrastructure and meeting legislative requirements. The guidelines align with the Department of Transport (DOT) Infrastructure Guidelines, Transport Appraisal Framework and EU, national and local policy. The PMG, PMM and PAG follow a consistent, structured and standardised phased process to guide the project through planning, design, construction and implementation, as shown in Figure 3-1.

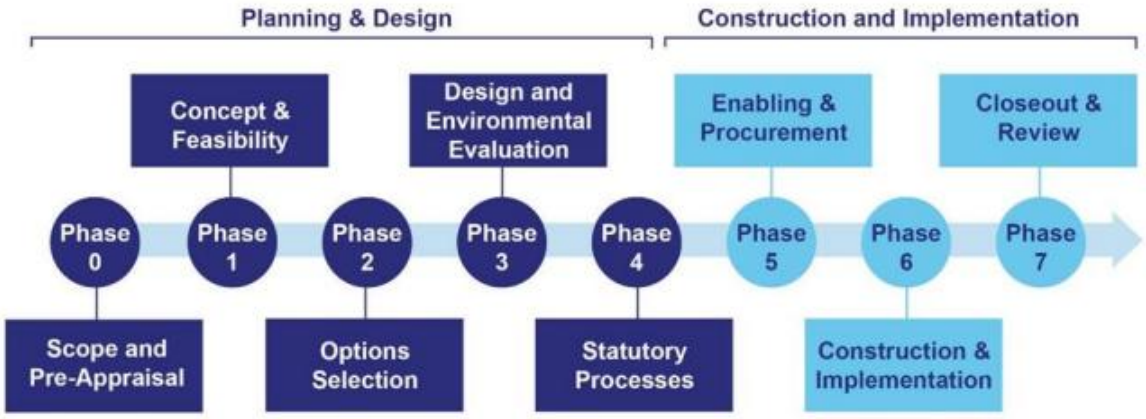


Figure 3-1 – TII Project Phases

3.2 Application of this Standard to Projects by Phase

Table 3-1 provides a high-level summary of the activities and deliverables at each TII Project Phase in relation to Biodiversity Impact Assessment for National Road, Greenway and Active Travel Projects. Further detail on this is provided in Section 4. The below is non-exhaustive summary and it is highlighted that specific project requirements and associated deliverables should be developed by the Project Manager/Project Team on a case-by-case basis. Figure 3-2 illustrates the process of selecting the Preferred Option and the points where input from the biodiversity practitioner is required.

The focus of this Standard is on the Planning and Design phases (Phases 1 to 4). This Standard does not provide detailed guidance for biodiversity practitioners on TII Project Phases 5 to 7, which relate to procurement, construction and implementation, closeout and review, or Phase 0 which is carried out by the Project Manager. However, Phases 0, 5 to 7 may require support from the biodiversity practitioners to help define problems, procure, implement and review, mitigation and monitoring measures where these are required. Some high-level guidance is provided in Section 4.1 on Phase 0 and Section 4.6 on Phases 5 to 7.

The implementation text as outlined in Section 1.3 is again highlighted here and it is noted that the application outlined below is assuming a non-transitional manner i.e. that the project or particular phase had not commenced prior to publication of this Standard.

Table 3-1 – Activities and Project Deliverables by TII Project Phase

Project Phase	Input, Objectives, Activities & Project Deliverables
Phase 0: Scope & Strategic Assessment	This will not require the input of a biodiversity practitioner. The main objective relevant to biodiversity at Phase 0 is to check alignment with the policies and objectives for the protection and restoration of biodiversity. In the preparation of the Project Outline Document (see PAG Unit 2.1 PE-PAG-02011), the Project Manager shall have regard to the national goals, objectives, and actions to protect and restore biodiversity outlined in the National Biodiversity Action Plan and TII's published Biodiversity Plan. Phase 0 key deliverable - Project Outline Document
Phase 1: Concept & Feasibility	This may require the input of a biodiversity practitioner. The main objectives relevant to biodiversity at Phase 1 is to collate the biodiversity constraints and opportunities, highlight any risks to/from biodiversity and to help assess the feasibility of the Strategic Options . The main activities to be undertaken by the Project Manager or biodiversity practitioner at Phase 1 are: • Define the preliminary Zone(s) of Influence (ZoI), based on judgement of the likely extent of effects on biodiversity and Important Ecological Features (IEFs). • Generate an initial biodiversity baseline from which Important Ecological Features can be identified. • Collate information on the relevant legislation, policy, plans and Standards, including the National Biodiversity Action Plan and TII's published Biodiversity Plan. • Input to the SMART Project Objectives, if required.

Project Phase	Input, Objectives, Activities & Project Deliverables
	• Identify the biodiversity risks, constraints and opportunities that input to the assessment of the feasibility of Strategic Options. • Input to the Constraints, Risks and Opportunities Study. • Identifying consultees for Stakeholder Engagement, if required. • Consideration of Biodiversity during the Assessment of Strategic Options. • Include the biodiversity inputs to the Feasibility Report, including a summary of how the Strategic Options align with any biodiversity related Project Objectives (noting that there are unlikely to be any such Objectives). Phase 1 key deliverable - Feasibility Report

Phase 2: Option Selection Process	This will require the input of a biodiversity practitioner.
	The main objective relevant to biodiversity at Phase 2 is to assess the impacts of the Preliminary Options and help select the Preferred Option, avoiding potentially significant impacts on biodiversity where possible.
	The main activities to be undertaken by the biodiversity practitioner at Phase 2 are:
	• Stage 1 – Preliminary Options Assessment.
	  ○ Review, update and refine Phase 1 biodiversity baseline data and relevant legislation, policy, plans and Standards information.
	  ○ If any changes to the Phase 1 baseline and legislation etc. are identified, review, update and refine as necessary the biodiversity constraints, risks and opportunities and the ZoI.
	  ○ Optional - Generate an initial biodiversity baseline using the Options Appraisal Toolkit within the TII Biodiversity Metric (TII BM).
	  ○ Input to the development of the Preliminary Options.
	  ○ Input to the High-Level Preliminary Options Multi-Criteria Analysis (MCA) process, if required.
	  ○ Provide biodiversity inputs to the Phase 2 Stage 1 summary report/process, including a description of how potential effects on biodiversity have been considered in the assessment of the long list of Preliminary Options and the selection of the short-list of Preliminary Options.
	  ○ Inputs to the first public consultation, if required.
	• Stage 2 – Project Appraisal Matrix.
	  ○ Review, update and refine the Phase 2 Stage 1 information where necessary. If any changes to the Phase 2 Stage 1 information are identified, review and update as required the relevant legislation, policy, plans and Standards information and the biodiversity constraints, risks and opportunities and the ZoI.
	  ○ Generate an initial biodiversity baseline using the Options Appraisal Toolkit within the TII Biodiversity Metric (TII BM).
	  ○ Undertake a Biodiversity Impact Assessment of each of the (short-listed) Preliminary Options.
	  ○ Provide inputs to stakeholder engagement and (second) public consultation.

Project Phase	Input, Objectives, Activities & Project Deliverables
	○ Input to the development of the Preliminary Options. ○ Provide inputs to the detailed MCA/TAA of the (short-listed) Preliminary Options and input to the Project Appraisal Matrices. ○ Provide biodiversity inputs to the Phase 2 Stage 2 summary report/process. This shall include a description of how potential effects on biodiversity have been considered in the assessment of (short-listed) Preliminary Options and a commentary on the overall performance of each Option. • Stage 3 – Selection of Preferred Option. ○ Review, update and refine the Phase 2 Stage 2 information where necessary. Identify any changes to the Phase 2 Stage 2 conclusions with regard to biodiversity. ○ Provide biodiversity inputs to the Phase 2 Stage 3 report/process. This shall include a description of the Preferred Option in terms of its biodiversity impacts (both positive and negative) and its alignment with any biodiversity related Project Objectives (noting that there are unlikely to be any such Objectives). ○ Document the option process in terms of biodiversity in the Options Report. Phase 2 key deliverable - Options Report
Phase 3: Design & Environmental Evaluation	This will require the input of a biodiversity practitioner. The main objectives relevant to biodiversity at Phase 3 are to: • Inform the design of the Preferred Option, avoiding adverse impacts on biodiversity, where possible; • Identify the final requirements for avoidance, mitigation, compensation and enhancement to achieve the desired outcome for biodiversity and compliance with relevant legislation, policy, plans and Standards; and • If relevant, fulfil the requirements of the EIA Directive with respect to biodiversity. If the project is an EIA project, the main activities to be undertaken by the biodiversity practitioner at Phase 3 are: • Review, update and refine the Phase 2 biodiversity baseline information as necessary. This includes confirming the geographic extent of the Zone(s) of Influence (ZoI) to ensure that it encompasses the areas in which effects on biodiversity can be reasonably expected to occur. • Input to the EIA Screening process and report, if required (and undertake AA screening). • Undertake a scoping exercise to identify the Important Ecological Features (IEFs) and the potentially significant and/or non-compliant effects on biodiversity to be included in the assessment. • Provide the biodiversity chapter of the EIA Scoping Report. • Collect the additional baseline information needed to inform the Biodiversity Impact Assessment, making best use of information used at Phase 2. • Collate information on other projects which may have cumulative effects on biodiversity with the proposed project.

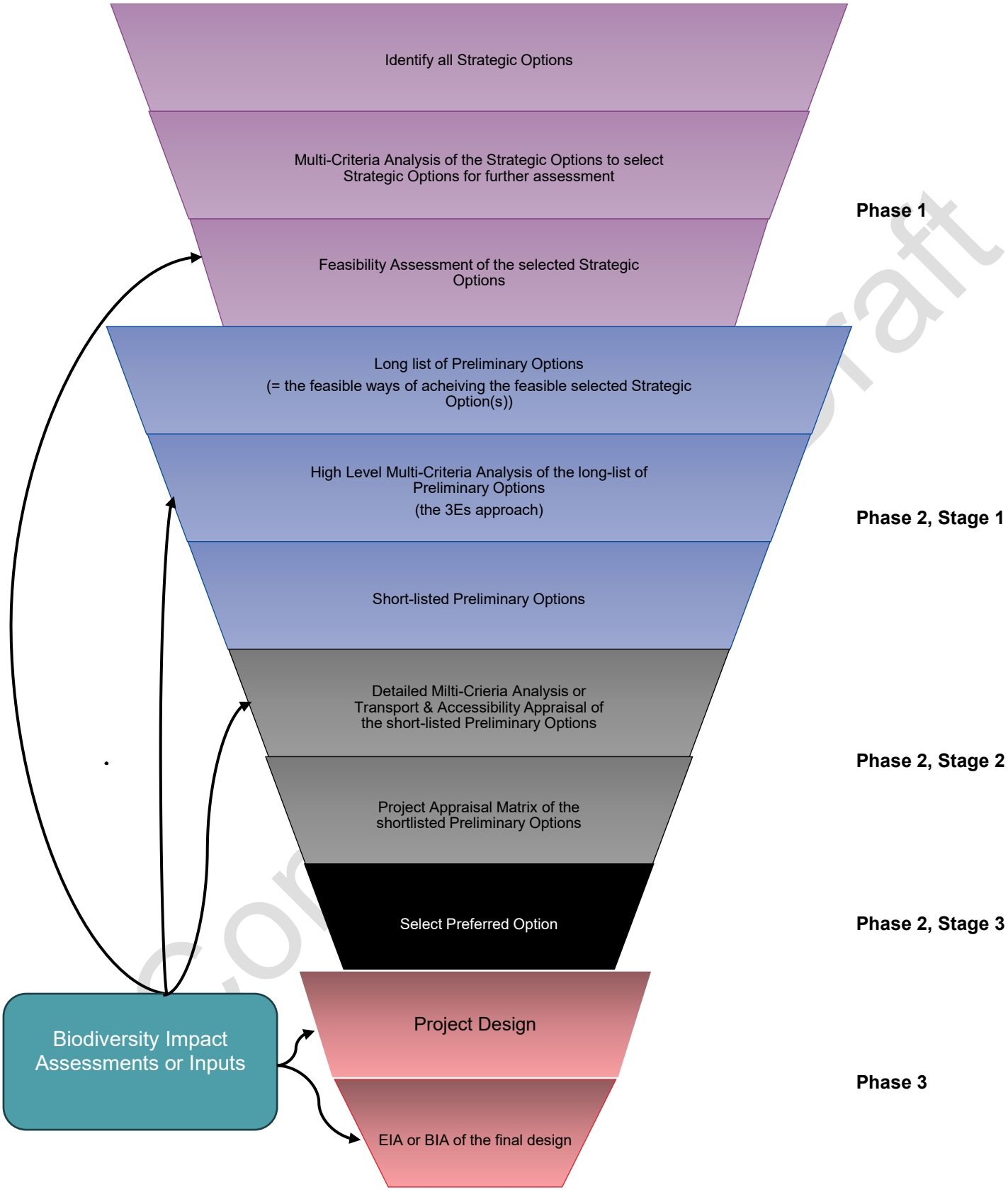
Project Phase	Input, Objectives, Activities & Project Deliverables
	• Provide input to the design of the project, incorporating measures to (i) avoid and mitigate the likely significant adverse effects of the project; (ii) comply with relevant legislation, policy, plans and Standards; and (iii) enhance biodiversity. • Provide inputs to the consultation process and if required undertake direct consultation with stakeholders. • Describe the likely significant and/or non-compliant effects on biodiversity and IEFs arising from site investigations and the construction, operation and maintenance of the proposed project, including (if scoped in) the use of resources and the risks arising from major accidents and disasters. Include cumulative effects and impact interactions. • Identify avoidance and mitigation measures to reduce adverse effects and comply with relevant legislation, policy, plans and Standards. • Assess the likely significant and/or non-compliant residual effects following the implementation of agreed avoidance and mitigation measures. Include cumulative effects and impact interactions. • Assess compliance with the legislation, policy, plans and Standards that relate to biodiversity and the protection of wildlife. • Identify measures to compensate for unavoidable adverse significant effects on biodiversity (or comply with any derogations) and measures to enhance biodiversity and/or achieve the objectives for biodiversity. • Identify and agree proposals for monitoring of effects on biodiversity. • Assess the project using the TII Biodiversity Metric during the design and for the final design of the project including any compensation and enhancement measures. • Provide the biodiversity chapter of the EIA Report or other planning related documents (including Natura Impact Statement, if required). • Obtaining any required consents and derogation licences with respect to biodiversity. If the project is not an EIA project, the list of activities is reduced, as agreed with the Project Manager, see Table 2-2. Phase 3 key deliverable - EIA Report, NIS, planning reporting, Schedule of Environmental Commitments, derogation licences etc.
Phase 4: Statutory Processes	This will require the input of a biodiversity practitioner. The main objective relevant to biodiversity at Phase 4 is to assist the decision-maker by providing information on the effects of the project on biodiversity, and refining measures to avoid, mitigate, compensate and/or enhance biodiversity, if required. The main activities to be undertaken by the biodiversity practitioner are: • Reviewing and drafting responses, where warranted, to biodiversity matters raised in submissions by third parties to the consenting authority. • Reviewing and drafting responses to any requests for further biodiversity-related information issued by the consenting authority. • Reviewing and updating, where necessary, aspects of the biodiversity assessment.

Project Phase	Input, Objectives, Activities & Project Deliverables
	• Drafting a biodiversity Brief of Evidence, where an oral hearing is to be held, in relation to biodiversity aspects including the assessment findings and responses to submissions, etc. • Taking part in oral hearing preparation meetings if applicable. • Taking part in meetings with third parties to discuss concerns/issues and possible resolutions. • Presenting the biodiversity Brief of Evidence at the oral hearing and responding to any questions on biodiversity aspects direct from the public, other bodies, or the Inspector. • Reviewing and reporting on any biodiversity aspects addressed in the decision of the consenting authority (and Planning Inspector's report). • Depending on the outcome of the statutory process, additional mitigation measures and conditions of consent may need to be incorporated into the design and Schedule of Environmental Commitments, which may require input from biodiversity practitioners. Phase 4 key deliverable – submissions, Request for Further Information (RFI) responses, Oral Hearing reporting. Brief of Evidence.

Phase 5 to 7: Enabling and Procurement, Construction and Implementation, Closeout and Review	This may require the input of a biodiversity practitioner.
	The main objective relevant to biodiversity at Phase 5 to 7 is to help ensure that the project is implemented in accordance with the relevant commitments, planning obligations and the law.
	The main activities to be undertaken by a biodiversity practitioner, if required, are:
	• **Phase 5: Enabling and Procurement**
	  ○ Reviewing the Schedule of Environmental Commitments and relevant planning conditions/obligations or modifications.
	  ○ Undertaking pre-construction surveys.
	  ○ Updating mitigation and compensation plans.
	  ○ Providing guidance on the implementation of mitigation and compensation.
	  ○ Providing guidance on the implementation of monitoring activities.
	  ○ Obtaining consents and derogation licences not obtained at Phase 3 or renewing any that have expired.
	  ○ Preparing the inputs biodiversity inputs to the landscape management plan.
	  ○ Input to procurement documents on scope.
	• **Phase 6: Construction and Implementation**
	  ○ Providing guidance on the implementation of mitigation and compensation.
	  ○ Providing guidance on the implementation of monitoring activities.
	  ○ Reviewing compliance with the Schedule of Environmental Commitments and relevant planning conditions/obligations or modifications.
	  ○ Ecological Clerk of Works.
	  ○ Carrying out works under a derogation licence.
	  ○ Monitoring.

Project Phase	Input, Objectives, Activities & Project Deliverables
	○ Reporting on activities completed. • **Phase 7: Closeout and Review** ○ Post-construction surveys and monitoring. ○ Monitoring compensation sites. ○ Reviewing compliance with mitigation and compensation plans. ○ Reviewing compliance with the landscape management plan. ○ Reporting on activities completed. Phase 5-7 key deliverable – Tender and contract documents.

Figure 3-2: Selection of the Preferred Option & Biodiversity Inputs



4. Application of Biodiversity Impact Assessment to TII Road Projects

4.1 Phase 0: Scope and Strategic Assessment

The Project Manager will oversee the production of a Project/Programme Outline Document (POD) during Phase 0, see PAG Unit 2.1 PE-PAG-02011. The Project Manager should consider biodiversity issues in relation to the following POD elements:

- Identifying project need.
- Determining the strategic alignment of the project with international, national and local policies.
- Setting high level, objectives for the project.
- Setting out the Appraisal Plan (as part of the POD).

Specifically, the Project Manager shall have regard to, and check alignment with, the national goals, objectives, and actions to protect and restore biodiversity outlined in the National Biodiversity Action Plan and TII's published Biodiversity Plan [PMM].

There is no requirement for input from a biodiversity practitioner at Phase 0. On larger or more complex projects, advice from a biodiversity practitioner may be sought at the Project Manager's discretion.

PAG Unit 2.1 - Project/Programme Outline Documents provides guidance on the structure and content of the POD and Table 4-1 below summarises the biodiversity issues that may be considered by the Project Manager during the preparation of the POD. The extent to which biodiversity needs to be considered at this Phase will depend on the scale and complexity of the Project / Programme.

Table 4-1 – Consideration of Biodiversity in the Project Outline Document at Phase 0

Element of Project Outline Document	Consideration of Biodiversity
Project Need	Biodiversity is not normally relevant to the project need, unless the project is related to an environmental improvement such as alleviating existing adverse effects on a European site.
Alignment with international, national and local policies	Alignment with international, national and local polices for the protection and restoration of biodiversity must be reviewed by the Project Manager.
Setting Objectives	Biodiversity is not normally relevant to the project objectives, unless the project is related to an environmental improvement as above. However, biodiversity net gain opportunities can also be considered at this early stage and further refined as the project progresses (PAG 2.1).
Appraisal Plan	Biodiversity is not normally directly relevant to choice of the intended appraisal approach. However, effects on biodiversity can influence whether an EIA (or AA) is required and therefore the approval procedure. The Project Manager should consider whether this influences the appraisal approach. The Appraisal Plan may refer to collection of biodiversity data, and the inclusion of biodiversity in the feasibility assessment (Phase 1) and the options assessment/appraisal (Phase 2).

Phase 0 includes setting high level objectives for the project. Such objectives nearly always relate to transport policies, problems and solutions and would not include biodiversity unless exceptional circumstances exist. An example of such an objective would be to alleviate adverse effects on the integrity of a European site by relocating or modifying an existing road. However, the project should still aim to avoid and reduce impacts on biodiversity, see PAG Unit 2.1 PE-PAG-02011.

At Phase 0, the input of the biodiversity practitioner is not required. Instead, the Project Manager shall be aware of the international, national and local legislation that pertains to (i) biodiversity, including protected sites, habitats and species and (ii) climate change. The Project Manager shall also review relevant policy and plan documents including:

- Convention on Biological Diversity.
- Global Biodiversity Framework.
- European Green Deal;
- EU Biodiversity Strategy for 2030;
- National Biodiversity Action Plan;
- TII Landscape and Biodiversity Plans;
- Draft Revised National Planning Framework;
- Regional Spatial & Economic Strategies;
- Local Authority City and/or County Development Plans;
- Local Authority Local Area Development Plans;
- Local Authority Biodiversity Action Plans; and
- Climate Action Plan 2023 (CAP23).

The Project Manager shall then summarise how the proposal could align with that policy/plan within the Project/Programme Outline Document (POD), taking into account the interaction between climate change and biodiversity, for example, the ability of biodiversity to absorb carbon and the adverse effects of climate change on biodiversity. This summary could be a table listing the policy documents reviewed and outlining the key aspects of each policy for the project, see PAG Unit 2.1.

4.2 Phase 1: Concept and Feasibility

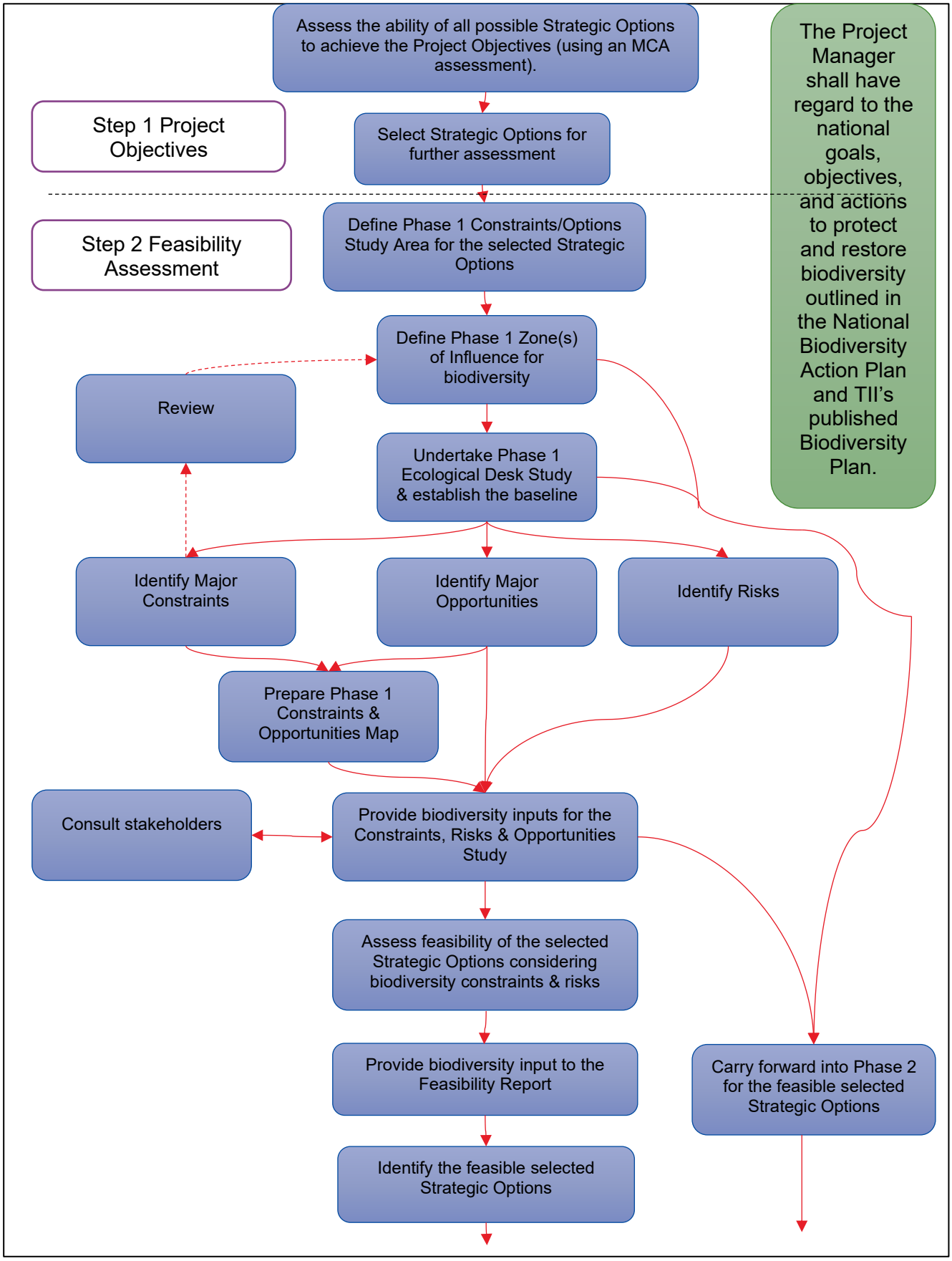
The purpose of Phase 1 is to develop and assess the Strategic Options in terms of their ability to satisfactorily meet the project objectives and their feasibility taking into account constraints, risks and opportunities. Depending on the nature, scale and potential complexity of the proposed project the relevant activities at Phase 1 can be undertaken by the Project Manager, or a suitability competent nominated person, which can include a biodiversity practitioner(s), see Table 4-2 and Figure 4-1.

At Phase 1, the Project Manager (and nominated person) shall have regard to the national goals, objectives, and actions to protect and restore biodiversity outlined in the National Biodiversity Action Plan and TII's published Biodiversity Plan.

Table 4-2 –Biodiversity approach and process for Phase 1

Biodiversity approach and process for Phase 1	Ref
Define the preliminary Zone(s) of Influence (ZoI), based on judgement of the likely extent of effects on biodiversity and Important Ecological Features (IEFs).	4.2.1
Generate an initial biodiversity baseline from which Important Ecological Features can be identified.	4.2.2
Input to the SMART Project Objectives, if required.	4.2.3
Collate information on the relevant legislation, policy, plans and Standards, including the National Biodiversity Action Plan and TII's published Biodiversity Plan.	4.2.4
Identify the biodiversity risks, constraints and opportunities that input to the assessment of the feasibility of Strategic Options.	4.2.5
Input to the Constraints, Risks and Opportunities Study.	4.2.6
Identifying consultees for Stakeholder Engagement, if required.	4.2.7
Consideration of Biodiversity during the Assessment of Strategic Options.	4.2.8 4.2.9
Include the biodiversity inputs to the Feasibility Report, including a summary of how the Strategic Options align with any biodiversity related Project Objectives (noting that there are unlikely to be any such Objectives).	4.2.9

Figure 4-1: Phase 1 process and Biodiversity



4.2.1 Identifying the Biodiversity Zone(s) of Influence (ZoI)

There are two study area types identified in the Feasibility Report, as described in PAG Unit 2.0 PE-PAG-02010. These are:

- **Appraisal Study Area**: The Appraisal Study Area is used in the Phase 1 process to analyse travel demand, transport conditions, develop the Strategic Options and assess them to identify the Preliminary Options for detailed appraisal. This study area will be based on the Project Objectives, the start and end points of the transport route for which a solution/intervention is being sought and the area of influence in which transport conditions could reasonably be expected to be influenced.
- **Constraints/Options Study Area:** The Constraints/Options Study Area is initially defined in Phase 1 for the purposes of identifying all the physical, artificial, engineering and natural constraints in the area within which it is expected that the options will be developed and examined.

The Project Manager, or the biodiversity practitioner in consultation with other topic practitioners, shall establish an appropriate biodiversity Phase 1 'Zone(s) of Influence' (ZoI) for the project.

The Project Manager will determine the Phase 1 Constraints/Options Study Area. The Project Manager or biodiversity practitioner shall then set the biodiversity Phase 1 ZoI. The ZoI will include the Phase 1 Constraints/Options Study Area and usually an area(s) beyond it. The ZoI can be estimated by assuming that the project will occur at the edges of the Constraints/Options Study Area and then estimating the area over which the project could affect biodiversity. There could be more than one ZoI, based on the type of impact and the features being considered. Establishing the ZoI is iterative and should be informed by baseline data gathering and vice versa. Additional guidance on the Zone of Influence is provided in Appendix B, Section B.3.3.

The purpose of establishing the ZoI now is to define the area within which the major constraints, risk and opportunities will be mapped at Phase 1.

Establishing the ZoI for biodiversity requires consideration of the potential development type and other environmental factors, as set out in Section 2.7 and Appendix C.

4.2.2 Initial Biodiversity Baseline

The Project Manager or biodiversity practitioner shall collate sufficient baseline data for the ZoI to identify the major biodiversity constraints, risks and opportunities.

The Project Manager or biodiversity practitioner shall undertake a Phase 1 ecological desk study for the ZoI. This must include all major constraints including:

- Listed or proposed Ramsar sites.
- Listed or proposed European sites.
- Compensation sites for adverse effects on listed or proposed European sites.
- Natural Heritage Areas.
- Proposed Natural Heritage Areas (statutory).
- Proposed Natural Heritage Areas (non-statutory).
- Peatland, including agricultural and afforested peatland.
- Ancient and long-established woodlands.

- Annex I habitats, identifying areas included in the Favourable Reference Area (FRA).
- Flora Protection Order species.
- Freshwater Pearl Mussel catchments.
- Any Sites and areas that have been identified in state or county plan for restoration or habitat creation.

These features shall be presented on a map of biodiversity constraints and opportunities. The information shall be imported into the project GIS and identified as a major constraint (and/or opportunity). The information shall be uniform across the entire Constraints/Options Study Area and the ZoI for the feature being considered.

Whilst the major constraints are likely to be included in existing datasets, a review of aerial imagery and/or land cover maps may be necessary to identify undesignated sites, which nevertheless have biodiversity value, and ecological networks.

While the gathering of data is primarily a desktop study, it may be necessary to verify the type and extent of habitats in the field. Surveys for species would rarely be appropriate at this Phase; instead, the known range and habitats of protected and threatened species should be used to inform project risks.

Sources of data include:

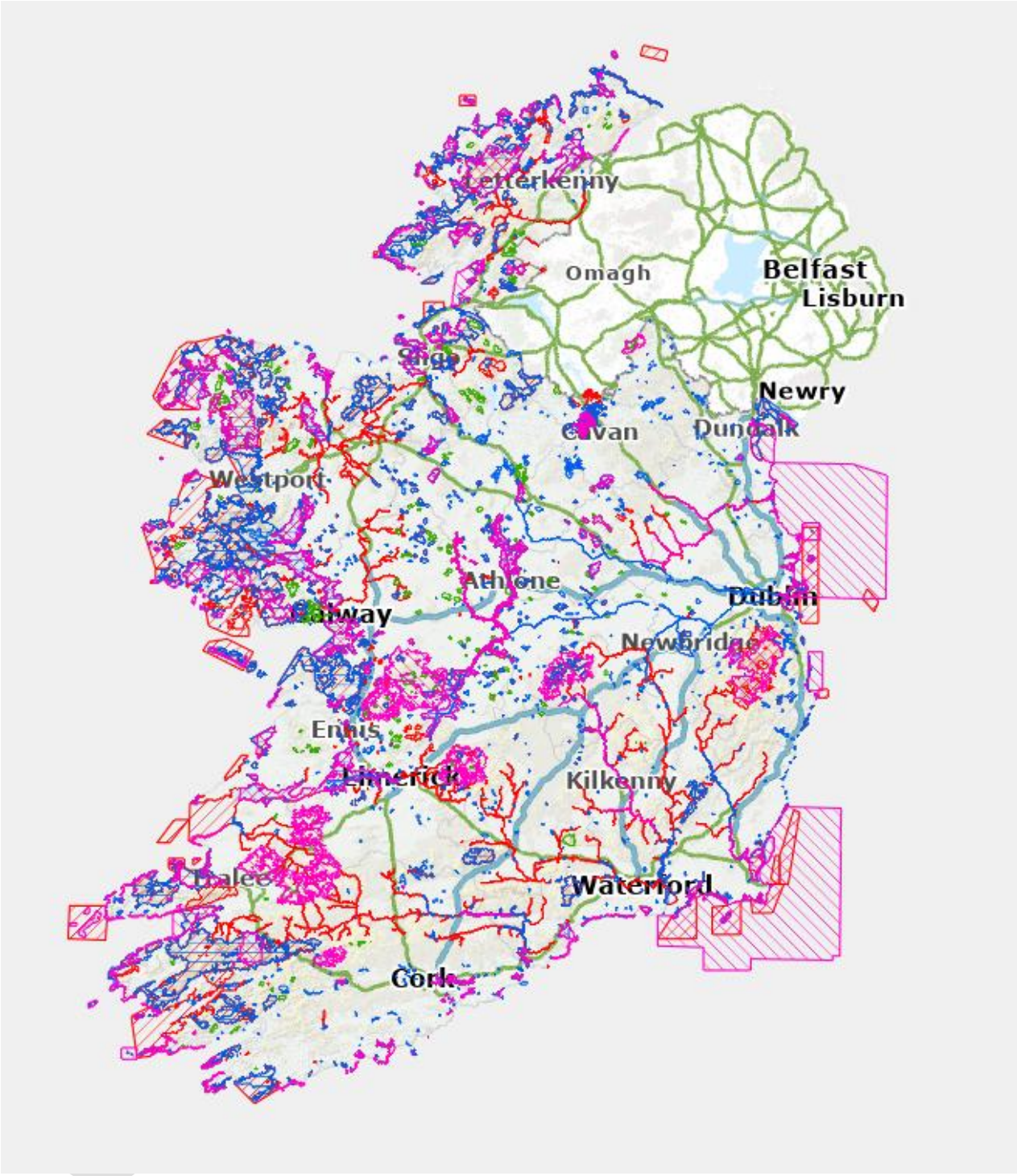
- National Parks and Wildlife Service maps and datasets;
- Ramsar Site Information Service;
- National Biodiversity Data Centre;
- Tailte Éireann's online National Land Cover Map; and
- Environmental Protection Agency maps and datasets.

Guidance on ecological desk studies is provided in Appendix B, B.3.9 and B.5.1.1.

4.2.3 Input to SMART Project Objectives

The objectives identified at Phase 0 are reviewed and developed into SMART Project Objectives at Phase 1 (PAG Unit 3.0 PE-PAG-02012). As set out in Section 4.1, the objectives identified at Phase 0 are unlikely to relate to biodiversity and the input of a biodiversity practitioner to SMART project objectives is generally not required.

Figure 4-2: Sites Designated for Wildlife in Ireland



4.2.4 Legislation, Policy, Plans and Standards

The Project Manager or biodiversity practitioner shall collate information on the relevant legislation, policy, plans and Standards, including the National Biodiversity Action Plan and TII's published Biodiversity Plan, see Appendix A and the accompanying literature review [27].

4.2.5 Identification of Biodiversity Constraints, Risks and Opportunities

The major constraints are of known location and are included on the biodiversity constraints and opportunities map. Risks either apply widely or are of currently unknown location and have the potential to limit the Project Scope, for example, the potential presence of a protected species or area used by migratory birds. Biodiversity opportunities are opportunities for the project to contribute to the restoration of biodiversity. Some are of known location (and are shown on the biodiversity constraints and opportunities map) while other opportunities apply more widely or may be of unknown location.

The identification of constraints and risks should be based on legal and policy protection, and the opportunities should be informed by obligations, objectives and plans to restore or enhance biodiversity.

This is a high-level assessment which does not need to set out the legislation and policy in detail; it provides enough information for the Project Manager to understand the risks from biodiversity to achieving the Project Objectives and the feasibility of the Strategic Options.

The Project Manager or biodiversity practitioner shall identify the major biodiversity constraints, risks and opportunities. This includes identifying the relevant protections for the major constraints within the Constraints/Options Study Area and the ZoI.

4.2.6 Input to the Constraints, Risks and Opportunities Study

The Constraints, Risks and Opportunities Study covers all relevant environmental factors including biodiversity. The Project Manager or biodiversity practitioner shall present the biodiversity constraints, risks and opportunities in the Constraints, Risks and Opportunities Study. Guidance on the content of this study is provided in the PMMs. The Study is included or summarised as a section in the Feasibility Report.

4.2.7 Stakeholder Engagement

Informal Stakeholder engagement may be undertaken at Phase 1 (see PAG Unit 3.0 and PMM for National Roads Section 1.1.3). If required, the biodiversity practitioner shall provide to the Project Manager a list of consultees which may be consulted about the project. The consultees may include the National Parks and Wildlife Service and Inland Fisheries Ireland. Stakeholder engagement is described in Section 2.8.

4.2.8 Consideration of Biodiversity during the Assessment of Strategic Options

As set out in PAG Unit 7.0 PE-PAG-02031, and shown on Figure 4-1, the assessment of the Strategic Options has two steps:

- Step 1 – assess all Strategic Options on the basis of their ability to achieve the Project Objectives (using an MCA assessment).
- Step 2 – a feasibility assessment of the selected Strategic Options brought forward from Step 1.

At Step 1, the SMART project objectives are used to evaluate all Strategic Options for the project. The Strategic Options may include different modes of transport (active travel, public transport, private vehicles) and different levels of intervention (optimising or improving existing infrastructure or building

new infrastructure). They may include options other than National Road, Greenway and Active Travel Projects. As the SMART project objectives are unlikely to include biodiversity, Step 1 is undertaken by the Project Manager and the input of the biodiversity practitioner is generally not required. The Project Manager will select one or more Strategic Options for further assessment which best meet the project need and objectives.

At Step 2, the feasibility of each selected Strategic Option is assessed. This assessment is likely to require the inputs of the environmental topic practitioners including biodiversity but could be completed by the Project Manager. The assessment is set out in the Feasibility Report.

The feasibility assessment shall be based on the information presented in Constraints, Risks and Opportunities Study, including the map, and the feedback received from the consultation (if undertaken).

4.2.9 Input to the Feasibility Report

The Project Manager or biodiversity practitioner shall prepare inputs to the Feasibility Report including a description of the biodiversity baseline and for each selected Strategic Option:

- Identification of the major constraints and risks.
- Identification of the opportunities for the restoration or enhancement of biodiversity (not compensation).
- Description of the likelihood and difficulty of compliance with relevant legislation, policy, plans and Standards.
- Description of the likelihood and difficulty of achieving the objectives for biodiversity and the potential need for off-site compensation or biodiversity provision.
- Outline of measures which may be needed to comply with relevant legislation, policy, plans and Standards.
- Outline of measures which could be included to achieve beneficial outcomes for biodiversity.
- A statement of feasibility or difficulties from the perspective of biodiversity.

The Feasibility Report shall include the map showing the biodiversity constraints and opportunities and the Constraints, Risks and Opportunities Study, either as a section or included as an appendix.

The feasibility assessment is a high-level assessment and would not usually require detailed descriptions of the designated sites and other ecological features found in the Constraints/Options Study Area and ZoI. The Project Manager or biodiversity practitioner should focus on the constraints and risks which could affect the feasibility of the selected Strategic Options or make them difficult to implement.

Phase 1 Biodiversity Outputs

The biodiversity outputs for the Phase 1 Feasibility Report shall include:

- *Map showing biodiversity constraints and opportunities for the selected Strategic Options.*
- *Biodiversity input to the Constraints, Risks and Opportunities Study of the selected Strategic Options.*
- *Summary of biodiversity constraints, risks and opportunities for each selected Strategic Option.*
- *Inputs to the Feasibility Report.*

Biodiversity approach and process for Phase 2	**Ref**
Stage 1 – Preliminary Options Assessment	
Review, update and refine Phase 1 biodiversity baseline data and relevant legislation, policy, plans and Standards information.	4.3.1.1 4.3.1.2
If any changes to the Phase 1 baseline and legislation etc. are identified, review, update and refine as necessary the biodiversity constraints, risks and opportunities and the ZoI.	4.3.1.3 4.3.1.4
Optional - Generate an initial biodiversity baseline using the Options Appraisal Toolkit within the TII Biodiversity Metric (TII BM).	4.3.1.5
Input to the development of the Preliminary Options.	4.3.1.6
Input to the High-Level Preliminary Options Multi-Criteria Analysis (MCA) process, if required.	4.3.1.7
Provide biodiversity inputs to the Phase 2 Stage 1 summary report/process, including a description of how potential effects on biodiversity have been considered in the assessment of the long list of Preliminary Options and the selection of the short-list of Preliminary Options.	4.3.1.8
Input to the first public consultation, if required.	4.3.1.9
Stage 2 – Project Appraisal Matrix	
Review, update and refine the Phase 2 Stage 1 information where necessary. If any changes to the Phase 2 Stage 1 information are identified, review and update as required the relevant legislation, policy, plans and Standards information and biodiversity constraints, risks and opportunities and the ZoI.	4.3.2.1 4.3.2.2 4.3.2.3 4.3.2.4
Generate an initial biodiversity baseline for each (short-listed) Preliminary Option using the Options Appraisal Toolkit within the TII Biodiversity Metric (TII BM).	4.3.2.5
Undertake a Biodiversity Impact Assessment of each of the (short-listed) Preliminary Options.	4.3.2.6
Provide inputs to stakeholder engagement and (second) public consultation.	4.3.2.7
Input to the development of the Preliminary Options.	4.3.2.8
Provide inputs to the detailed MCA/TAA of the (short-listed) Preliminary Options and input to the Project Appraisal Matrix.	4.3.2.9
Provide biodiversity inputs to the Phase 2 Stage 2 summary report/process. This shall include a description of how potential effects on biodiversity have been considered in the assessment of the (short-listed) Preliminary Options and a commentary on the overall performance of each Option.	4.3.2.10 4.3.2.11
Stage 3 – Selection of Preferred Option.	
Review, update and refine the Phase 2 Stage 2 information where necessary. Identify any changes to the Phase 2 Stage 2 conclusions with regard to biodiversity.	4.3.3.1

Biodiversity approach and process for Phase 2	Ref
Provide biodiversity inputs to the Phase 2 Stage 3 report/process. This shall include a description of the Preferred Option in terms of its biodiversity impacts (both positive and negative) and its alignment with any biodiversity related Project Objectives (noting that there are unlikely to be any such Objectives).	4.3.3.2
Document the option process in terms of biodiversity in the Options Report.	4.3.3.3

4.3 Phase 2: Options Selection

The Phase 2 Options Selection will identify a Preferred Option through a structured, comparative appraisal of Preliminary Options, to provide a best fit with the Project Objectives and Appraisal Criteria. The process is split into three distinct stages within the TII PAG, each requiring a greater level of assessment and appraisal, see Figure 4-3. For EIA projects, reference should also be made to RE-ENV-07008 Chapter 3 in relation to the overarching requirement to comply with Article 5(1)(d) of the amended EIA Directive.

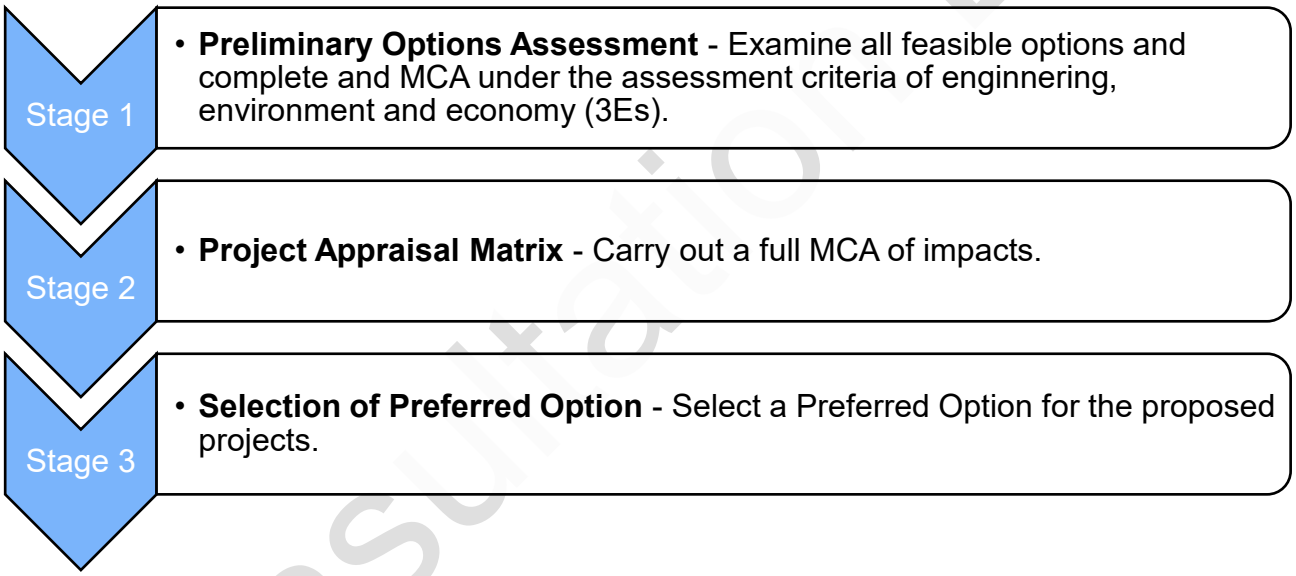


Figure 4-3 – TII Options Process

Phase 2 will require inputs from the biodiversity practitioner(s) to ensure that site investigation, construction, operational (including maintenance) and, if relevant, decommissioning impacts on biodiversity are considered in the selection of a Preferred Option, see Table 4-3. Unit 7.0 of the PAG for National Roads provides guidance and methods to be used to conduct MCA assessments of options. Guidance is provided on the approaches and levels of detail required for projects of different scales and complexities.

Table 4-3 –Biodiversity approach and process for Phase 2

Biodiversity approach and process for Phase 2	Ref
Stage 1 – Preliminary Options Assessment	
Review, update and refine Phase 1 biodiversity baseline data and relevant legislation, policy, plans and Standards information.	4.3.1.1 4.3.1.2
If any changes to the Phase 1 baseline and legislation etc. are identified, review, update and refine as necessary the biodiversity constraints, risks and opportunities and the ZoI.	4.3.1.3 4.3.1.4
Optional - Generate an initial biodiversity baseline using the Options Appraisal Toolkit within the TII Biodiversity Metric (TII BM).	4.3.1.5
Input to the development of the Preliminary Options.	4.3.1.6
Input to the High-Level Preliminary Options Multi-Criteria Analysis (MCA) process, if required.	4.3.1.7
Provide biodiversity inputs to the Phase 2 Stage 1 summary report/process, including a description of how potential effects on biodiversity have been considered in the assessment of the long list of Preliminary Options and the selection of the short-list of Preliminary Options.	4.3.1.8
Input to the first public consultation, if required.	4.3.1.9
Stage 2 – Project Appraisal Matrix	
Review, update and refine the Phase 2 Stage 1 information where necessary. If any changes to the Phase 2 Stage 1 information are identified, review and update as required the relevant legislation, policy, plans and Standards information and biodiversity constraints, risks and opportunities and the ZoI.	4.3.2.1 4.3.2.2 4.3.2.3 4.3.2.4
Generate an initial biodiversity baseline for each (short-listed) Preliminary Option using the Options Appraisal Toolkit within the TII Biodiversity Metric (TII BM).	4.3.2.5
Undertake a Biodiversity Impact Assessment of each of the (short-listed) Preliminary Options.	4.3.2.6
Provide inputs to stakeholder engagement and (second) public consultation.	4.3.2.7
Input to the development of the Preliminary Options.	4.3.2.8
Provide inputs to the detailed MCA/TAA of the (short-listed) Preliminary Options and input to the Project Appraisal Matrices.	4.3.2.9
Provide biodiversity inputs to the Phase 2 Stage 2 summary report/process. This shall include a description of how potential effects on biodiversity have been considered in the assessment of the (short-listed) Preliminary Options and a commentary on the overall performance of each Option.	4.3.2.10 4.3.2.11

Biodiversity approach and process for Phase 2	Ref
Stage 3 – Selection of Preferred Option.	
Review, update and refine the Phase 2 Stage 2 information where necessary. Identify any changes to the Phase 2 Stage 2 conclusions with regard to biodiversity.	4.3.3.1
Provide biodiversity inputs to the Phase 2 Stage 3 report/process. This shall include and its alignment with any biodiversity related Project Objectives (noting that there are unlikely to be any such Objectives).	4.3.3.2
Document the option process in terms of biodiversity in the Options Report.	4.3.3.3

4.3.1 Phase 2 Stage 1: Preliminary Options Assessment

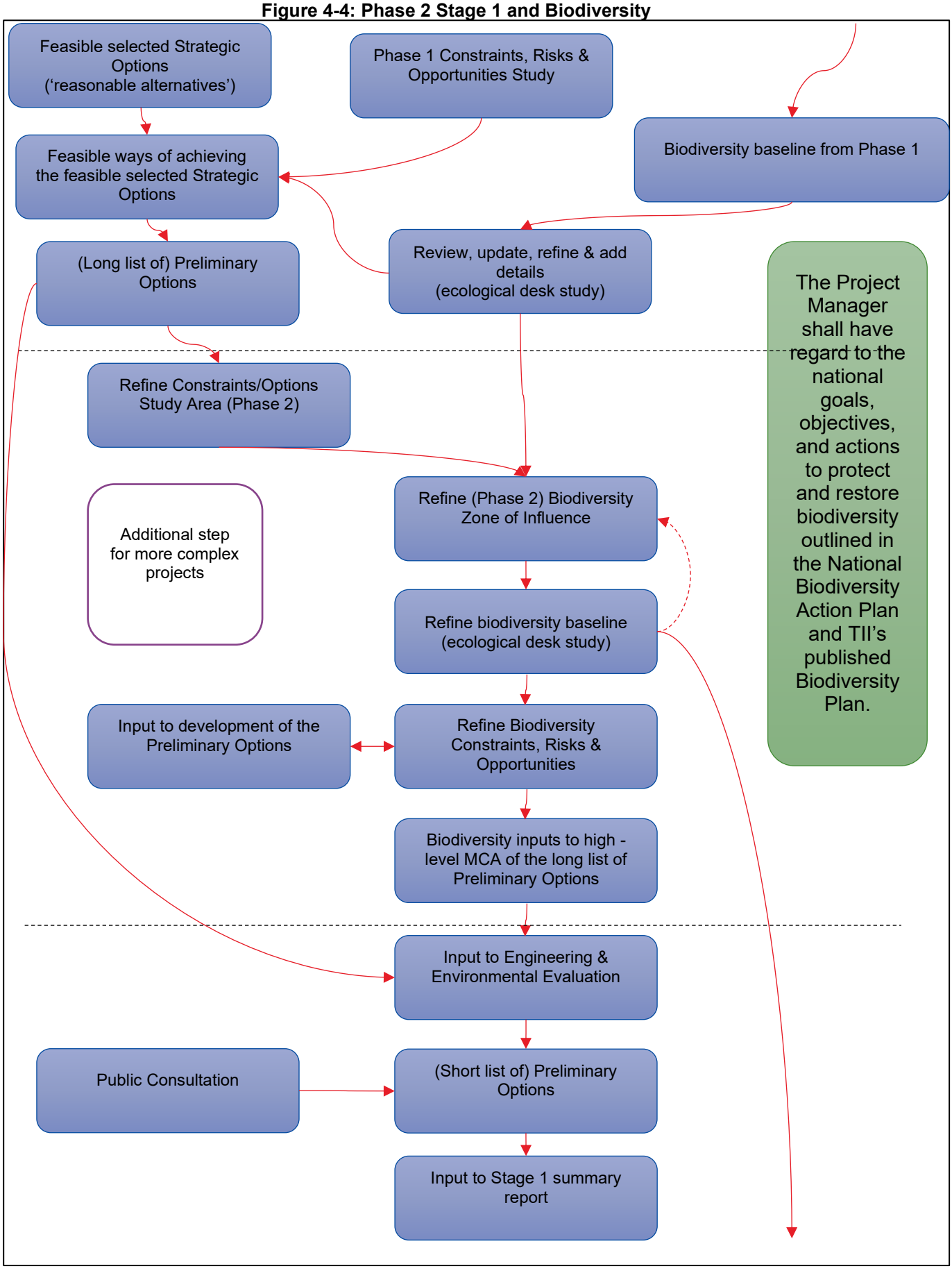
At the end of the Phase 1 Feasibility Report, a number of Strategic Options ('reasonable alternatives') are identified for further consideration in Phase 2. Strategic Options are high-level options, consisting of modes and intervention types, with broad alignments/design details. In Phase 2, for each identified Strategic Option, the Project Manager should identify the potential alignments/routes and/or locations/interventions for that option. The identification of Preliminary Options at the outset of Phase 2 should be informed by the constraints, risk and opportunities study undertaken at Phase 1.

The Project Manager shall take into account the Constraints, Risks and Opportunities Study undertaken at Phase 1 and have regard to the national goals, objectives, and actions to protect and restore biodiversity outlined in the National Biodiversity Action Plan and TII's published Biodiversity Plan. The Project Manager or biodiversity practitioner shall review and, if necessary, update the biodiversity baseline and any changes shall also be taken into account.

For larger and more complex projects with a long list of Preliminary Options (i.e. the feasible ways of achieving the feasible selected Strategic Options (also 'reasonable alternatives')) an additional selection process may be undertaken to provide a short-list. If done, the biodiversity practitioner shall provide (further) inputs to the Phase 2 Stage 1 Preliminary Options Assessment by considering the potential impacts of each of the long list of Preliminary Options on biodiversity. This shall include input to the high-level Multi-Criteria Analysis (MCA) of the long list of Preliminary Options to help the Project Manager select the short-list of Preliminary Options that will be assessed at Phase 2 Stage 2. See Figure 4-4.

Following the completion of Phase 2 Stage 1, the Project Manager shall prepare a sufficiently detailed summary of the findings. This should detail the outcome of Phase 2 Stage 1, and the recommended (short-listed) Preliminary Options proposed for advancement to Phase 2 Stage 2 of the Options Selection Process.

Figure 4-4: Phase 2 Stage 1 and Biodiversity



4.3.1.1 Review, Update and Refine Phase 1 Biodiversity Baseline Data

As set out above, there are one or two processes for Phase 2 Stage 1 and therefore up to two points when the biodiversity data shall be reviewed.

Identifying the (long-list of) Preliminary Options from the feasible selected Strategic Options is primarily based on the data collected at Phase 1 (Constraints, Risks & Opportunities Study). However, if there is more than 12 months between the completion of Phase 1 and the start of Phase 2, the Project Manager or biodiversity practitioner shall review and if necessary, update the biodiversity data collected at Phase 1. Any new information shall be considered when selecting the Preliminary Options.

If a short-listing process is undertaken, the baseline biodiversity data collected at Phase 1 shall be reviewed, updated and refined if:

- The Constraints/Options Study Area is refined (reduced), to reflect the long list of Preliminary Options;
- More than 12 months have passed between selecting the long list of Preliminary Options and undertaking the high-level Preliminary Options MCA (see 4.3.1.7);
- The Project Manager or biodiversity practitioner are aware of any change to the baseline such as the designation of new sites or extension of existing sites; or
- Additional information on biodiversity is required to inform the high-level Preliminary Options MCA.

Additional information may include the distribution of habitats and ecological networks derived from aerial imagery or land cover mapping and verification of habitat types in the field. The need to collect additional information shall be determined by the Project Manager in consultation with the biodiversity practitioner. They shall make the best use of information collected at Phase 1.

4.3.1.2 Review, Update and Refine Phase 1 Legal and Policy Information

Whenever the baseline biodiversity data is updated, the Project Manager or biodiversity practitioner shall review the relevant legislation, policy, plans and Standards and the features identified in the biodiversity baseline. In particular, the biodiversity practitioner shall review the requirements of Ireland's Nature Restoration Plan (when published) and any changes in national, regional and local planning policy.

4.3.1.3 Review, Update and Refine the Zone of Influence

The Biodiversity Zone(s) of Influence shall be reviewed by the Project Manager or biodiversity practitioner and updated as necessary, as described in Section 4.2.1, whenever:

- the nature of the Option changes or becomes better known.
- the Constraints/Options Study Area is changed;
- changes are identified in the biodiversity baseline or new information is obtained; or
- changes in relevant legislation, policy, plans and Standards are identified.

Consultation with other practitioners may be required, see Section 2.7 and Appendix C.

4.3.1.4 Review, Update and Refine the Biodiversity Constraints, Risks and Opportunities

If the short-listing process is undertaken, and any area, data or information has changed, the Project Manager or biodiversity practitioner shall update the biodiversity constraints and opportunities data and the information from the Constraints, Risks and Opportunities Study prior to undertaking the High-

Level Preliminary Options Multi-Criteria Analysis (MCA). Note that the deliverables from Phase 1 are not re-opened and updated.

4.3.1.5 TII Biodiversity Metric (Optional)

If the short-listing process is undertaken, the Options Appraisal Toolkit within the TII Biodiversity Metric should be used to compare the Preliminary Options on the long list that have a route; see Section 4.3.2.5.

4.3.1.6 Input to the Development of the Preliminary Options

At Phase 2 Stage 1, the biodiversity practitioner should be an active member of the design team including by:

- interpreting the Constraints, Risks and Opportunities Study for biodiversity.
- advising on the feasibility of ways of developing the Strategic Options into Preliminary Options in terms of impacts on biodiversity.
- identifying opportunities to avoid or reduce significant adverse or non-compliant effects on biodiversity.
- helping the Project Manager to revise the Preliminary Options.
- helping the Project Manager to select the (short list of) Preliminary Options.

4.3.1.7 Input to the Preliminary Options High-Level Multi-Criteria Analysis (MCA) process, if required

The short-listing process includes the High-Level Preliminary Options Multi-Criteria Analysis (MCA). As set out in PAG Unit 7.0, the High-Level Preliminary Options Assessment MCA will usually be focused on the criteria of Engineering, Environment and Economy. Under Environment, one of the sub-criteria is biodiversity (out of a total of 26 in all three categories, with each criteria having equal weight in the assessment).

The criteria for biodiversity shall be:

Biodiversity (impact on biodiversity including designated sites, and listed habitats and species)

Biodiversity has the same meaning as in the Biodiversity Convention (see glossary). Designated sites are listed or proposed Ramsar sites, European Sites and NHAs; Nature Reserves and Wildlife Refuges; sites/networks with policy protection in County/City development plans; sites required for compensating effects on a designated site; and restoration sites included in a state or local authority plan. Listed habitats refers to the habitats listed in Annex I of the Habitats Directive and those with policy protection in County/City development plans. Listed species are those in the NPWS checklist of protected and threatened species [49], or any update to the sources referred to in the checklist.

For each Preliminary Option included in the High-Level MCA, a quantitative score is given on a seven-point scale for each criterion, along with a qualitative description. The criteria are not weighted. The seven-point scale for biodiversity is shown in **Table 4-4**.

Using the baseline data collected and knowledge of the relevant area, the Project Manager or biodiversity practitioner shall:

- score each of the long list of Preliminary Options for biodiversity impact using the seven-point scale; and
- provide a comprehensive narrative for each Option to accompany the score.

The narrative shall include any risks that would make it difficult to progress a Preliminary Option due to adverse effects on biodiversity.

Table 4-4: Preliminary Options Assessment MCA Scores for Biodiversity

Seven Point Scale	Qualitative description
7 – Major or highly positive	The option considering all the potential effects would result in potentially high positive effects on biodiversity in the ZoI. This for example could be through large increases in biodiversity, contributing to national restoration targets and no effects on listed habitats and species that require specific mitigation to comply with legislation and policy.
6 – Moderately positive	The option considering all the potential effects would result in potentially moderate positive effects on biodiversity in the ZoI. This for example could be through moderate increases in biodiversity, contributing to national or local restoration targets.
5 – Minor or slightly positive	The option considering all the potential effects would result in potentially minor positive effects on biodiversity in the ZoI. This for example could be through minor in biodiversity.
4 – Not significant or neutral	The option would not result in any noticeable changes to biodiversity within the ZoI.
3 – Minor or slightly negative	The option, considering all the potential effects, would result in potentially minor negative effects on biodiversity in the ZoI. This, for example, could be through minor loss of biodiversity and minor adverse effects on unlisted habitats and species only, assuming standard mitigation measures will be employed. No impediment to a restoration plan being undertaken by a government agency, or regional or local authority.
2 – Moderately negative	The option, considering all the potential effects, would result in a potentially moderate negative effect upon biodiversity in the ZOI. This for example could be through moderate loss of biodiversity and effects on listed habitats and listed species that require specific mitigation to meet legislation or policy requirements. Or it is a moderate impediment to a restoration plan being undertaken by a government agency, or regional or local authority.
1 – Major or highly negative	The option considering all the potential effects would result in potentially highly negative effect overall to biodiversity in the ZOI. This effect(s) could result in a non-compliance with national and/or local policy and/or impact upon a designated site and listed habitats to an extent that it has the potential to prevent the option from progressing and/or compensation or derogation would be required for the option to progress. Or it is a major impediment to a restoration plan being undertaken by a government agency, regional or local authority.

The Project Manager shall review the narrative on biodiversity carefully. While matters may be favourable for other criteria, effects on biodiversity could make a Preliminary Option unviable or very difficult to achieve. For example, if one option would lead to an adverse effect on the integrity of a

European site which could not be mitigated, that option is only likely to receive consent if there are imperative reasons of over-riding public interest and there are no alternative solutions.

4.3.1.8 Provide Biodiversity inputs to the Phase 2 Stage 1 Summary

The Phase 2 Stage 1 outputs may include the completed High-Level MCA and shall include an Engineering & Environmental Evaluation (see PMM for National Roads, PE-PMG-02042, Section 2.1.5.2.1) and a summary of the findings from Phase 2 Stage 1 (see PMM for National Roads, Section 2.1.5.2.3).

The Phase 2 Stage 1 summary shall include:

- a summary of how potential effects on biodiversity have been considered in the assessment of the (long list of) Preliminary Options (the methodology);
- a summary of the baseline biodiversity, relevant legislation, policy, plans and Standards within the Zone(s) of Influence;
- a brief evaluation of the outcomes for each of the (long list of) Preliminary Options for biodiversity;
- a view on the viability or difficulty of implementing each of the (long list of) Preliminary Options; and
- a description of how biodiversity was considered when selecting each of the (short-list of) Preliminary Options, with regard to the national goals, objectives, and actions to protect and restore biodiversity outlined in the National Biodiversity Action Plan and TII's published Biodiversity Plan.

The summary will form the basis of the Phase 2 Stage 1 section of the Options Report (see Section 4.3.3.3 of this Standard, PMM for National Roads Section 2.1.6 and PAG Unit 4.0 PE-PAG-02013).

The output from Phase 1 Stage 1 is a short-list of Preliminary Options which will be taken forward for further assessment at Phase 1 Stage 2.

4.3.1.9 Input to First Public Consultation

As set out in the PMM for National Roads (Section 2.1.5.2.4 and Appendix A2.4), the first public consultation may occur during Phase 2 Stage 1. If requested by the Project Manager, the biodiversity practitioner shall participate in the consultation by for example:

- Identifying organisations to be invited to participate.
- Presenting or summarising the results of the Constraints Risks and Opportunities Study.
- Explaining how biodiversity was considered when selecting each of the (short-list of) Preliminary Options.
- Providing input to brochures and display materials.
- Interpretating relevant stakeholder responses
- Reviewing the likely effects on biodiversity of any suggested options or modifications.

Phase 2 Stage 1 Biodiversity Outputs

The biodiversity outputs from Phase 2 Stage 1 shall include:

If there no short-listing exercise is undertaken:

- *Updated biodiversity baseline, if required.*
- *Biodiversity component of the Engineering & Environmental Evaluation.*
- *Biodiversity component of the Stage 1 summary.*

And if the short-listing exercise is undertaken:

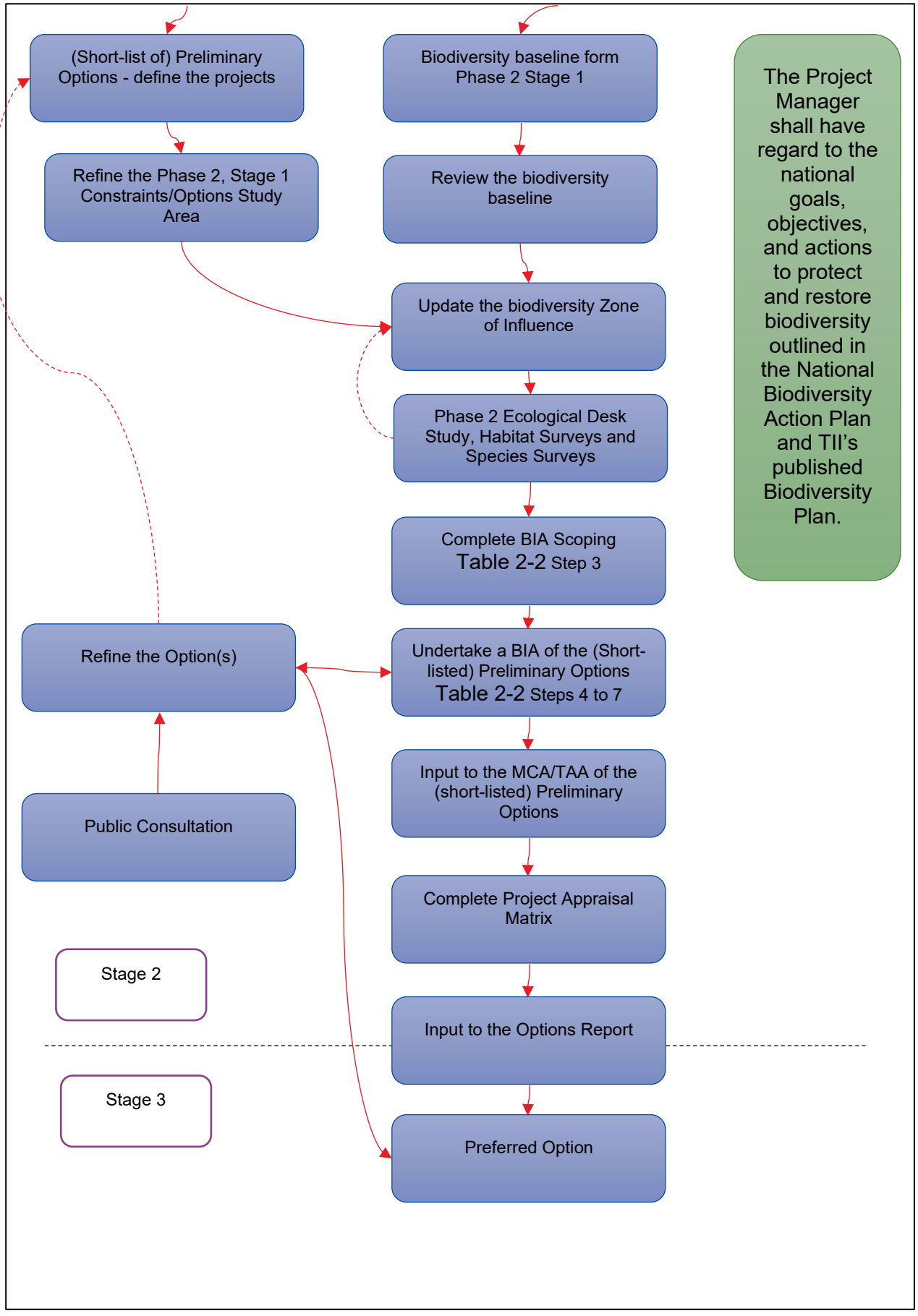
- *Updated constraints and opportunities map of major constraints and opportunities.*
- *Updated description of constraints, risks and opportunities for each of the long list of Preliminary Options.*
- *If done, a completed Options Appraisal Toolkit spreadsheet within the TII BM for the long list of Preliminary Options.*
- *Completed High-Level MCA for the long list of Preliminary Options and associated narrative.*

The outputs from Phase 2, Stage 1 will inform the Stage 1 section of the Options Report (see Section 4.3.3.3 of this Standard, PMM for National Roads Section 2.1.6 and PAG Unit 4.0).

4.3.2 Phase 2 Stage 2: Options Assessment (Project Appraisal Matrix)

Following an examination of the Phase 2 Stage 1 Preliminary Options Assessment, the option selection process continues. The Design Team further develops the (short-list) of Preliminary Options which will then be assessed in accordance with the Project Appraisal Matrix. Phase 2 Stage 2 is a more detailed or refined options selection process. It includes the (short-listed) Preliminary Options from Phase 2 Stage 1 and may include amended or new Preliminary Options as a result of design refinement during the Phase 2 Stage 2 process. It would not include new Strategic Options until these have passed through Phase 1. The process is outlined in Figure 4-5.

Figure 4-5: Phase 2 Stages 2 & 3 and Biodiversity



For the earlier Phases/Stages, the biodiversity baseline comprised only major constraints and the assessment focused on the feasibility of the Strategic Options (Phase 1) and the relative impacts of the (long-list of) Preliminary Options (Phase 2 Stage 1). Both assessments considered biodiversity constraints, risks and opportunities at a relatively high level, having regard to the requirements of Article 5(1)d of the amended EIA Directive (the assessment of alternative options). A more in-depth assessment is now required to evaluate and compare the (short-listed) Preliminary Options.

4.3.2.1 Review, Update and Refine the Biodiversity Baseline

For each (short-listed) Preliminary Option, the biodiversity practitioner shall:

- Review the existing biodiversity baseline information;
- complete the Phase 2 ecological desk study;
- undertake habitat mapping; and
- undertake any necessary habitat, vegetation and species surveys that are required to understand the effects on biodiversity of each (short-listed) Preliminary Option and inform the selection of the Preferred Option.

Phase 2 Ecological Desk Study

Building on the information obtained during Phase 1 (and updated at Phase 2 Stage 1), the biodiversity practitioner shall complete a Phase 2 Ecological Desk Study for the (short-listed) Preliminary Options. This should include all major and moderate constraints that could be affected by the Preliminary Option being considered, as well as any areas which may have been identified for restoration in accordance with the Nature Restoration Plan (see Appendix A, Section A.1.4). The constraints/opportunities may include:

- Proposed or listed Ramsar sites and their qualifying interest.
- Proposed or listed European sites and their qualifying/special conservation interest.
- Sites identified, or required, as compensatory measures for adverse effects on listed or proposed European sites.
- Natural Heritage Areas and their reasons for designation.
- Statutory Proposed Natural Heritage Areas and their reasons for designation.
- Non-Statutory Proposed Natural Heritage Areas and their reasons for designation.
- Nature Reserves and Wildlife Refuges and their reasons for designation.
- Peatland, including afforested peatland.
- Ancient and long-established woodlands.
- Annex I habitats.
- Ground water dependent terrestrial ecosystems.
- Populations of plant and animal species listed as protected or threatened [49], including those listed in the Annexes of the Habitats Directive.
- Populations of regularly occurring migratory species of birds (ROMS) and populations of birds listed on Annex I of the Birds Directive.
- Linear and ‘stepping stone’ habitats.
- Priority/County value/Significant/Heritage hedgerows identified in a County dataset or the National Hedgerow Database.

- Populations of Wildlife Act protected species.
- Populations of Flora Protection Order species.
- Freshwater Pearl Mussel catchments.
- Sites and areas that have been identified for restoration or habitat creation, such as cut-over bog.

Requirements and guidance for ecological desk studies is provided in Appendix B, B.3.9 and B.5.1.1.

Habitat Mapping – Desk Based

The biodiversity practitioner shall commission a habitat map of the Zone(s) of Influence for habitats for each of the (short-listed) Preliminary Options. This can be achieved using the National Land Cover Map produced by Tailte Éireann or other means of interpreting aerial imagery. The habitat classification system shall be based on the National Land Cover Map classification or the Fossitt classification [50], both supplemented by Annex I habitat mapping from the NPWS dataset. See Appendix B, Sections B.3.9 and B.5.1.2. This aligns with the approach used in the Options Appraisal Toolkit within the TII Biodiversity Metric (although the Metric is focused on habitats within the potential boundary rather than ZoI). Note that the ZoI is likely to be different for terrestrial and aquatic habitats, and may be discontinuous for e.g. groundwater dependent habitats. The habitat mapping should reflect this.

Habitat Survey

For most (but not all) projects, a field survey will be required to verify the habitat mapping, increase its precision, and gather plant species data.

The purpose of Phase 2 Stage 2 and the nature and location of the Options being considered should inform the decision to undertake a habitat survey at this point rather than at Phase 3. A habitat survey at Phase 2 Stage 2 shall be undertaken:

- for each (short-listed) Preliminary Option that is a new motorway, busway, service area or prescribed road i.e. it will be automatically ‘screened in’ for EIA.
- for each (short-listed) Preliminary Option that is likely to have a significant effect on biodiversity i.e. it is likely to be screened in for EIA including for effects on biodiversity.
- when there is no clear difference between the (short-listed) Preliminary Options from the desk study data and remote habitat mapping alone and information on the type and quality of the habitats (such as rivers, hedgerows and grassland) would inform the appraisal of the Preliminary Options.

If undertaken, the habitat survey shall as a minimum include all potential and known Irreplaceable, Very High and High Distinctiveness habitat parcels (see Appendix D) identified from aerial imagery within the Zone(s) of Influence for these habitats, plus any parcels where ground-truthing is required to verify the habitat type. Alternatively, it shall cover all habitat parcels within the Zone(s) of Influence for habitats if the biodiversity practitioner considers this useful at Phase 2 Stage 2. For the avoidance of doubt, a complete habitat survey of all Preliminary Options is not required unless the biodiversity practitioner considers it useful.

Guidance on undertaking a habitat survey is provided by the Heritage Council [51]. See also Appendix B, Sections B.3.9 and B.5.1.2.

Hedgerows

For (short-listed) Preliminary Options that are subject to a habitat survey and may bisect hedgerows, data on hedgerows shall be obtained. This can make use of the county dataset when one is available

and provides adequate coverage [52]. Otherwise, a hedgerow survey should be undertaken to assess the hedgerows in accordance with the Heritage Council methodology [53]. At Phase 2 Stage 2, a sampling strategy can be employed to characterise each type of hedgerow present in the Zone(s) of Influence for this habitat.

Watercourses

For (short-listed) Preliminary Options that are subject to a habitat survey and may bisect watercourses, data on watercourses shall be obtained. This includes:

- a review of EPA water quality data [54];
- a review of available fish monitoring data (for the Water Framework Directive) from the Inland Fisheries Ireland [55]; and
- a survey of each 2nd and higher order watercourse, using the River Habitat Survey (RHS) technique [56] and/or the River Hydromorphology Assessment Technique (RHAT) [57].

The survey technique should be discussed with a water practitioner to agree the most suitable option.

Protected Species Walkover Survey

A protected species walkover survey shall be conducted alongside, or as part, of the habitat survey. This shall include an evaluation of the potential of the habitats present to support protected and threatened species included in the NPWS checklist [49] and regularly occurring migratory species of birds within the same area as the habitat survey. For some taxonomic groups, the red lists to inform the NPWS checklist have been updated; the latest published red list shall be used in place of that in the checklist, including the most recent list of Birds of Conservation Concern Ireland [58].

The combination of habitat survey, hedgerow survey, watercourse survey and protected species survey is referred to as **multi-disciplinary walkover survey** [5].

Vegetation and Species-Specific Surveys

At Phase 2 Stage 2, it may be necessary to undertake vegetation and/or species-specific surveys. This will be dependent on the nature and location of the (short-listed) Preliminary Options and informed by the results of the ecological desk study, habitat mapping and any surveys that have been undertaken.

Vegetation surveys may be required to determine whether a habitat corresponds with an Annex I type. When undertaken, vegetation surveys and classification shall use the National Vegetation Database methods [59] and the Irish Vegetation Classification system [60].

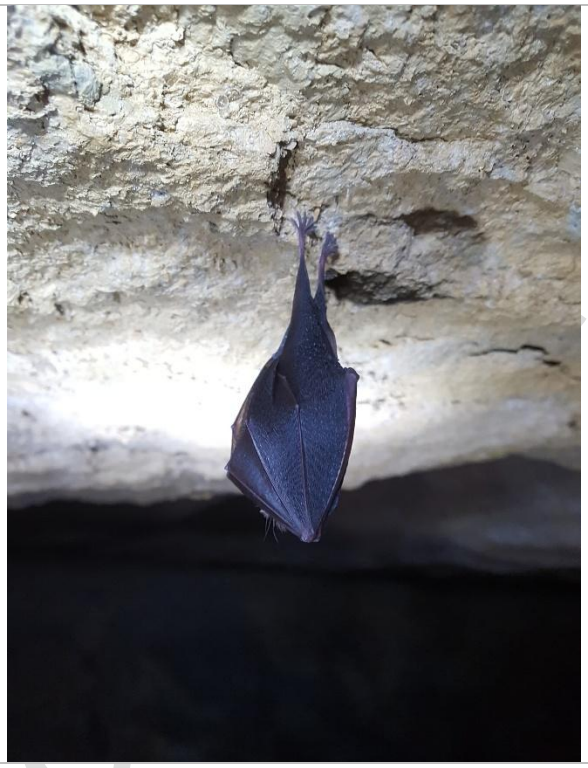
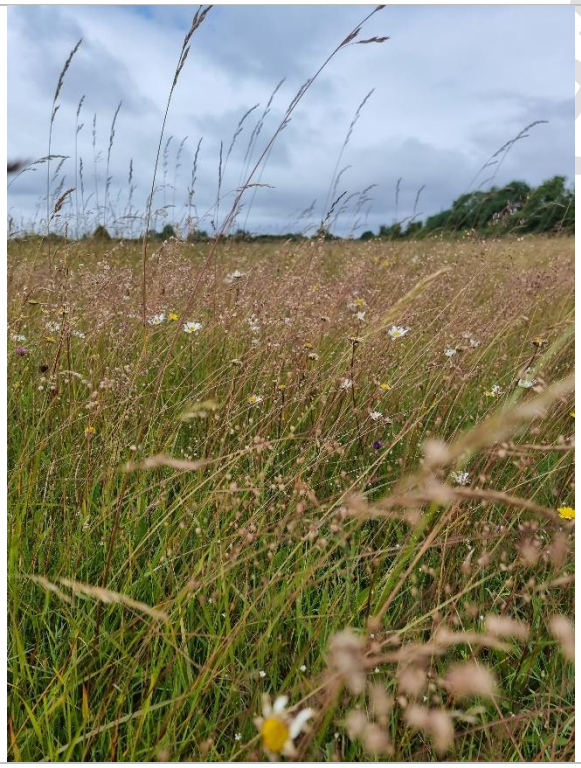
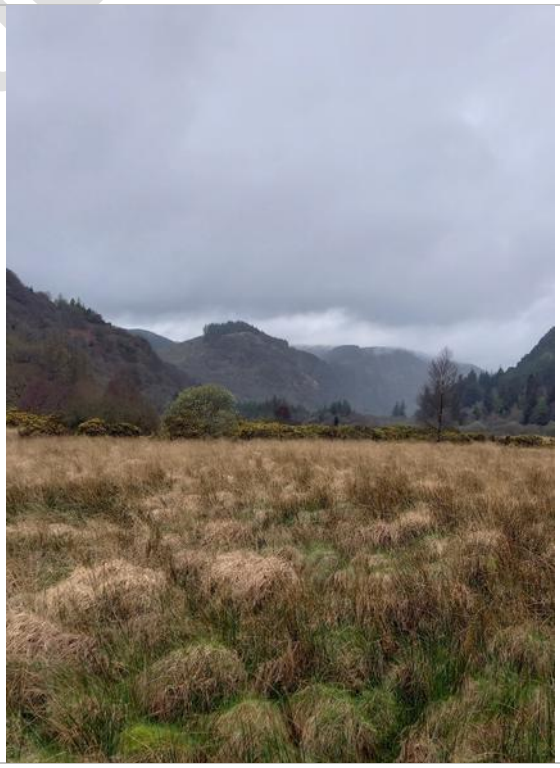
Examples of when species-specific surveys may be necessary at Phase 2 Stage 2 are:

- The Preliminary Option could affect the population of Annex I or regularly occurring migratory species of bird ranging away from a designated site.
- The Preliminary Option could affect the population of bats foraging outside a designated site for which they are a qualifying interest feature.
- Effects on a population of a protected or threatened species would have a bearing on the viability of the Preliminary Option or clearly distinguish between two Options.

Species-specific surveys only need to be completed at Phase 2 Stage 2 when it is crucial to know if a species is present to inform the assessment of the Preliminary Options; otherwise, the presence of species can be assumed where the habitat is suitable and within the natural range of the species.

The biodiversity practitioner shall determine the requirements for vegetation and species-specific surveys in accordance with the NRA survey guidance [5] and the guidance in Appendix B, section B.3.

Figure 4-6: Protected Sites, Habitats and Species

Top left, Meadow Barley *Hordeum secalinum*, a Flora Protection Order species. Credit: Andrew Torsney.
Top right, Lesser Horseshoe Bat *Rhinolophus hipposideros*, QI species of some SACs. Credit: Andrew Torsney.
Bottom left, Lowland Hay Meadow, an Annex I habitat. Credit: Andrew Torsney.
Bottom right, Wicklow Mountains SAC. Credit: Richard Arnold.

4.3.2.2 Review, Update and Refine Legal and Policy Information

The biodiversity practitioner shall identify the relevant legislation, policy, plans and Standards for biodiversity and each of the ecological features that are identified during the baseline studies and surveys described above.

4.3.2.3 Review, Update and Refine the Zone(s) of Influence

The Zone(s) of Influence shall be reviewed by the biodiversity practitioner and updated as necessary, taking into account the new information and changes in the biodiversity baseline, including relevant legislation, policy, plans and Standards, see Appendix B, Section B.3.3. The Zone(s) of Influence shall be established for each of the (short-listed) Preliminary Options.

The biodiversity practitioner shall consult with other practitioners when establishing the ZoI, as set out in Section 2.7 and Appendix C.

4.3.2.4 Review, Update and Refine the Biodiversity Constraints, Risks and Opportunities

The biodiversity practitioner shall update the constraints, risks and opportunities for each (short-listed) Preliminary Option.

For each relevant designated site, the biodiversity practitioner shall determine appropriate buffers (risk zones) within which development of the Preliminary Option is likely to be very constrained or not possible. In preparing buffers (risk zones), the practitioner shall consider the use of land outside the designated site by its qualifying/special conservation interest and how the surrounding habitats may provide a supporting function for the designated site. See Appendix B, Section B.5.2.9.

At Phase 2 Stage 2, the opportunities to enhance biodiversity as part of the project should become clearer, for example, a ‘green bridge’ to connect fragmented habitats as part of a road improvement project. These shall also be identified for each Preliminary Option, where they exist.

The biodiversity constraints and opportunities should be presented on a drawing, based on published guidance for an Ecological Constraints and Opportunities Plan (ECOP) (see [61], clause 5.4, and [62], Appendix 4).

Any constraint or risk that affects the viability of the Preliminary Option shall be clearly identified.

4.3.2.5 TII Biodiversity Metric

The biodiversity practitioner shall calculate the baseline biodiversity in Biodiversity Units (BU) for the (short-listed) Preliminary Options using the Options Appraisal Toolkit within the TII Biodiversity Metric (TII BM). This is based on the Tailte Éireann National Land Cover Map and assumed habitat condition. However, the habitat type can be amended for selected parcels if field data is available. Guidance on the use of the Options Appraisal Toolkit within the TII BM is contained in the accompanying user guide. The outputs shall inform the selection of the Preferred Option.

The Preliminary Options of the same type (e.g. new National Road) must be compared on a like for like basis.

There are four ways of selecting a project width for the purpose of calculating baseline BUs, as follows:

- Using the full corridor width (when the actual alignment could be anywhere within a wide corridor).
- Using the centre line plus a distance either side which is likely to encompass the full width of the Option (when the alignment is known but there is no design).

- Using the potential layout of the Option (boundary to boundary, when there is a preliminary design).
- Using the standard widths for use in the TII BM that are provided in Table 4-5 (these are not design parameters), which may be increased in proportion to each other to accommodate uncertainty on Option alignment.

The Project Manager shall determine which way is to be used each time baseline BUs are calculated at Phase 2.

In each case, habitat parcels which will certainly be retained can be excluded from the calculation of biodiversity units for the relevant Option.

Table 4-5: Standard Widths for use in the Metric

Option Type (see Glossary)	**Width**		**Separation Distance***
	Low Volume	**High Volume**	
Motorway	70m		-
National Road	60m		3m
Regional Road	40m		2m
Local Road	30m		1m
Footpath	2m	2.5m	-
One way Cycle Lane	2m	2.5m	-
Footway	2m	2.5m	-
One way Cycle Track	2m	2.5m	-
One way Cycleway	4m	5m	-
Two-way Cycleway	5m	6m	-
Shared Use Cycleway	5m	7m	-
Greenway	5m	7m	

* Separation distance is the distance between edge of running lane of a National Road and any footway or cycle track.

If a cycle track or footway is provided along one side of the road, then the width for use in the metric is:

width given for the road + the width given for the cycle track/footway + separation distance

If the same layout is provided on both sides of the road, then it is:

width given for the road + 2 x (the width given for the cycle track/footway + separation distance)

Footpaths and cycle lanes have no separation distance.

4.3.2.6 Biodiversity Impact Assessment

Using the updated and refined baseline information, the biodiversity practitioner shall undertake a proportionate Biodiversity Impact Assessment of the (short-listed) Preliminary Options.

EIA projects (or if it is not known whether an EIA is required)

In addition to the steps described above (4.3.2.1 to 4.3.2.3), for EIA projects and projects where is it not yet know if an EIA will be required, the BIA shall comprise:

- Understand the Option and its potential impacts, Appendix B, B.3.1.
- Establish the EPOs and significance criteria, Appendix B, B.3.6.
- Identify other projects to consider for cumulative effects, Appendix B, B.3.10.
- Identify opportunities for avoiding significant adverse effects, Appendix B, B.3.11.
- Scope the biodiversity impact assessment, Appendix B, B.3.13.
- Define the (short-listed) Preliminary Option, Appendix B, B.4.
- Describe and quantify the biodiversity baseline, Appendix B, B.5.2.
- Identify the biodiversity that is likely to be significantly affected, Appendix B, B.6.
- Describe the likely significant effects, Appendix B, B.7.
- Determine likely compliance with relevant legislation, policy, plans and Standards, Appendix B, B.8.
- Determine the likely requirements for achieving the desired outcome for biodiversity using the TII BM, Appendix C, Section C.11.

The outputs from the Phase 2 biodiversity impact assessment of the (short-listed) Preliminary Options shall be, for each Preliminary Option:

- A qualitative and quantitative statement on the overall loss (or gain[1]) of biodiversity [63].
- A statement on likely significant effects for each potentially affected:
  - designated site,
  - listed habitat parcel,
  - listed species population, and
  - any other important ecological feature
- A statement on effects on any relevant state or council plan to restore biodiversity.

The statement shall include the names of the features, a list of significant effects, the size (quantity) of the effect and the significance of the effect on the geographic scale. For the avoidance of doubt, a full impact assessment report, as would be completed at Phase 3, is not required.

Here, biodiversity has the same meaning as in the Biodiversity Convention (see glossary). Designated sites are listed or proposed Ramsar sites, European Sites and NHAs; Nature Reserves and Wildlife Refuges; sites/networks with policy protection in County/City development plans; sites required for compensating effects on a designated site; and restoration sites included in a state or local authority plan. Listed habitats refers to the habitats listed in Annex I of the Habitats Directive and County/City

[1] The statement on biodiversity loss or gain shall be based on the likely changes in habitats, ecological networks, processes, species diversity and abundance, and so on (see Appendix Box B.5-2 and Appendix Box B.7-1). Note that the Options Appraisal Toolkit within the TII BM provides only the baseline BU in the relevant area.

development plans. Listed species are those in the NPWS checklist of protected and threatened species, or updated lists of such species [40].

Non-EIA projects

In addition to the steps described above (4.3.1.1 to 4.3.2.3), if the Project Manager considers it highly unlikely that an EIA would be required, the BIA shall comprise:

- Understand the projects and its potential impacts, Appendix B, B.3.1.
- Identify opportunities for avoiding effects that could contravene relevant legislation, policy, plans and Standards, Appendix B, B.3.11.
- Scope the biodiversity impact assessment, Appendix B, B.3.13.
- Define each short-listed Preliminary Option and activities, Appendix B, B.4.1.
- Quantify environmental changes, Appendix B, B.4.2.
- Determine the Zone(s) of Influence for each impact type, Appendix B, B.4.5.
- Describe and quantify biodiversity and Important Ecological Features Appendix B, B.5.2.1 to B.5.2.4 and identify their legal and policy protection, B.5.2.6.
- Determine the 'sensitivity' of each feature, Appendix B, B.5.2.9.
- Identify risks that the Project (each short-listed Preliminary Option) may contravene the relevant legislation, policy, plans or Standards.
- Describe how each short-listed Preliminary Option will impact biodiversity, Appendix B, B.7.1.
- Determine and, if possible, quantify the effects on biodiversity, Appendix B, B.7.3
- Determine whether the impact would contravene the relevant legislation, policy, plans or Standards protecting biodiversity, Appendix B, B.8
- Determine the likely requirements for achieving the desired outcome for biodiversity using the TII BM, Appendix C, Section C.11.

The outputs from the Phase 2 BIA of the (short-listed) Preliminary Options shall be, for each Preliminary Option:

- A qualitative and quantitative statement on the overall loss (or gain) of biodiversity [44].
- A statement on compliance with relevant legislation, policy, plans and Standards for each potentially affected:
  - designated site,
  - listed habitat parcel,
  - listed species population, and
  - any other important ecological feature.
- A statement on effects on any relevant state or council plan to restore biodiversity.

The statement shall include the name of the features, a list of effects that could contravene relevant legislation, policy, plans or Standards and the size of the effect. For the avoidance of doubt, a full impact assessment report, as would be completed at Phase 3, is not required.

All Projects

The precautionary principle shall be applied where there is a lack of information.

The level of detail included in the assessment shall be commensurate with the Phase and Stage; by, for example, providing brief descriptions of ecological features, using tables and bullet lists to summarise impacts, and omitting details of the functioning of ecosystems and impact mechanisms.

At Phase 2 Stage 2, it may be assumed that standard mitigation measures (i.e. generic measures included in Construction Environmental Management Plans) will be implemented for every Preliminary Option being assessed. This should be clearly stated. Non-standard mitigation measures, compensation, offsetting and enhancements shall not be included as part of the Preliminary Options.

The biodiversity practitioner shall consult with other practitioners, see Section 2.7 and Appendix C.

The (short-listed) Preliminary Options Biodiversity Impact Assessment shall be included in the Options Report (see 4.3.3.3 and PAG Unit 4.0) as an Appendix, either as standalone assessment or as part of a wider Environmental Assessment.

4.3.2.7 Stake-holder Engagement and Second Public Consultation

As directed by the Project Manager, consultation with the prescribed bodies and others may take place at Phase 2 Stage 2. See the guidance in Section 2.8. If done, a summary of the relevant feedback shall be included in the Biodiversity Impact Assessment with a response; for example, where a matter raised has been addressed within the assessment.

A second public consultation may be undertaken at Phase 2, Stage 2, as set out in PMM for National Roads, section 2.1.3.4. If requested by the Project Manager, the biodiversity practitioner shall participate in the consultation by for example:

- Identifying organisations to be invited to participate.
- Presenting or summarising the results of the Biodiversity Impact Assessment.
- Explaining how biodiversity was considered during the development of the Preliminary Options.
- Providing input to brochures and display materials.
- Interpretating relevant stakeholder responses.
- Reviewing the likely effects on biodiversity of any suggested options or modifications.

4.3.2.8 Input to the Development of the Preliminary Options

At Phase 2 Stage 2, the biodiversity practitioner should be an active member of the design team including by:

- Interpreting the biodiversity constraints, risks and opportunities.
- Interpreting the outcome of the Biodiversity Impact Assessment.
- Advising on the impacts on biodiversity as the Preliminary Options are further developed.
- Identifying opportunities to avoid or reduce significant adverse effects on biodiversity.
- Helping the Project Manager to revise the Preliminary Options.

- Helping the Project Manager to select the Preferred Option.

4.3.2.9 Input to the Detailed MCA/TAA of the (short-listed) Preliminary Options

The High-Level MCA of the long list of Preliminary Options (undertaken at Phase 2 Stage 1) and the Detailed MCA (or Transport and Accessibility Appraisal (TAA), see explanation below) of the short-listed Preliminary Options (undertaken at Phase 2 Stage 2) both have a single biodiversity criterion and use the same 7-point scale. The key difference is that the Detailed MCA is based on more evidence and analysis, including the Biodiversity Impact Assessment of the (short-listed) Preliminary Options described above (Section 4.3.2.6). At Phase 2 Stage 2, PAG Unit 7.0 Section 2.4 provides two options for the detailed MCA of the (short-listed) Preliminary Options depending on the likely cost of the Project, with the threshold being €30m. See Table 4 5.

Table 4-6: MCA Summary

Phase	Stage	MCA Assessment	MCA Method	Biodiversity sub-criterion	Scale	Biodiversity Assessment
1	-	Strategic Options, any € value	MCA against project objectives	No	3-point colour scale	None.
2	1	High-level, long list, any € value	MCA using 3Es	Yes	7-point score scale	Low detail, desk study only, qualitative, professional judgement.
2	2	Detailed, short-list, **less** than €30m	MCA using 7 TAF criteria	Yes	7-point score scale, same as above	Moderate detail, field surveys if EIA, objective and quantified. Evidenced.
2	2	Detailed, short-list, **more** than €30m	TAA using 6 TAA criteria	Yes	7-point score scale, same as above	Moderate detail, field surveys if EIA, objective and quantified. Evidenced.

Projects under €30m

For projects under €30m, the detailed MCA uses seven criteria, derived from the Department of Transport (DoT) Transport Appraisal Framework (TAF). One of these is 'Local Environmental Impacts'. The 7-point same scoring system is used as for the high-level MCA undertaken at Phase 2 Stage 1, see **Table 4-4**. 'Local Environmental Impacts' includes 12 sub-criteria, one of which is for biodiversity.

The sub-criterion shall be:

Biodiversity, including designated sites, and listed habitats and species.

Biodiversity has the same meaning as in the Biodiversity Convention (see glossary). Designated sites are listed or proposed Ramsar sites, European Sites and NHAs; Nature Reserves and Wildlife Refuges; sites/networks with policy protection in County/City development plans; sites required for compensating effects on a designated site; and restoration sites included in a state or local authority plan. Listed habitats refers to the habitats listed in Annex I of the Habitats Directive and County/City development plans. Listed species are those in the NPWS checklist of protected and threatened species, or updated lists of such species [40].

For scoring biodiversity, the appraisal considerations shall be:

- Overall loss (or gain) of biodiversity.
- Effects on designated sites.
- Effects on listed habitats.
- Effects on listed species.
- Effects on a plan to restore biodiversity.

The relevant guidance to consider is provided in Appendix B of this Standard, and the CIEEM/CIRIA guidelines [3] [44].

Projects over €30m

For projects over €30m, the detailed MCA is replaced by the Transport and Accessibility Appraisal (TAA) method which is very similar to the MCA method described above. The key differences are

1. The TAA method does not include an economic criterion.
2. The scores for each criterion are considered independently and not summed to give a total, single score for each (short-listed) Preliminary Option.

There are six TAA criteria, one of which is 'Local Environment'. The same 7-point scoring system is used as for the High-Level MCA undertaken at Phase 2 Stage 1, see Table 4 4. Under Local Environment are five sub-criteria and indicators, one of which is Biodiversity.

With respect to biodiversity, the criterion, impacts to be measured, and the relevant guidance, are the same as for the detailed MCA for sub-€30m projects.

All Projects

For both MCA and TAA, impacts on biodiversity arising under the other sub-criteria (air quality, noise, soils, water, climate) shall be aggregated and considered under the biodiversity criterion only, while the effects of biodiversity loss/gain on the climate, society and the economy shall be considered under those criteria. This is to avoid duplication of effects across multiple criteria.

The biodiversity practitioner and Project Manager shall review the biodiversity sub-criterion in the MCA/TAA and the associated measures to confirm alignment with this Standard. They shall also determine how effects on biodiversity arising from other factors, and vice versa, are to be accounted for in the MCA/TAA.

The biodiversity practitioner shall provide a score for each of the (short-listed) Preliminary Options in accordance with the criteria in **Table 4-4** for inclusion in the MCA or TAA. The score shall be based on the BIA of each Option and accompanied by a narrative, explaining the rationale and identifying any factors which may make a Preliminary Option unviable or difficult to implement due to adverse effects on biodiversity.

4.3.2.10 Options Assessment Project Appraisal Matrix

The final assessment of the short-listed Preliminary Options uses an objective Project Appraisal Matrix, this combines the outputs from the detailed MCA/TAA of each short-listed Preliminary Option into a matrix to select the Preferred Option, see PAG Unit 4.0. This task is completed by the Project Manager, who may consult the biodiversity practitioner if needed.

4.3.2.11 Provide Biodiversity inputs to the Stage 2 Summary

The Phase 2 Stage 2 outputs shall include the Local Environmental Appraisal comprising a summary of the findings from the Stage 2 environmental assessment (see PMM for National Roads section 2.1.5.3.3) and the completed Project Appraisal Matrix (see PAG Unit 4.0).

The Phase 2 Stage 2 summary shall include:

- a summary of how potential effects on biodiversity have been considered in the assessment of the (short list of) Preliminary Options (the methodology);
- a summary of the baseline biodiversity, relevant legislation, policy, plans and Standards within the Zone(s) of Influence;
- an evaluation of the outcomes for each of the (short list of) Preliminary Options for biodiversity;
- a view on the viability or difficulty of implementing each of the (short list of) Preliminary Options; and
- a description of how biodiversity was considered when selecting the Preferred Option, with regard to the national goals, objectives, and actions to protect and restore biodiversity outlined in the National Biodiversity Action Plan and TII's published Biodiversity Plan.

The summary will form the basis of the Phase 2 Stage 2 section of the Options Report (see Section 4.3.3.3 of this Standard, PMM for National Roads Section 2.1.6 and PAG Unit 4.0).

Phase 2 Stage 2 Biodiversity Outputs

The biodiversity outputs form Phase 2 Stage 2 shall include:

- *Biodiversity constraints and opportunities map for each (short-listed) Preliminary Option.*
- *Biodiversity Impact Assessment report.*
- *Assessment of each option using the Options Appraisal Toolkit within the TII Biodiversity Metric.*
- *MCA/TAA Score for each (short-listed) Preliminary Option.*
- *Commentary on the MCA/TAA Score for each (short-listed) Preliminary Option.*
- *Biodiversity component of the Local Environmental Appraisal summary (PMM for National Roads, Section 2.1.5.3.3).*

The outputs from Phase 2 Stage 2 will inform the Phase 2 Stage 2 section of the Options Report (see 4.3.3.3, PMM for National Roads Section 2.1.6 and PAG Unit 4.0).

4.3.3 Phase 2 Stage 3: Preferred Option

The purpose of Phase 2 Stage 3 is to select the Preferred Option and to outline the likely environmental effects, including effects on biodiversity. After the completion of Phase 2 Stage 2 (Project Appraisal Matrix), a Preferred Option for the project will emerge and be selected based on the Detailed MCA/TAA. Further project detail may or may not be available for the Preferred Option. Where new information is available, the assessment shall be updated, and any additional detail should be reflected in the Phase 2 Stage 3 report. Phase 2 Stage 3 will provide a summary assessment of the Preferred Option for inclusion as a chapter in the Options Report.

4.3.3.1 Review, Update and Refine the Stage 2 information

Once the Preferred Option has been selected, the biodiversity practitioner shall:

- Review the Biodiversity Impact Assessment of the now Preferred Option which was completed at Phase 2 Stage 2.

- Determine whether any changes in relevant legislation, policy, plans and Standards or the baseline conditions may affect the conclusions of that assessment.
- Determine whether any new project details may affect the conclusions of that assessment.
- Notify the Project Manager if any the changes or details affect the conclusions of the Biodiversity Impact Assessment.

If necessary, the Biodiversity Impact Assessment undertaken for the now Preferred Option at Phase 2 Stage 2 shall be updated, to the same level of detail.

4.3.3.2 Provide Biodiversity Inputs to the Stage 3 Report/Process.

The biodiversity practitioner shall provide a proportionate description of the Preferred Option in terms of its biodiversity impacts (both positive and negative) including compliance with relevant legislation, policy, plans and Standards. The summary shall include:

- the implications for biodiversity arising from Preferred Option.
- a summary of the (so far identified) likely significant and/or non-compliant effects of the Preferred Option.
- recommendations for avoidance, mitigation and compensation measures, opportunities for biodiversity enhancement and/or achieving biodiversity objectives.

4.3.3.3 Document the Option Process

Phase 2 (Stages 1 to 3) are documented in the Options Report and associated appendices. Guidance on the Options Report is provided in PAG Unit 4.0. The consideration of biodiversity in the selection of the Preferred Option is provided in:

- Section 5. Stage 1 – Preliminary Options Assessment
- Section 6. Stage 2 – Project Appraisal Matrix
- Section 7. Stage 3 – Preferred Option

The Options Report shall set out clearly how biodiversity was considered at each stage of the selection process for the Preferred Option, as described in Sections 4.3.1.8, 4.3.2.11 and 4.3.3.2.

Phase 2 Stage 3 Biodiversity Outputs

The biodiversity outputs for the Phase 2 Options Report shall include:

- *Updated biodiversity impact assessment for the Preferred Option, if required*
- *Biodiversity components of Sections 5, 6 and 7 of the Options Report*

4.4 Phase 3: Design and Environmental Evaluation

If a BIA is required, Phase 3 will require inputs from biodiversity practitioner(s) to undertake the assessment of the proposed project (the Preferred Option), see Table 4-7, Figure 4-7 and Figure 4-8. The objectives at Phase 3 are (i) to describe the likely effects on biodiversity resulting from site investigations and the construction, operation and maintenance (and if relevant, decommissioning) of the proposed project and (ii) to inform the development of the proposed project, aiming to avoid, mitigate or compensate for significant adverse effects on biodiversity, and meet the policy objectives for biodiversity. The biodiversity practitioner(s) shall refer to the questions in Table 3.5 of the EPA Guidelines to ensure sufficient information has been provided to describe the likely significant and/or non-compliant effects.

When an EIA is required, biodiversity shall be included as part of the EIA scoping process and, where likely significant effects are identified, included in the EIA Report, taking into account any scoping opinion provided by the competent authority. The biodiversity impact assessment shall satisfy the requirements of the amended EIA Directive and, where relevant, the EPA Guidelines (utilising the methods and definitions of the CIEEM guidelines [3]).

For projects that do not require an EIA, Biodiversity Impact Assessment shall be undertaken where the potential effects are considered to be a material consideration in the planning decision. This decision will be taken by the Project Manager, with advice from biodiversity practitioners where necessary. Where biodiversity impact assessment is undertaken outside the EIA process, it will either form a standalone report or be compiled within a project-specific environmental report. When an EIA is not required, the need for specific elements such as stakeholder engagement, cumulative assessment and monitoring shall be determined by the Project Manager in conjunction with the biodiversity practitioner(s), see Table 2-2. In all cases, the objective of the assessment process shall be to identify likely effects on biodiversity, incorporate measures to mitigate adverse effects and/or enhance biodiversity, and comply with the relevant legislation, policy, plans and Standards.

Table 4-7 – Biodiversity approach and process for Phase 3

Biodiversity approach and process for Phase 3	Ref
Review, update and refine the Phase 2 biodiversity baseline information as necessary. This includes confirming the geographic extent of the Zone(s) of Influence (ZoI) to ensure that it encompasses the areas in which effects on biodiversity can be reasonably expected to occur.	4.4.1
Input to the EIA Screening process and report, if required (and undertake AA screening).	4.4.2
Undertake a scoping exercise to identify the Important Ecological Features (IEFs) and the potentially significant and/or non-compliant effects on biodiversity to be included in the assessment.	4.4.3
Provide the biodiversity chapter of the EIA Scoping Report (if required).	4.4.3
Provide inputs to the consultation process and if required undertake direct consultation with stakeholders.	4.4.4
Collect the additional baseline information needed to inform the Biodiversity Impact Assessment, making best use of information used at Phase 2.	4.4.5
Collate information on other projects which may have cumulative effects on biodiversity with the proposed project (if required).	4.4.6

Biodiversity approach and process for Phase 3	Ref
Provide input to the design of the project, incorporating measures to (i) avoid and mitigate the likely significant adverse effects of the project; (ii) comply with relevant legislation, policy, plans and Standards; and (iii) enhance biodiversity.	4.4.7
Undertake an assessment to identify and describe the likely significant and/or non-complaint effects on biodiversity and IEFs arising from site investigations and the construction, operation and maintenance of the proposed project, including resource use and the risks arising from major accidents and disasters (if these are scoped into the assessment). Include cumulative effects and topic interactions.	4.4.8
Identify avoidance and mitigation measures to reduce significant adverse effects and/or comply with relevant legislation, policy, plans and Standards.	4.4.9
Assess the likely significant and/or non-compliant residual effects following the implementation of agreed avoidance and mitigation measures. Include cumulative effects and impact interactions.	4.4.10
Assess compliance with legislation, policy, plans and Standards which relate to biodiversity and the protection of wildlife.	4.4.11
Identify measures to compensate for unavoidable adverse significant effects on biodiversity (or comply with any derogations) and measures to enhance biodiversity and/or achieve the objectives for biodiversity.	4.4.12 4.4.13
Identify and agree proposals for monitoring of effects on biodiversity.	4.4.14
Assess the project using the TII Biodiversity Metric during the design and for the final design of the project including any compensation and enhancement measures.	4.4.15
Provide the biodiversity chapter of the EIA Report or other planning related documents (including Natura Impact Statement, if required).	4.4.16
Obtain any required consents and derogation licences with respect to biodiversity.	4.4.17

Figure 4-7: Phase 3 Process & Biodiversity for an EIA Project (Biodiversity scoped in)

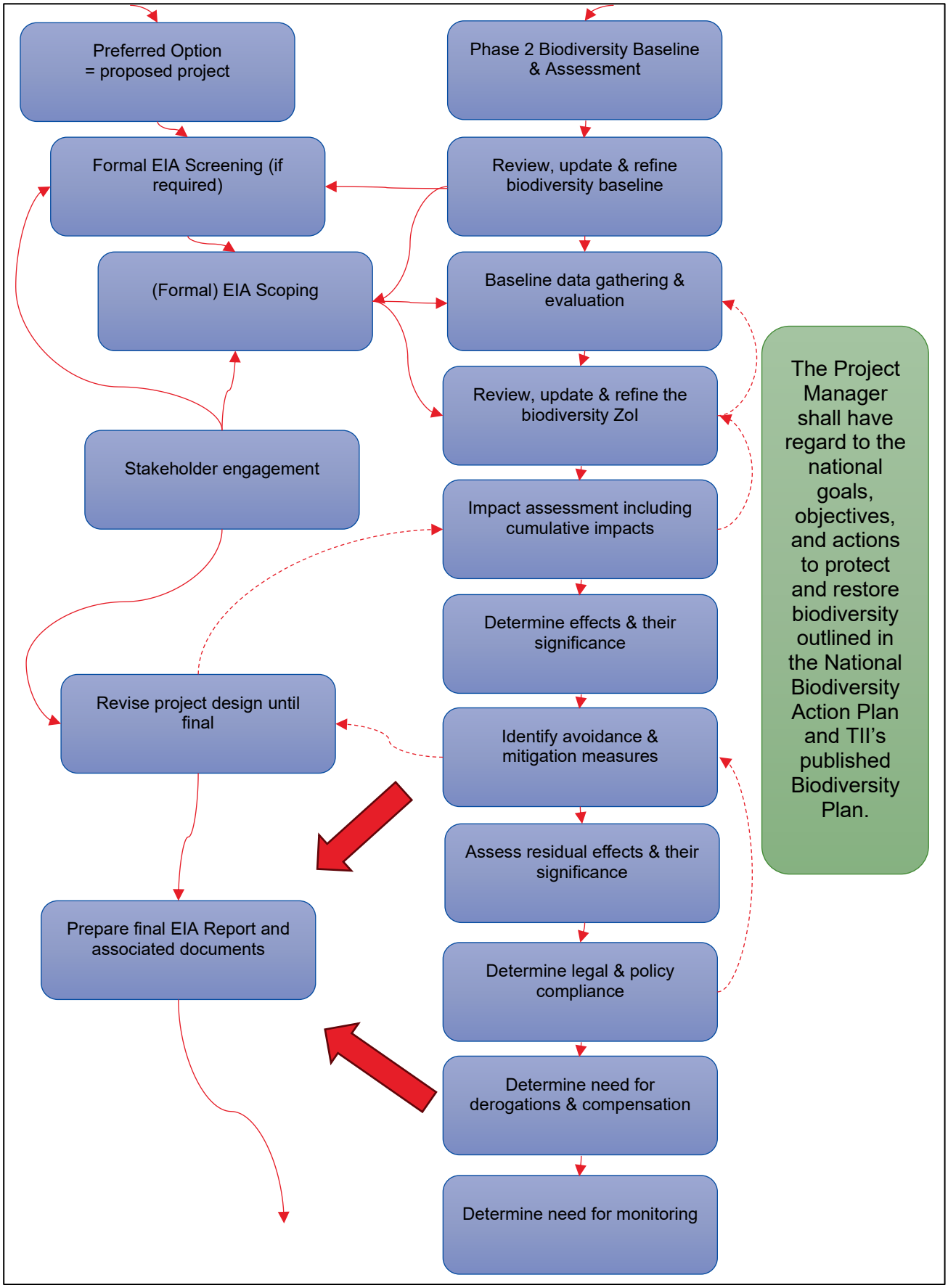
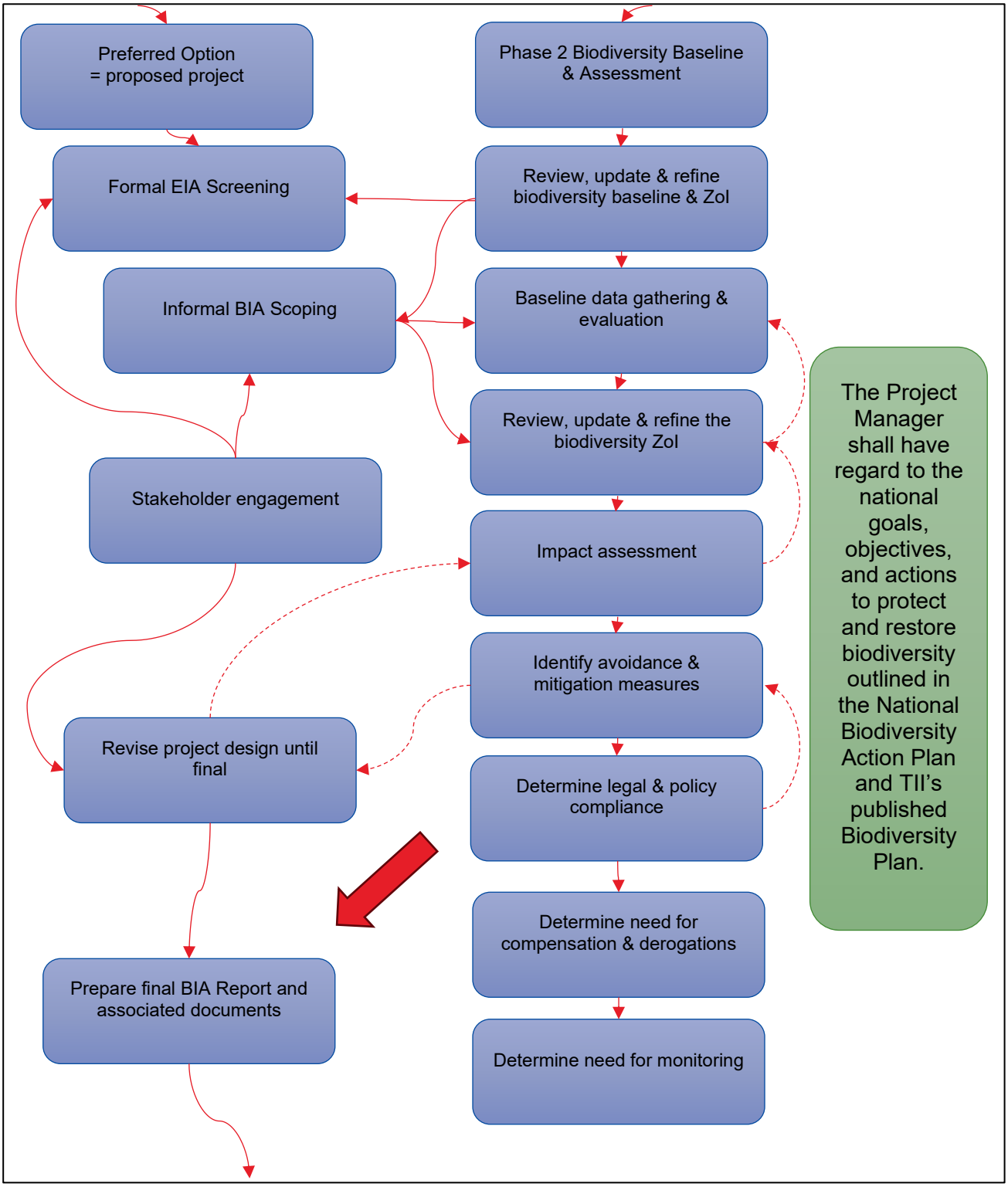


Figure 4-8: Phase 3 Process & Biodiversity for a non-EIA Project (or biodiversity scoped out of EIA)



4.4.1 Review, Update and Refine the Phase 2 Biodiversity Baseline

The biodiversity practitioner shall review the biodiversity baseline information collated for Phase 2 for the Preferred Option (now the proposed project) to inform the EIA screening and/or scoping assessments.

The baseline biodiversity data collected at Phase 2 shall be updated if:

- More than 12 months will have passed between the data being collected and the start of screening or scoping;
- The Project Manager or biodiversity practitioner are aware of any change to the baseline such as the designation of new sites or changes to existing designated sites (such as revised qualifying interest, changes in conservation condition, and amendments to the site-specific conservation objectives); or
- Additional information on biodiversity is required to inform screening and scoping assessments.

As a minimum, the update shall include a repeat of the ecological desk study for the ZoI (see below) of the proposed project.

The biodiversity practitioner shall review the ZoI for the Preferred Option and amend it as required for the proposed project, see Appendix B, Section B.3.3. Note that the ZoI may be amended again as the impact assessment progresses.

4.4.2 EIA Screening

The process for EIA screening is set out in TII RE-ENV-07008 [32]. The environmental team working on the project may prepare a Screening for Environmental Impact Assessment Report for consideration by the competent authority. If required, the biodiversity practitioner shall provide relevant inputs to the EIA Screening Report. See Appendix B, Section B.1.

The Project Manager shall forward the draft Screening for Environmental Impact Assessment Report to TII's Environmental Policy and Compliance Section (EPCS) prior to submission to the competent authority, see PMM for National Roads 3.1.8.

4.4.3 EIA Scoping

If an EIA is required, the environmental team working on the project may prepare an EIA Scoping Report for consideration by An Coimisiún Pleanála (the competent authority) and/or for an informal scoping exercise. If required, the biodiversity practitioner shall undertake a scoping exercise and provide relevant inputs to the EIA Scoping Report. See Appendix B, Sections B.2 and B.3.

4.4.4 Stakeholder Engagement

If a formal scoping opinion has been requested, An Coimisiún Pleanála (the competent authority) must consult with, *inter alia*, the Environmental Protection Agency and may invite submissions or observations from other bodies regarding the information to be contained in the EIA Report, before it issues its scoping opinion.

As set out in the PMM for National Roads, the Project Manager will also undertake informal consultation with relevant stakeholders at Phase 3. This includes consultation with Inland Fisheries Ireland (IFI), NPWS and Bord na Móna for the reasons stated in the PMM. The biodiversity practitioner shall assist, as described in Section 2.8 of this Standard.

If requested by the Project Manager, the biodiversity practitioner shall prepare inputs to consultation and engagement materials, attend public exhibitions and meet with stakeholders. The relevant responses shall be addressed by the biodiversity practitioner in the EIA or BIA Report. A list of suggested potential stakeholders is contained in the PMM for National Road Projects, Appendix A2.2.

4.4.5 Baseline Biodiversity Data and Evaluation

If a BIA is required, the biodiversity practitioner shall review the biodiversity baseline collected at Stage 2 (as updated for screening and scoping) and determine the need for additional data collection to inform the biodiversity chapter of the EIA Report or final BIA Report. See Appendix B, Section B.3.

EIA projects

For an EIA project, the biodiversity practitioner shall review whether:

- The baseline data meets the requirements of any formal scoping opinion and the Scoping Report, and any agreed requirements arising from informal scoping.
- The age of the baseline data is compliant with CIEEM standards [4].
- There is adequate information to describe the baseline scenarios.
- Where they exist, the EPO for each Important Ecological Feature is current.
- There is adequate information to determine whether an effect will be significant and to what degree.
- There is adequate information to determine whether the project will be compliant with the relevant legislation, policy, plans and Standards.
- There is adequate information to complete the baseline component of the TII BM Full Biodiversity Metric Toolkit.

The IEFs shall be evaluated as described in Appendix B, Section B.5.2.10.

The biodiversity baselines to be described are (i) the current baseline; (ii) at the start of construction; (iii) during operation; (iv) if relevant, at the time of decommissioning; and (v) in the absence of the project over what would have been the project's lifetime.

Non-EIA Projects

For a non-EIA project, the biodiversity practitioner shall review whether:

- The baseline data meets the agreed requirements of any informal scoping and any Scoping Report.
- The age of the baseline data is compliant with CIEEM standards [4].
- There is adequate information to describe the baseline.
- There is adequate information to determine whether the project will be compliant with the relevant legislation, policy, plans and Standards.
- There is adequate information to complete the baseline component of the TII BM Full Biodiversity Metric Toolkit.

All Projects

If required, additional data shall be collected as set out in Appendix B, Section B.5.1. If an AA Screening report or Natura Impact Statement is required, the biodiversity practitioner should identify the information required for that purpose and collect this alongside the information collected for the BIA.

The biodiversity practitioner shall produce a survey programme and share this with the Project Manager. If the surveys have an impact on the Project Programme, the Project Manager shall notify the Steering Group and prepare a revised Project Programme for delivery to the end of Phase 3.

4.4.6 Other Projects

If an EIA is required, the environmental team working on the project may determine a list of projects to be considered for cumulative impact assessment. The biodiversity practitioner shall review this list and determine whether it is adequate for the BIA as described in Appendix B, Sections B.5.2.11 and B.7.1.3. For each project that may give rise to cumulative effects, the biodiversity practitioner shall collate information on its effects on biodiversity.

The Project Manager shall determine whether a cumulative impact assessment is required for non-EIA projects.

4.4.7 Input to the Project Design

At Phase 3, the biodiversity practitioner should be an active member of the design team including by:

- Attending relevant design team meetings.
- Assisting with landscape designs in accordance with TII guidelines [19] [20] and research [9]. The proposals for biodiversity mitigation as part of the landscape design shall be incorporated into the landscape design.
- Advising how significant adverse effects on biodiversity and/or effects that could contravene relevant legislation, policy, plans and Standards could be avoided or reduced through layout choices and design refinements.
- Identifying opportunities for enhancements that could be included in the project for example a ‘green bridge’ as part of a road improvement scheme, or ‘greening’ an existing grey bridge.
- Advising on compliance with the national goals, objectives and actions to protect and restore biodiversity outlined in the National Biodiversity Action Plan and TII’s published Biodiversity Plan.

The advice of the practitioner shall be based on proven interventions where possible, making the best use of the scientific literature and best practice guidance [47] [48].

The Project Manager shall have regard to the national goals, objectives and actions to protect and restore biodiversity outlined in the National Biodiversity Action Plan and TII’s published Biodiversity Plan.

The Project Manager shall use the TII BM (see Section 4.4.15) as a design tool, with the results informing the layout of the project and the potential requirements for the provision of new habitats including location.

Any departures and/or relaxations from this Standard shall be identified and submitted to TII for approval, see PMM for National Roads Section 3.1.5.21.

4.4.8 Impact Assessment

As indicated in Figure 4-7 and Figure 4-8, BIA shall be an iterative process, with the findings informing the project design and vice versa. When the final design is reached, a formal BIA shall be undertaken (unless it has been determined that one is not required), presented as either a chapter in an EIA Report or a standalone BIA plus supporting documents such as survey reports.

When the design is final, the biodiversity practitioner shall provide an impact assessment within the EIA Report chapter or BIA Report, as set out in Appendix B, Sections B.4 to B.12, taking into account the requirements of any formal scoping opinion and the Scoping Report, and any agreed requirements arising from informal scoping.

Prior to completing the assessment, the biodiversity practitioner shall inform the Project Manager of any remaining effects which may contravene legislation, policy or the national goals, objectives and actions to protect and restore biodiversity outlined in the National Biodiversity Action Plan and TII's published Biodiversity Plan.

4.4.9 Avoidance and Mitigation Measures

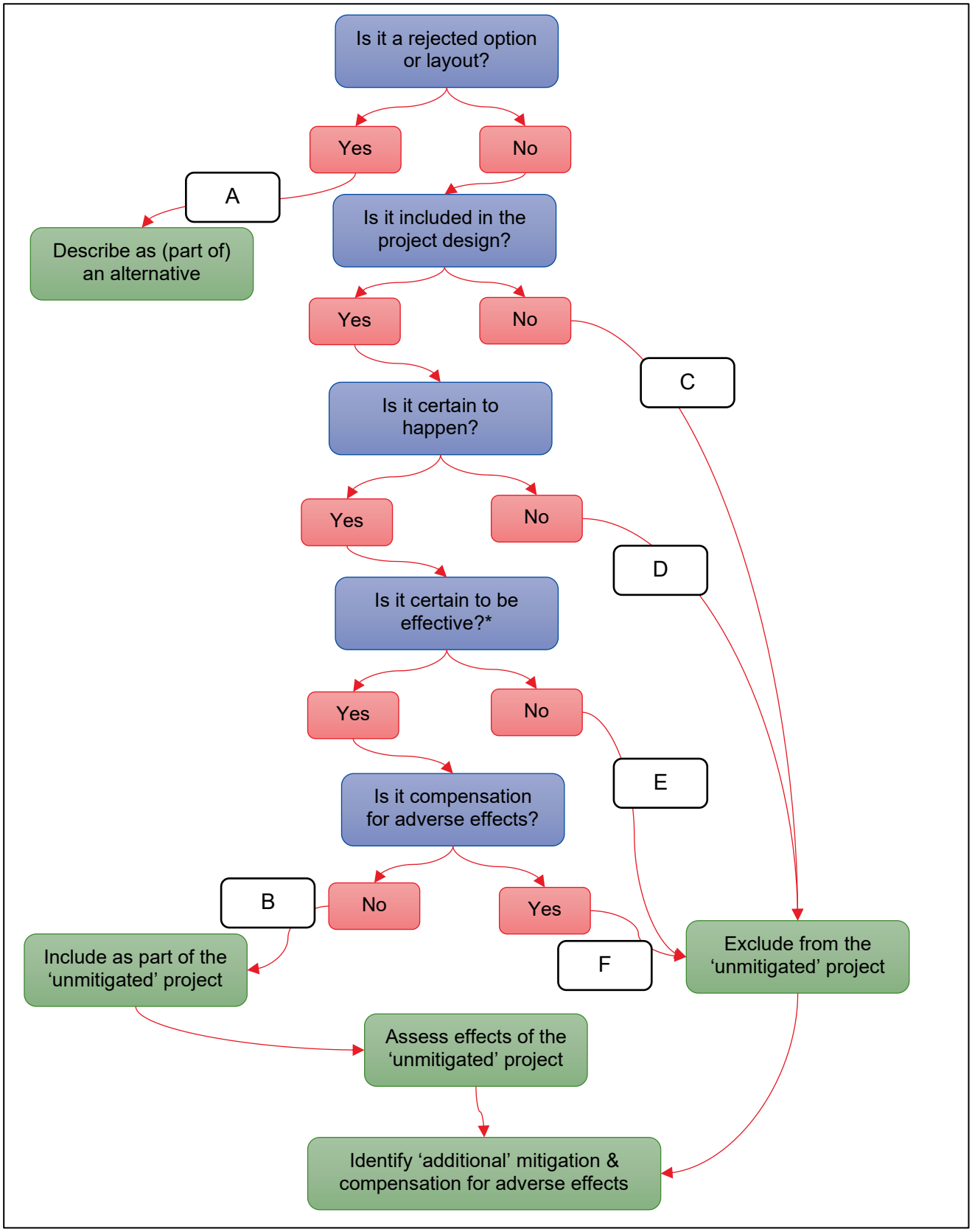
The mitigation hierarchy, as described in Section 2.6, shall be applied to the project.

As set out in the PMM for National Roads, the Project Manager shall determine the requirements for environmental mitigation, including measures to ensure that environmental protection is achieved during the construction works. For biodiversity, this shall be based on the recommendations of the biodiversity practitioner.

At Phase 3, the biodiversity practitioner shall provide input to the project design as described in Section 4.4.7.

For the EIA Report chapter or final BIA, avoidance and mitigation measures shall be treated as set out Figure 4-9 with examples of how this should be applied set out in Table 4-8.

Figure 4-9: Treatment of Avoidance, Mitigation & Compensation in the EIA Report or BIA Report



* for some measures, the answer may be partially, so effective for some features but not others, or dependent on distance from the project; if this the case, the measure is split into the 'yes/no' routes accordingly.

Table 4-8: Types of mitigation and treatment in the EIA Report or BIA Report

Examples	Type, see Figure 4-9	Suggested treatment in BIA
Complete avoidance of adverse effects on a feature by options selection.	A	Alternatives assessment only. Scope effects out of the impact assessment.
New planting provided as part of the landscape design.	B, E or F	Include in project description. B – scope positive effects into the impact assessment. E & F – assess effects on relevant features in the absence of new planting.
Providing false cuttings to reduce noise and air pollution in sensitive habitats.	B or E depending on feature/ distance	Include in project description. B – scope effects out of the impact assessment. E – assess impacts of noise & air pollution on relevant features, identify cuttings as mitigation.
Reducing light by the selection and location of lighting types.	B or E depending on feature/ distance	Include in project description. B – scope effects out of the impact assessment. E – assess impacts of light on the relevant features, identify light reduction as mitigation.
Fencing to protect a habitat during construction.	B or E depending on feature/ distance	Include in project description. B – scope effects out of the impact assessment. E – assess impacts on the relevant features, identify fencing as mitigation.
Provision of an ecological clerk of works.	C	Assess effects in the absence of an ECoW. Identify ECoW as an 'additional' mitigation measure.
Actions dependent on pre-construction surveys.	C	Assess effects in the absence of pre-construction surveys. Identify pre-construction surveys as an 'additional' mitigation measure.
Avoiding or limiting work in certain seasons.	C	Assess effects in the absence of pre-seasonal restrictions. Identify seasonal restrictions as an 'additional' mitigation measure.
Deferred to pre-commencement planning condition (noting that this not usually appropriate).	D	Exclude from the project description. Assess effects in the absence of the measure.
Permanent water pollution control measures that require maintenance.	E	Include in project description. Assess the effects in the absence of maintenance. Identify maintenance as an 'additional' mitigation measure.
Treatment of site run-off before it enters a watercourse.	E	Include in project description. Assess the effects in the absence of treatment. Identify treatment as an 'additional' mitigation measure.
Fencing to exclude animals from the road.	E	Include in project description. Assess the effects in the absence of treatment. Identify treatment as an 'additional' mitigation measure.
Wildlife underpasses and overpasses.	F	Include in project description. Assess the effects in the absence of the pass. Identify pass as a compensation measure.

The biodiversity practitioner shall propose to the Project Manager the avoidance and mitigation measures to address the significant adverse effects of the project on biodiversity and/or achieve compliance with the relevant legislation, policy, plans and Standards, in accordance with the guidance provided in Appendix B, Section B.13.1. These measures shall take into account cumulative effects and impact interactions. The agreed measures shall be included the EIA Report chapter or final BIA Report.

As stated in the PMM for National Roads, the Project Manager shall also ensure that there is sufficient land being acquired to implement all mitigation measures identified in the Schedule of Environmental Commitments (see Appendix B, Section B.13.7) and that the effects of the proposed mitigation measures on the design and constructability of the Project are fully assessed.

4.4.10 Residual Effects

Considering the agreed avoidance and mitigation measures, the biodiversity practitioner shall re-assess the effects of the project on biodiversity to determine the residual effects. This assessment shall include any adverse effects on biodiversity arising from the mitigation measures included in the project (for whatever reason). The biodiversity practitioner shall clearly describe the residual effects in the EIA Report chapter or final BIA Report. For an EIA Report chapter, this shall include a clear statement on whether the effect is significant and to what degree. The effects shall be quantified when possible. See Appendix B, Section B.14.

4.4.11 Legal and Policy Compliance

Considering the agreed avoidance and mitigation measures, the biodiversity practitioner shall re-assess the effects of the project on biodiversity to determine compliance with relevant legislation, policy, plans and Standards. The biodiversity practitioner shall provide a clear statement on compliance in the EIA Report chapter or final BIA Report. See Appendix B, Section B.8 and B.9.

The biodiversity practitioner shall make the Project Manager aware of any changes in biodiversity legislation or policy during Phase 3. Such changes may require a review of previous deliverables produced by the biodiversity practitioner.

The biodiversity practitioner shall develop measures to comply with the relevant legislation, policy, and plans pertaining to invasive species and the TII standard [6].

4.4.12 Compensation Measures

The biodiversity practitioner shall propose compensation measures that are required, as a last resort, to:

- Offset the loss of biodiversity, having regard to the national goals, objectives, and actions to protect and restore biodiversity outlined in the National Biodiversity Action Plan and TII's published Biodiversity Plan.
- Offset the significant adverse effects described in the final BIA.
- Achieve the required outcomes for biodiversity as measured by the TII BM (percent change in BU).

The agreed measures, if any, shall be included the final EIA Report chapter or BIA Report with any shortfall in compensation clearly stated. See Appendix B, Section B.13.2.

4.4.13 Enhancements

The biodiversity practitioner shall propose enhancement measures to be included in the project design or provide a net gain for biodiversity. See Appendix B, Section B.13.3 and B.13.4. The agreed

measures, if any, shall be included the final EIA Report chapter or BIA Report, with a clear explanation as to how and to what degree the measure enhances biodiversity.

4.4.14 Monitoring

The biodiversity practitioner shall propose monitoring measures that are necessary to:

- Confirm the implementation of conditions/planning agreements.
- Audit predicted impacts and effects against the actual situation.
- Audit mitigation measures against their actual effectiveness.
- Inform the requirements for remedial action should effects be worse than expected.
- Inform the adaptive management of any areas included in the project to compensate for significant adverse effects on biodiversity or to provide an enhancement/net gain.
- Audit the condition of new habitats in accordance with the planned outcome in BU using the TII BM.

See Appendix B, Section B.13.6. The agreed measures, if any, shall be summarised in the final EIA Report chapter or BIA Report, with the detail provided in the landscape management plan.

4.4.15 TII Biodiversity Metric

When there is a final engineering layout of the hard infrastructure and earthworks and a final landscape design, the Project Manager shall commission a final TII BM using the Full Biodiversity Metric Toolkit and report on the predicted change in BU as result of the project.

The following principles shall apply:

- The Project Manager shall set the goal for biodiversity in terms of BU for the proposed project in line with legislation and national and local policy and the national goals, objectives and actions to protect and restore biodiversity outlined in the National Biodiversity Action Plan and TII's published Biodiversity Plan.
- Any habitat that is provided as part of the project, e.g. compensation for protected species or landscaping, may count towards achieving a net gain in biodiversity.
- Irreplaceable habitats and habitats within NHAs, European sites and Ramsar sites are excluded from the metric and must be dealt with via a bespoke compensation approach.
- Gains in biodiversity (in terms of BU) must not be attributed to an action which was required anyway (in the absence of the project) under another legal obligation; for example, other obligations on landowners to restore biodiversity.

The following shall be produced and provided along with the other planning application documents:

- A landscape management plan which *inter alia* demonstrates how a development will achieve the goal for biodiversity in terms of BU and describes how management will achieve the required habitat condition, how this will be monitored and reported on and commitments for remedial action if the stated outcome is not achieved;
- Completed final TII BM Full Biodiversity Metric Toolkit (spreadsheet);
- Condition assessments (spreadsheet) for the habitat parcels included in the metric, where required;

- Pre-development and post-development drawings showing the habitats and their current condition and intended condition;
- A compensation plan (written document) if the project affects irreplaceable habitats or those within a designated site; and
- Agreements with the offset provider if offsite compensation is to be provided.

4.4.16 Inputs to the EIA Report and Associated Documents

The biodiversity practitioner shall prepare the biodiversity chapter of the EIA Report or standalone BIA (see Appendix Figure B.2-1: to determine which is appropriate) in accordance with the guidance in Appendix B, Section B.18.

In addition, the biodiversity practitioner shall prepare other documents or provide input to other documents as needed to inform or accompany the EIA Report or BIA Report. These are detailed in Table 4-9. These documents are all prepared at Phase 3 utilising data collected at Phase 3, incorporating data collected at Phase 2, if available.

The biodiversity practitioner shall liaise with other topic practitioners as described in Section 2.7 and Appendix C. This shall be facilitated by the Project Manager or EIA co-ordinator at regular intervals throughout Phase 3.

Table 4-9: Additional Documents/Chapters associated with the Biodiversity Chapter or BIA Report

Document	Format	Description	Lead	EIA	Non-EIA
Non-technical Summary of the EIA Report	Written document.	Part of EIA Report.	EIA	✓	X
Consideration of alternatives chapter in the EIA Report	Written document.	Part of EIA Report.	EIA	✓	X
Resource use chapter in the EIA Report	Written document.	Part of EIA Report.	EIA	✓	X
Accidents & disasters chapter in the EIA Report	Written document.	Part of EIA Report.	EIA	✓	X
Habitat/ vegetation survey report	Written documents supported by drawings.	Methods & results of survey, evaluation. TA of the EIA Report of standalone.	BP	✓	✓
Vegetation survey data	Spreadsheet.	In the format of the National Vegetation Database [59]	BP	✓	✓
Hedgerow Appraisal Report	Written documents supported by drawings & data.	Methods & results of survey, evaluation. TA of the EIA Report of standalone.	BP	✓	✓
River Habitat Survey/RHAT Report	Written documents supported by drawings & data.	Methods & results of survey, evaluation. TA of the EIA Report of standalone.	BP	✓	✓
Species survey reports	Written documents supported by drawings.	Methods & results of survey, evaluation. TA of the EIA Report of standalone.	BP	✓	✓
Natura Impact Statement (NIS)	Written documents supported by drawings.	Standalone assessment of likely significant effects on European sites, if required.	BP	✓	✓

Document	Format	Description	Lead	EIA	Non-EIA
Invasive Species Management Plan (ISMP)	Written document supported by drawings.	Describing the actions to prevent the spread of invasive species in accordance with the TII SD [6].	BP	✓	✓
Landscape management plan	Written documents supported by drawings.	Sets out the landscape design and the principles for habitat management. Demonstrates how a development will achieve the goal for biodiversity in terms of BU.	LD	✓	✓
Landscape maintenance and habitat management manual	Written document supported by drawings.	Describing the actions to achieve the desired outcomes for the landscape. Describes the actions to achieve the required outcome in biodiversity units and any other objectives for biodiversity.	LD	✓	✓
Construction Environment Management Plan (CEMP)	Written document supported by drawings.	Describing the actions to be taken to limit environmental harm during construction. See PMM for NR 3.1.5.20.	PM	✓	✓
Schedule of Environmental Commitments	Written document.	List of avoidance and mitigation measures that will be undertaken as part of the project. See PMM for NR 3.1.22.	PM	✓	✓
Habitat condition assessments	Spreadsheet.	Record of field assessments of habitat condition to calculate baseline BU.	BP	✓	✓
Final TII BM	Spreadsheet.	Showing the baseline BU, post development BU and % change.	BP	✓	✓

BP = biodiversity practitioner
BU = Biodiversity Unit
EIA = EIA co-ordinator
LD = landscape designer
NR = National Road
PM = Project Manager
SD = Standard Document
TA = Technical Appendix

The Project Manager shall review and comment on the EIA Report until satisfied with the document. Then the Project manager shall submit it for review by TII's Environmental Policy and Compliance Section (EPCS) and responses see PMM for National Roads Section 3.1.9.

4.4.17 Derogations

Prior to applying for the development consent for the project, it may be necessary to obtain a licence/derogation, for example, under the Habitats or Birds Directives, as described in the PMM for National Roads, Section 3.1.4. The Project Manager shall ensure that all required licences/derogations for the Project have been obtained before the application is made. The biodiversity practitioner shall advise the Project Manager of the need for derogations and assist where relevant in preparing the required documentation. It may be necessary to re-apply for the licence after consent for the project has been obtained. Guidance on derogations is available from the NPWS [64] [65].

Phase 3 Biodiversity Outputs

The biodiversity outputs for the Phase 3 reporting shall include:

- *Biodiversity chapter of the EIA Report or standalone BIA Report*
- *Input to Non-technical Summary of the EIA Report*
- *Input to Consideration of alternatives chapter in the EIA Report*
- *Input to Resource use chapter in the EIA Report (if scoped in)*
- *Input to Accidents & disasters chapter in the EIA Report (if scoped in)*
- *Habitat/ vegetation survey report*
- *Vegetation survey data*
- *Hedgerow Appraisal Report*
- *River Habitat Survey/RHAT Report*
- *Species survey reports*
- *Natura Impact Statement (NIS), if required*
- *Invasive Species Management Plan (ISMP)*
- *Input to Landscape management plan*
- *Input to Landscape maintenance and habitat management manual*
- *Input to Construction Environment Management Plan (CEMP)*
- *Input to Schedule of Environmental Commitments*
- *Habitat condition assessments*
- *Final TII BM*

4.5 Phase 4: Statutory Process

At Phase 4, stakeholders (e.g., members of the public and prescribed bodies) can (depending on the statutory process) provide submissions and/or observations in respect of the proposed project, which must be considered by the consenting authority. This process is applicable to EIA and non-EIA projects. The purpose of the statutory process is to ensure that the proposed project is developed in accordance with planning and environmental legislation. This Standard does not set out detailed requirements and guidance for Phase 4. However, the role of the practitioner at Phase 4 is outlined below. During the statutory process, the practitioner(s) shall respond to third party submissions, RFI and participate in oral hearing(s) as required by the statutory processes. related inputs at Phase 4 are likely to include those outlined in Table 4-10.

Table 4-10 – Biodiversity approach and process for Phase 4

Biodiversity approach and process for Phase 4
Reviewing and drafting responses, where warranted, to biodiversity matters raised in submissions by third parties to the consenting authority.
Reviewing and drafting responses to any requests for further biodiversity-related information issued by the consenting authority.
Reviewing and updating, where necessary, aspects of the biodiversity assessment.
Drafting a biodiversity Brief of Evidence, where an oral hearing is to be held, in relation to biodiversity aspects including the assessment findings and responses to submissions, etc.
Taking part in oral hearing preparation meetings if applicable.
Taking part in meetings with third parties to discuss concerns/issues and possible resolutions.
Presenting the biodiversity Brief of Evidence at the oral hearing and responding to any questions on biodiversity aspects direct from the public, other bodies, or the Inspector.
Reviewing and reporting on any biodiversity aspects addressed in the decision of the consenting authority (and Planning Inspector's report).
Depending on the outcome of the statutory process, additional mitigation measures and conditions of consent may need to be incorporated into the design and schedule of mitigation commitments, which may require input from biodiversity practitioners.

The biodiversity practitioner will review submissions and observations submitted during the consenting process. For biodiversity items, the biodiversity practitioner will review the relevant concerns and comment and provide a brief summary response with mitigation measures, referencing the proposed road project documentation and EIA Report where possible.

For a road project that requires an oral hearing, a brief of evidence may be required. Typically, this will include:

- Background of assessor, including role and description of competence.
- A high-level overview of the assessment process, referencing the EIA Report.
- A high-level summary of the key findings of the assessment, referencing the EIA Report.

- Responses to third party submissions, addressed by topic or location and referencing the EIA Report where possible.
- Errata, including details of any errors or omissions identified within the original EIA Report

Phase 4 Biodiversity Outputs

The outputs for the Phase 4 reporting shall include:

- *Responding to observations*
- *Responding to further information requests*
- *Brief of evidence*
- *Document updates and addendums, as required*

4.6 Phase 5 -7: Enabling and Procurement, Construction and Implementation, Closeout and Review

Phases 5 to 7 comprise the appointment of contractors, the construction and implementation of the project in accordance with the design, specification, relevant standards and legislation, closeout of outstanding actions and post-project review. Implementation and monitoring of committed environmental and social mitigation and enhancement measures are undertaken during these Phases. This Standard (PE-ENV-07006) is not applicable to Phases 5 to 7.

Inputs from a biodiversity practitioner(s) may be undertaken at the request of the Project Manager during Phase 5 to 7. These may include activities such as those listed in **Table 4-11**.

Table 4-11: Biodiversity Inputs at PMG Phases 5 to 7

Phase	Biodiversity inputs
Phase 5: Enabling and Procurement	• Reviewing the Schedule of Environmental Commitments and relevant planning conditions/obligations or modifications. • Pre-construction surveys. • Updating mitigation and compensation plans. • Implementation of the Invasive Alien Plant Species Management Plan. • Guidance on the implementation of mitigation and compensation. • Guidance on the implementation of monitoring activities. • Obtaining consents and derogation licences not obtained at Phase 3, or required to be reobtained. • Input to procurement documents on scope.
Phase 6: Construction and Implementation	• Guidance on the implementation of mitigation and compensation. • Guidance on the implementation of monitoring activities. • Reviewing compliance with the Schedule of Environmental Commitments and relevant planning conditions/obligations or modifications. • Ecological Clerk of Works. • Carrying out works under a derogation licence. • Monitoring. • Reporting on activities completed.
Phase 7: Closeout and Review	• Monitoring compensation sites. • Reviewing compliance with the Landscape management plan and Landscape maintenance and habitat management manual. • Reporting on activities completed.

4.6.1 Environmental Condition Enforcement

The European Union (Roads Act 1993) (Environmental Impact Assessment) (Amendment) Regulations, 2019, created a regulatory regime in relation to environmental condition enforcement in respect of national roads (which require EIA). Cognisance of these facts is required in Phase 5, 6 and further phases, see RE-ENV-07008 for further details.

5. Glossary and Acronyms

The following definitions describe how terminology should be interpreted in the context of this Standard (PE-ENV-07006).

Term	Definition
Active Travel	Active Travel involves travelling with a purpose, using your own energy via sustainable means. It includes walking, wheeling, and cycling or the use of self-powered, non-motorised scooters as part of a purposeful journey [66].
Active Travel Project	One or a combination of (i) Offline solutions in compliance with the TII Standard DN-GEO-03047 (Rural Cycleway Design (Offline)) (ii) Links to an existing or proposed active travel network. (iii) Cycle and pedestrian facilities adjacent to a proposed road upgrade.
Ancient and long-established woodlands	Ancient woodland refers to those woods that have had a continuous history of cover since before the period when planting and afforestation became common practice (mid-1600s). Possible ancient woodland (PAW) stands have been continuously wooded since 1660. Long-established woodlands (LEW) have been continuously wooded since 1830, including stands for which no evidence of antiquity could be found in older documentation (LEW (I)), and stands for which there is evidence that the site is not ancient (LEW (II)).
Ancient Tree	A tree that has passed beyond maturity and is old, or aged, in comparison with other trees of the same species [67].
Annex I Birds	Species listed on Annex I of the Birds Directive, i.e. bird species which are of European Community interest, and require the designation of Special Protection Areas for their conservation.
Annex I Habitat	Habitat listed on Annex I of the Habitats Directive, i.e. habitats which are of European Community interest, and require the designation of Special Areas of Conservation for their conservation.
Annex II Species	Species listed on Annex II of the Habitats Directive i.e. species which are of European Community interest and require the designation of Special Areas of Conservation for their conservation.
Annex IV Species	Species listed on Annex IV of the Habitats Directive i.e. animal and plant species of European Community interest which are strictly protected.
Annex V Species	Species listed on Annex V of the Habitats Directive i.e. animal and plant species of European Community interest whose taking in the wild and exploitation may be subject to management measures.
Appropriate Assessment	An assessment of the implications of a project or plan on the integrity of a European site, in view of the site's conservation objectives, as required by Article 6(3) of the Habitats Directive and the implementing legislation.
Approving Authority	Ensures that the project or programme remains compliant with the requirements of the Infrastructure Guidelines throughout the various stages in the project lifecycle and makes decisions on whether or not to proceed to the next stage of the project lifecycle.

Term	Definition
Article 10 Habitats	From Article 10 of the Habitats Directive: *Features of the landscape which are of major importance for wild fauna and flora …..which, by virtue of their linear and continuous structure (such as rivers with their banks or the traditional systems for marking field boundaries) or their function as stepping stones (such as ponds or small woods), are essential for the migration, dispersal and genetic exchange of wild species*.
Article 12 reports	As required by Article 12 of the Birds Directive, as amended, a report to be produced every six years, on the status and trends of wild bird species protected by the Directive, the threats and pressures on them, the conservation measures taken for them and the contribution of the network of Special Protection Areas to the objectives of the Birds Directive [68] [69].
Article 17 reports	As required by Article 17 of the Habitats Directive, a report to be produced every six years on the conservation measures undertaken within SACs, and their effect on the conservation status of the natural habitat types of Annex I and the species in Annex II, and the conservation status of these species and natural habitats and species at the member state level [70] [71].
Avoidance	*Prevention of impacts occurring, having regard to predictions about potentially negative environmental effects (e.g. project decisions about site location or design*) [3]. Avoiding significant effects on the environment by option selection, design amendments or changes to construction methods and timing.
Baseline Scenario	A description of the relevant aspects of the current state of the environment, as required by Annex IV of the EIA Directive.
Biodiversity as a Resource	Annex IV of the EIA Directive requires consideration of the use of biodiversity as a resource as part of EIA Screening (Annex III) and in the EIA Report (Annex IV). Biodiversity as a resource could mean the use of products derived from wild species such as trees from forests to produce wood products or fish from the sea to produce food products. Note that the Directive also requires an assessment of the effects of the use of other resources by the project on the environment, including biodiversity (Annex IV, 5(b).
Biodiversity Net Gain	An approach to development which makes sure that habitats for wildlife are left in a measurably better state than they were before the development [72]. See also [44].
Biodiversity or Biological Diversity	As defined in the Convention on Biological Diversity, biodiversity is the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.
Compensation	*'Measures taken to offset the loss of, or permanent damage to, ecological features despite mitigation. Any replacement area should be similar in terms of biological features and ecological functions that have been lost or damaged, or with appropriate management have the ability to reproduce the ecological functions and conditions of those biological features. Compensation addresses negative effects which are residual, after avoidance and mitigation have been considered. It is this objective of compensation, and not its location, that distinguishes compensation from*

Term	Definition
	'mitigation'. Depending on circumstances, compensation measures may be located within or outside the project site.' [3]
Competent Authority	In the context of the EIA and Habitats Directive, a Competent Authority is the public body that has the legal responsibility to make the final decision on a project and ensure the assessment is conducted properly. In respect of EIA National Road projects, the Competent Authority is An Coimisiún Pleanála.
Condition Assessment	An assessment of the condition of a designated site, habitat or a species population, using a standard method of assessment and classification. For a designated site, conservation condition can be favourable or unfavourable, and it is determined by comparing the current status of its qualifying interest features (habitats and/or species) with a series of targets. For habitats, systems include (i) Table 2 and Appendix 1 of the Irish Semi-natural Grasslands Survey 2007-2012 report, (ii) Table 7 and Appendix V of the Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland; and (iii) condition assessments for habitats to inform the calculation of Biodiversity Units for use in the TII Biodiversity Metric, which has a five point scale from poor to good.
Conservation Listing	The lists on which the habitat or species appears, such as Annex I or Red Data Book. Cf conservation status.
Conservation Objectives	A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site; the objective is typically to maintain or restore the favourable conservation condition of a qualifying interest feature, with favourable conservation condition defined by a set of attributes and targets which are specific to that feature at that site. These are provided for (most) European sites. A broader definition is any objective for the conservation of biodiversity, be that in a management plan or stated in a policy [3].
Conservation Status	Conservation status of a habitat is its current extent, structure, function distribution within its natural range and the presence of its typical species, and whether these are increasing/improving, stable, or deteriorating/ declining. Conservation status of a species is its current abundance and distribution within its natural range, and whether these are increasing, stable or declining. Criteria can be used to classify conservation status of a species population using the IUCN Red List [73] and BOCCI [58]. In BIA, a change in conservation status refers to the parameters given above; it does not mean a change in the IUCN/BOCCI category.
Construction Environment Management Plan	A plan which sets out in detail the measures to be undertaken during the construction of the project to avoid or reduce environmental damage and control resource use, it can include measures to protect biodiversity and is based on the relevant parts of the Schedule of Environmental Commitments.
Cumulative Effects	*Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a proposed development results in individually insignificant impacts that, when considered*

Term	Definition
	cumulatively with impacts of other proposed or consented projects, [and other effects arising from the same project], *can result in significant effects* [3]. See also [74].
Cycle Lane	Part of the road pavement reserved for use by cycles. The cycle lane forms part of the road pavement, and it is thus located within the contiguous road surface. It is not a cycleway nor cycle track and therefore, generally not for the exclusive use of cycles. DN-GEO-03047.
Cycle Track	A part of the road cross section, separated from the road / vehicular carriageway by a verge, which is reserved for the use of cycles and from which all mechanically propelled vehicles, other than mechanically propelled wheelchairs and electric bikes, are prohibited from entering except for the purpose of maintenance and access. A cycle track can be adjacent to a footway. DN-GEO-03047.
Cycleway	An offline public road reserved for the exclusive use of people cycling or people walking, wheeling, and cycling (see also definitions of 'Greenway' and 'Shared Use Active Travel Facility'). All mechanically propelled vehicles, other than mechanically propelled wheelchairs and electric bikes, are prohibited from entering except for the purpose of maintenance and access. DN-GEO-03047.
Deliberate Disturbance (of Annex IV species, wild bird species and other protected species)	For strictly protected animal species under the HD, deliberate disturbance is '*deliberate disturbance that may affect the chances of survival, the breeding success or the reproductive ability of a protected species, or that leads to a reduction in the occupied area or to relocation or displacement of the species*' and it is unrelated to FCS [75]. For wild bird species, deliberate disturbance is that which *would have a significant effect on the objective of maintaining populations of all species of naturally occurring birds in the wild state …at a level which corresponds in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements, or of adapting the population of these species to that level* [76]. Short-term relocation or displacement of limited extent with no other effects is probably excluded. This definition can be usefully applied to other protected species in the BIA. See Deliberate Killing for the definition of deliberate.
Deliberate Killing etc (of Annex IV species, wild bird species and other protected species)	For strictly protected animal species under the HD and all wild bird species, ''*Deliberate' actions are to be understood as actions by a person or body who knows that their action will most likely lead to an offence against a species* [including killing]*, but intends this offence or, at least, consciously accepts* [it is] *the foreseeable results of his action*' [75] [76]. This definition can be usefully applied to other protected species in the BIA.
Ecological Desk Study	The process of collating (i) basic information about a site or area; (ii) information on designated sites within that site and the Zone(s) of Influence; (iii) existing records of habitats and species from the Zone(s) of Influence and (iv) contextual information on habitat and species distribution and conservation status [62].
Ecological Impact Assessment	The process of identifying, quantifying and evaluating the potential effects of development-related or other proposed actions on habitats, species and ecosystems [3].

Term	Definition
Ecological Receptors	Sites, habitats, features, assemblages, species or individuals that occur in the vicinity of a project and upon which impacts are likely [33].
Effect	Outcome for an ecological feature from an impact [3].
Enhancement	Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.
Environmental Impact Assessment	The process of carrying out an Environmental Impact Assessment as required by Directive 2011/92/EU, as amended by Directive 2014/52/EU on assessment of the effects of certain public and private projects on the environment. The EIA process is composed of different steps including preparation of the EIA Report, publicity and consultation and decision-making [31].
Environmental Impact Assessment Report	The outputs of the Environmental Impact Assessment undertaken by the developer are presented in the EIA Report which contains: information regarding the project, the baseline scenario, the likely significant effects of the project, the proposed alternatives, and the measures to mitigate adverse significant effects, as well as a Non-Technical Summary and any additional information specified in Annex IV of the EIA Directive [31]. It is used by the competent authority to complete its own EIA of the proposed project.
Environmental Protection Objective (EPO)	An objective set by the European union or a Member State for the protection of the environment, be that a legal or policy objective, which should be taken into account when describing the likely significant effects of a project on the environment in an EIA (see Annex IV of the EIA Directive).
European Site	A candidate Site of Community Importance, a Site of Community Importance (SCI), a candidate Special Area of Conservation (cSAC), a Special Area of Conservation (SAC), a candidate Special Protection Area, or a Special Protection Area (SPA).
Evolution of the Baseline	How the baseline situation would be expected to develop over time [31].
Favourable Conservation Condition	Applies to the qualifying features of individual European sites. A feature has favourable conservation condition when it is meeting its conservation objectives within that site. Favourable conservation condition is defined by the site-specific conservation objectives for that feature at that site. The maintenance of habitats and species within European sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. [77]
Favourable Conservation Status (FCS)	A natural habitat (listed on Annex I of the Habitats Directive) has FCS when *(a) its natural range and areas it covers within that range are stable or increasing; (b) the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and (c) the conservation status of its typical species is favourable*. A species (listed on Annex II, IV or V of the Habitats Directive) has FCS when (*a) population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and (b) the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and (c) there is, and will probably*

Term	Definition
	continue to be, a sufficiently large habitat to maintain its populations on a long-term basis. The judgement for FCS is based mainly on the Favourable Reference Values at the level of the member state i.e. the comparison is usually with the range and area occupied by a habitat had in 1992 when the Habitats Directive came into force, or the range and population that the species that a species had in 1992, although it could be a higher values as determined by the member state, and must also take into account the other factors that define FCS [78]. The Article 17 reports provide the Favourable Reference Values for the species and habitats listed in the Annexes of the Habitats Directive.
Favourable Reference Area	For a habitat listed in Annex I of the Habitats Directive: at least the area of land occupied by the habitat when the Directive came into force (1992) [78].
Favourable Reference Population	For a species listed in the Annexes of the Habitats Directive: at least the size of the population when the Directive came into force (1992) [78]
Favourable Reference Range	For a habitat or species listed in the Annexes of the Habitats Directive: *at least the range (in size and configuration) when the Directive came into force* [1992]*; if the range was insufficient to support a favourable status the reference …. should be larger*, where range is *the outer limits of the overall area in which a habitat or species is found at present and it can be considered as an envelope within which areas actually occupied occur* [78]
Footpath	A path, separated from the road / vehicular carriageway by a kerb, for use by pedestrians which does not form part of the road pavement. DN-GEO-03047.
Footway	A path for use by pedestrians, separated from the road / vehicular carriageway by a verge, which does not form part of the road pavement. DN-GEO-03047.
Greenway	A cycleway, or other, that caters for people walking, wheeling and cycling in a mainly recreational environment. DN-GEO-03047.
Habitat parcel (not included in a Site)	A geographically defined area of a single habitat type which is generally small, isolated and/or vulnerable to external pressures.
Hydromorphology	Hydromorphology considers the physical character and water content of water bodies. Good hydromorphological conditions support aquatic ecosystems (i.e. hydromorphological elements such as water flow and substrate provide physical habitat for biota such as fish, invertebrates and aquatic macrophytes).
Impact	Actions resulting in changes to an ecological feature [3].
Impact Interactions	The reactions between impacts, whether between the impacts of just one project or between the impacts of other projects [128].
Important Ecological Features	Sites, habitats and species that provide the key focus for biodiversity conservation, supported by policy and legislation, or are considered important on the basis of expert judgment, or play a key functional role in the landscape as 'stepping stones' [3] or are linear and continuous habitats are essential for migration and dispersal of wild species (see Article 10 habitats).
Integrity, of a European Site	The integrity of a European site is linked to its conservation objectives. European sites should have written conservation objectives which are site specific and include attributes and targets that define favourable

Term	Definition
	conservation condition. A European site has integrity when all its qualifying/special conservation interest features are meeting their conservation objectives within the site and are therefore in favourable condition. Alternatively, the integrity of a European site is *the coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is designated* [36]. This definition could be applied to other types of sites.
Invasive Alien Plant Species Management Plan	A Management Plan setting out a clear programme for eradicating, controlling and/or containing IAPS including a full topographical survey, an implementation schedule, records of treatments undertaken records of re-growth of IAPS and disposal locations of contaminated or potentially contaminated materials GE-ENV-01104.
Irreplaceable Habitat	Habitat that, once lost, cannot be created elsewhere within a reasonable timeframe. See Appendix D for the list of irreplaceable habitats applicable to this Standard and the TII BM.
Lifespan of Ecological Data	The length of time after which data is collected that it remains valid, which typically ranges from 12 to 36 months [4].
Mitigation	Measures taken to reduce negative impacts and effects. Measures may include: locating the development and its working areas and access routes away from areas of high ecological interest, fencing off sensitive areas during the construction period, or timing works to avoid sensitive periods. An example of a reduction measure is a reed bed silt trap that is designed to minimise the amount of polluted water running directly into an ecologically important watercourse. Depending on circumstances, mitigation measures may be located within or outside the project site. [3]
Mitigation (Additional)	Mitigation that addresses an impact arising from the final design of the Project or mitigation which has been included in the project design but which is uncertain to be implemented or successful [33]; examples include mitigation which relies on certain conditions, such as the season, the weather or the results of pre-construction surveys; mitigation that relies on the actions of site staff; and mitigation that is dependent on maintenance such as sediment traps.
Mitigation Hierarchy	In order of preference: Avoidance is used where an impact has been avoided, e.g. through changes in scheme design. Mitigation is used to refer to measures to reduce or remedy a specific negative impact. Compensation describes measures taken to offset residual effects, i.e. where mitigation is not possible.
Multi-Criteria Analysis	The practice of assessing options against a set of objectives or criteria in order to identify a preferred set of options, or single option, PE-PAG-02031.
National Road Project	Element of the network of national roads for which TII has overall responsibility, although new elements are usually proposed by the local authority, and can take many forms including park and share facilities, active travel projects, toll schemes, motorway schemes, busway schemes,

Term	Definition
	proposed road development, road safety improvement schemes, low-cost remedial safety works, junction improvement schemes, road space reallocation schemes, pavement rehabilitation schemes.
National/Regional/ Local Road	Roads in Ireland are classified as: • National Roads, subdivided into National Primary routes and National Secondary routes, with some National Roads designated as motorways. • Regional roads. • Local roads, subdivided into local primary, local secondary and local tertiary.
Natura 2000 Site	A Special Area of Conservation (SAC) designated under the Habitats Directive or a Special Protection Area (SPA) designated under the Birds Directive (note this has a narrower definition than European site).
Natural Heritage Area (NHA)	An area which is worthy of conservation for one or more species, communities, habitats, landforms or geological or geomorphological features, or for its diversity of natural attributes, and so designated under the Wildlife (Amendment) Act 2000. An NHA can be designated for features of national or international importance [79].
No Net Loss of Biodiversity	An approach to development which makes sure that habitats for wildlife are left in measurably no worse than they were before the development.
Precautionary Principle	As defined in the Rio Declaration on Environment and Development; where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation. See also Article 191 of the Treaty on the Functioning of the European Union and Communication from the Commission on the precautionary principle COM/2000/0001 final.
Prescribed Road	'the construction of a new road of four or more lanes, or the realignment or widening of an existing road so as to provide four or more lanes, where such new, realigned or widened road would be eight kilometres or more in length in a rural area, or 500 metres or more in length in an urban area' or "the construction of a new bridge or tunnel which would be 100 metres or more in length' RE-ENV-07008.
Primary and old-growth forests	A forest is a land area of more than 0.5 ha, with a tree canopy cover of more than 10%, which is not primarily under agricultural or other specific non-forest land use. A primary forest is a forest that has never been logged and has developed following natural disturbances and under natural processes, regardless of its age. Old growth forest stands are stands in primary or secondary forests that have developed the structures and species normally associated with old primary forest of that type have sufficiently accumulated to act as a forest ecosystem distinct from any younger age class. [80]
Proposed Natural Heritage Area (Non-statutory)	Proposed Natural Heritage Areas (pNHA) were published on a non-statutory basis in 1995. They have not since been statutorily proposed or designated but are considered in local planning policy. These sites are of significance for wildlife and habitats.

Term	Definition
Proposed Natural Heritage Area (Statutory)	Proposed Natural Heritage Areas (pNHA) that are formally proposed for designation under the Wildlife (Amendment) Act 2000. There are none at the time of writing.
Qualifying Interest	A habitat or species population which is the reason for the designation of a Special Area of Conservation.
Qualitative Assessment	An assessment that enhances quantitative assessments by describing aspects of biodiversity which cannot be measured or for which measurement would be too onerous, see [44].
Quantitative Assessment	An assessment using numerical data on biodiversity such as habitat areas, species populations and biodiversity metrics, see [39].
Ramsar site	Wetland site designated under the Ramsar convention for the conservation of its habitats and species populations.
Regularly occurring migratory species of birds	Regularly occurring migratory species which are not listed in Annex I of the Birds Directive but which nevertheless require the designation of Special Protection Areas for their protection at breeding, moulting and wintering areas and staging posts along their migration routes, especially wetland birds.
Road Authority	A Road Authority is, generally, a local authority that has a number of functions, responsibilities, powers, etc., in respect of public roads in its functional area. A Road Authority is, for example, more often than not responsible for the maintenance of public roads within its jurisdiction and is mostly the body that proposes national road projects.
Schedule of Environmental Commitments	A compendium of mitigation and monitoring commitments contained in an EIAR as a separate section or appendix to the EIAR, comprising a list of relevant measures without elaboration on the reasoning or their effectiveness [29].
Scoping	For an EIA, the process of identifying the content and extent of the information to be submitted to the Competent Authority under the EIA process [30]. Or more broadly, *determination of the extent of an assessment* [3]
Scoping Opinion	The 'Scoping stage' of an EIA provides the opportunity for Developers to ask competent authorities about the extent of the information required to make an informed decision about the project and its effects. This step involves the assessment and the determination, or 'scoping', of the amount of information and analysis that authorities will need. The output is called a scoping opinion.
Screening	Ascertaining *whether the Project's effects on the environment are expected to be significant, i.e. the Project is 'Screened' to determine whether an EIA is necessary. Projects listed in Annex I to the EIA Directive are automatically subjected to an EIA because their environmental effects are presumed to be significant. Projects listed in Annex II to the EIA Directive require a determination to be made about their likely significant environmental effects. The Member State's Competent Authority make that determination through either …(i) case-by-case examination or (ii)* [setting] *thresholds or criteria.* [28]

Term	Definition
Significant effect	*'An effect that either supports or undermines biodiversity conservation* [or environmental protection] *objectives for 'Important Ecological Features' or for biodiversity in general'* [3]. An effect which undermines or supports an EPO (or other agreed significance criteria), worsens or improves the conservation status of an IEF (with no relevant EPO), or results in the loss or gain in biodiversity.
Site	A geographically defined area, whose extent is clearly delineated, which usually supports more than type of semi-natural habitat, aggregated into a single unit. The areas of semi-natural habitats are usually adjacent and the site is usually surrounded by highly modified habitats, a different ecosystem or a physical barrier. A site can be any size however it must be large enough to provide the physical and semi-natural conditions for the maintenance of a particular habitat, species population or community.
Source-Pathway-Receptor Model	The Source-Pathway-Receptor (SPR) model is a framework in environmental risk management, where: Source: is the origin of the hazard; this could be any human action or inaction that could lead to an adverse environmental impact. Pathway: is the route through which the impact travels from the source to the receptor, includes air, water, soil and direct contact. Receptor: is the entity that could be harmed by the impact, includes habitats and species populations. For there to be an impact, all three components must be present and connected. If any one of these is missing the risk of an impact may be nil but see 'the restore objective'.
Special Area of Conservation (SAC)	Site designated under the Habitats Directive for the conservation of the habitats and species listed under Annex I and Annex II of the Directive.
Special Conservation Interest (SCI)	A bird population which is the reason for the designation of a Special Protection Area.
Special Protection Area (SPA)	Site designated under the Birds Directive for the protection of the bird species listed in Annex I of the Directive and regularly occurring migratory species (ROMS).
Species of Community Interest	Those listed in the Habitats Directive Annex II, IV and V and the Birds Directive Annex I (to which FCS applies).
The 'Restore' Objective	The objective for features that have unfavourable condition or have unfavourable conservation status, the aim being to restore the area, structure and function of a habitat, or the abundance and distribution of a specie, and achieve favourable conservation condition/status.
The 'Maintain' Objective	The objective for features that are in favourable condition or have favourable conservation status, the aim being to maintain that condition or status.
Typical Species (of a habitat)	Those which occur regularly and at high constancy, and are good indicators of favourable habitat quality [78], this definition applies to Annex I habitats for the purpose of Article 17 reporting but could be applied more widely.

Term	Definition
Veteran Tree	A tree with habitat features, such as wounds or decay, as a consequence its life or environment, that is not old enough to ancient [67].
Zone of Influence	The area(s) over which ecological features may be affected by the biophysical changes caused by the proposed project and associated activities [3].

Acronyms used in this Standard are listed in the table below.

Acronym	In Full
AA	Appropriate Assessment
BD	Birds Directive
TII BM	TII Biodiversity Metric
BNG	Biodiversity Net Gain
CBD	Convention on Biological Diversity
CEMP	Construction Environmental Management Plans
CIEEM	Chartered Institute of Ecology and Environmental Management
DAU	Development Applications Unit (of the Department of Housing, Local Government and Heritage/National Parks and Wildlife Service (NPWS)
DMRB	Design Manual for Roads and Bridges
DRNPF	Draft Revised National Planning Framework
EBS	EU Biodiversity Strategy for 2030
EC	European Commission
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
EIA Report	Environmental Impact Assessment Report
ELD	Environmental Liabilities Directive
EPA	Environmental Protection Agency
FA	Fisheries Acts
FPO	Flora Protection Order
GIS	Geographical Information Systems
HD	Habitats Directive
IROPI	Imperative Reasons of Over-riding Public Interest
MCA	Multi-Criteria Analysis
MSFD	Marine Strategy Framework Directive
NBAP	Ireland's 4th National Biodiversity Action Plan 2023–2030
NHA	Natural Heritage Area

Acronym	In Full
NIS	Natura Impact Statement
NIR	Natura Impact Report
NNL	No Net Loss
NPF	National Planning Framework
NPS	National Peatland Strategy
NPWS	National Parks and Wildlife Service
NRL	Nature Restoration Law
NSA	No Satisfactory Alternative
PAG	Project Appraisal Guidelines
PMG	Project Management Guidelines
PMM	Project Manager's Manual
pNHA	Proposed Natural Heritage Area
QI	Qualifying Interest
RBMP	River Basin Management Plan
REE	EC Regulation 1100/2007 for the recovery of the stock of European eel
ROMS	Regularly occurring migratory species of birds, as referenced in Article 4 2 of the Birds Directive
RSES	Regional Spatial Economic Strategy
SAC	Special Area of Conservation
SCI	Special Conservation Interest or Site of Community Interest
SD	Standard Document
SEA	Strategic Environmental Assessment
SPA	Special Protection Area
WA	Wildlife Acts
WAA	Wildlife Amendment Act
WFD	Water Framework Directive
ZoI	Zone of Influence

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Appendix A – Legislation and Policy Framework

Important Note: This brief summary of legislation and policy is provided for information only. It was up to date at the time of writing. However, changes in legislation and policy occur regularly, or the law may be re-interpreted by the courts. It is therefore essential that the Project Manager and biodiversity practitioner consult primary sources when identifying constraints and risks, and when completing a Biodiversity Impact Assessment. This summary is not a legal interpretaion.

A.1 Legislation pertaining to Biodiversity

A.1.1 The Biodiversity Convention

Article 14 of the Convention on Biological Diversity (CBD) requires each party to, '*as far as possible and as appropriate, … Introduce appropriate procedures requiring environmental impact assessment of its proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimizing such effects and, where appropriate, allow for public participation in such procedures'*. Ireland and the European Union are both parties of the convention.

A.1.2 The EIA Directive

The EU's Environmental Impact Assessment (EIA) Directive (2011/92/EU as amended by 2014/52/EU) and the transposing legislation are the main way that Article 14 of the Biodiversity Convention is implemented within the EU. The Directive requires, *inter alia*, a description of the likely significant effects of certain projects on the environment, including biodiversity, as defined by the convention, but '*with particular attention to species and habitats protected under [the Habitats] Directive 92/43/EEC and [the Birds] Directive 2009/147/EC'*. The Directive states that the description of such effects '*should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project*'.

A.1.3 The Nature Directives

The EU's Nature Directives are 92/43/EEC the Habitats Directive (HD) and 2009/147/EC the Birds Directive (BD). These provide the main protection for sites and species at the European level. The Habitats Directive deals with habitats, plants and animals other than birds, while the Birds Directive deals only with birds and their habitats, especially wetlands.

The Habitats Directive includes a list of habitats in Annex I and a list of species in Annex II for which the designation of Special Areas of Conservation (SACs) is required. SACs and their qualifying interest receive protection under the Directive. In addition, Annex IV is a list of species which are strictly protected under the Directive and Annex V is a list of species which receive more limited protection. Similarly, the Birds Directive includes a list in Annex I for which the designation of Special Protection Areas (SPAs) is required. SPAs are also designated for the protection of regularly occurring migratory species of birds (ROMS). SPAs and SACs are known as Natura 2000 sites. Member States are required to endeavour to improve the ecological coherence of the network of Natura 2000 sites by maintaining, developing, and encouraging the management of linear habitats and stepping stone habitats which '*are essential for the migration, dispersal and genetic exchange of wild species*' (Article

3(3) and Article 10 of the HD) and '*to take the requisite measures to preserve, maintain or re-establish a sufficient diversity and area of habitats for all* [wild birds] (Article 3 of BD).

Therefore, in addition to the protections afforded by the Nature Directives, these are the habitats and species which require particular attention in the description of likely significant effects under EIA. Those listed on the Annexes and ROMS are referred to collectively as the habitats and species of community interest. The objective of the Nature Directives, as extended to birds by the Environmental Liability Directive (see A.1.6) [47], is to maintain or achieve favourable conservation status (FCS) for these habitats and species.

A.1.4 The Nature Restoration Law

Regulation (EU) 2024/1991 on nature restoration is the Nature Restoration Law. It includes an overarching objective for restoring biodiversity with binding restoration targets for specific habitats and species.

It is focused on the habitats listed under the Habitats Directive, and the habitats of species listed under the Habitats Directive and '*falling within the scope'* of the Birds Directive, which is all wild birds. Member States are required to restore a certain quantity of these habitats to a good condition and re-establish these habitats in places where they do not occur, up to a certain quantity and by certain dates. Connectivity between these areas must also be considered. At the same time, measures must be put in place to avoid the deterioration of the habitats listed under the Habitats Directive (whether already in good condition or being restored) except for certain reasons which can include, outside of Natura 2000 sites, renewable energy projects, national defence projects or another '*plan or project of overriding public interest for which no less damaging alternative solutions are available*' and, inside Natura 2000 sites, a plan or project authorised in accordance with Article 6(4) of the Habitats Directive. In effect, the Law picks up where the Habitats Directive stopped. The Habitats Directive set an aim of reaching or maintaining favourable conservation status (FCS) for the habitats and species listed in Annexes I, II, IV and V at the Member State level, but only required the designation of SACs to contribute towards achieving FCS for those listed on Annexes I and II, and surveillance of progress towards achieving FCS for these and the species listed in Annex IV and V. The Law requires restoration (and maintenance) of a quantity of Annex I habitats and the habitats of species listed in Annexes II, IV and V outside of SACs, and a quantity of the habitats of wild birds, including those listed in Annex I of the Birds Directive and regularly occurring migratory species of birds (ROMS) outside of SPAs, to contribute to reaching or maintaining FCS. However, neither actually requires Member States to achieve FCS for these habitats and species.

The Nature Restoration Law also includes targets for urban biodiversity, rivers and floodplains (including removing artificial barriers), pollinator populations, biodiversity in agricultural systems (including farmland bird populations), rewetting peatlands, and forest ecosystems (including forest bird populations).

It requires Member States to have in place a national plan for the restoration of biodiversity. The requirement for national plans for the restoration of biodiversity is set out in Article 14 of Regulation (EU) 2024/1991 and the required content is set out in Article 15. In essence, the national plans are for each Member State to prepare, setting out how they will meet the restoration targets and fulfil the obligations of the Nature Restoration Law. The plans must be based on preparatory research, be quantified, and be supported by maps, and include any derogations that the Member State intends to apply. The draft plan is to be submitted to the Commission by 1 September 2026. The draft plan will then be reviewed by the Commission and the final plan will be due six months later. In Ireland, this is referred to as Ireland's Nature Restoration Plan.

A.1.5 The Water Quality Directives

The EU has several Directives that pertain to water quality. For freshwater and coastal waters, these include the Water Framework Directive (WFD, Directive 2000/60/EC establishing a framework for the Community Action in the field of Water Policy) and its 'daughter' Directive, the EQSD (Directive 2008/105/EC on environmental quality standards in the field of water policy). For groundwater, they are the WFD and its second daughter directive, the Groundwater Directive (Directive 2006/118/EC on the protection of groundwater against pollution and deterioration). And for the seas, it is the Marine Strategy Framework Directive (MSFD, Directive 2008/56/EC establishing a framework for community action in the field of marine environmental policy).

The WFD and MSFD both have environmental protection objectives that pertain directly to ecology or biodiversity. For the WFD, Inland, transitional and coastal waters are required to, *inert alia*, have good ecological status, and all heavily modified water bodies are required to have good ecological potential. The measurement of ecological status includes the composition and abundance of aquatic flora and benthic invertebrate fauna, and the composition, abundance and age structure of fish fauna. Similarly, in the MFSD, all seas (the marine environment) are required to have good environmental status, which includes maintaining biodiversity, defined as '*the quality and occurrence of habitats and the distribution and abundance of species are in line [with natural conditions]*'.

A.1.6 The Environmental Liability Directive

The Environmental Liability Directive (ELD) seeks to achieve the prevention and remediation of environmental damage, specifically:

i. damage to the species protected under the Birds (Annex I and Article 4.2 ROMS) and Habitats Directives (Annexes II and IV (but not V));
ii. the habitats of these species and the habitats listed in the Habitats Directive (Annex I);
iii. any other habitats and species designated by Member States which it decides falls under the scope of environmental liability;
iv. water resources damage that significantly adversely affects the ecological, chemical and/or quantitative status and/or ecological potential; and
v. land contamination which presents a threat to human health.

It reinforces the objective of reaching or maintaining favourable conservation status (FCS) for the habitats and species listed in three of the Annexes of the Habitats Directive and extends this objective to the birds listed in Annex I of the Birds Directive and mentioned in Article 4.2 (ROMS). Damage to these habitats and species which has been expressly authorised by a derogation under the Habitats Directive (Article 6(4) for designated sites and Article 16 for protected species listed on Annex II, IV and V) or the Birds Directive for any wild bird species is not included. Such derogations ~~or consents~~ either must or should take account the need to reach or maintain FCS.

A.1.7 The Transposing Legislation

The Directives described above are, or will be, transposed into Irish law through numerous pieces of legislation. The most relevant amongst these is the Roads Acts 1993 to 2019, with the amendments provided by the European Union (Roads Act 1993) (Environmental Impact Assessment) (Amendment) Regulations 2019. The amendment brings the requirements of the 2014 amendments to the EIA Directive into the Roads Act and this is the Act under which EIAs pertaining to road developments are primarily done.

A.1.8 Domestic Legislation

Relevant domestic legislation which is not directly transposing legislation includes the Wildlife Act 1976, as amended, the Wildlife (Amendment) Act 2000, 2010, 2012, 2023, the Flora (Protection) Order 2022 and the Inland Fisheries Acts 1959 to 2017. Collectively, these provide strict protection for certain species of animals and plants listed in the Schedules (as added to by Regulations), including the nesting habitats of birds during the breeding season and the habitat of protected plants, and establish designated sites including nature reserves, wildlife refuges and Natural Heritage Areas (NHAs). The designated sites also receive strict protection, including from activities outside them which may nevertheless have an adverse effect on the integrity of the site (Wildlife Amendment Act 2000, Sections 15, 16 and 20). More recent amendments establish duties for the conservation and restoration of biodiversity and provide a statutory underpinning for the National Biodiversity Action Plan, however these are focused on the sites and species of European interest and do not directly address the conservation status of the animals and plants which are only listed on the Fifth Schedule of the Wildlife Act, as amended, or in the Flora Protection Order. The domestic legislation contains provisions, exemptions and derogations that may apply to road construction and maintenance by local authorities.

A.2 Policies pertaining to Biodiversity

A.2.1 National Biodiversity Policy

Much biodiversity policy in Ireland relates to compliance with the European Directives and Law set out above.

The first revision of the National Planning Framework (April 2025) includes five policies that pertain directly to biodiversity, see Appendix Box A.2-1.

Appendix Box A.2-1: First Revision NPF Policies on Biodiversity

National Policy Objective 84: In line with the National Biodiversity Action Plan and European Union Nature Restoration Law, and best available scientific information, regional and local planning authorities shall support the preparation and implementation of the National Restoration Plan.

National Policy Objective 85: In line with the National Biodiversity Action Plan; the conservation, enhancement, mitigation and restoration of biodiversity is to be supported by: (i) Integrating policies and objectives for the protection and restoration of biodiversity, including the principles of the mitigation hierarchy of - avoid, minimise, restore and offset - of potential biodiversity impacts, in statutory land-use plan[s]. (ii) Retention of existing habitats which are currently important for maintaining biodiversity (at local/regional/national/international levels), in the first instance, is preferable to replacement/restoration of habitats, in the interests of ensuring continuity of habitat provision and reduction of associated risks and costs.

National Policy Objective 86: In line with the objectives of the National Biodiversity Action Plan, planning authorities should seek to address no net loss of biodiversity within their plan making functions.

National Policy Objective 87: Enhance the conservation status and improve the management of protected areas and protected species by: (i) Implementing relevant EU Directives to protect Ireland's environment and wildlife and support the objectives of the National Biodiversity Action Plan; (ii) Developing and utilising licensing and consent systems to facilitate sustainable activities within Natura 2000 sites; (iii) Continued research, survey programmes and monitoring of habitats and species.

National Policy Objective 88: Facilitate the protection and restoration of biodiversity [including in European sites and the habitats and species for which they are selected] through the preparation of national guidance in relation to Planning and Biodiversity to (i) Plan and manage for integration of biodiversity protection and restoration in future planning and development; (ii) Ensure a consistent and strategic approach to biodiversity protection and restoration across planning authorities and administrative boundaries, and (iiI) Support the implementation of the National Biodiversity Action Plan (2023-2030) and the forthcoming National Restoration Plan.

As this revision is recent, these policies have not yet been incorporated into any land-use plans however many such plans already go further than the National Planning Framework.

A.2.2 Regional Spatial and Economic Strategies

There are three Regional Spatial and Economic Strategies RSES for Ireland. These all contain policies for the protection of biodiversity but vary, see Appendix Table A.2-1. Two include policies that support no net loss of biodiversity, one has a policy to improve the conservation status of (European?) protected species and habitats, and one has a policy to conserve, manage and where possible enhance all habitats and species of conservation interest.

Appendix Table A.2-1: Biodiversity Policies in the Regional & Economic Spatial Strategies

RSES	Biodiversity Policy
Northern & Western	**RPO 5.5:**…**no net contribution to biodiversity loss** arising from development supported in this strategy. Conserve and protect designated areas and natural heritage areas. Conserve and protect European sites and their integrity. **RPO 5.22:** To protect and conserve our designated peatlands and bogs for reasons of biodiversity, ecosystem services, carbon sinks, areas of habitat importance, amenity and landscape value.
Eastern & Midland	**RPO 7.16**: Support the implementation of the Habitats Directives in achieving an **improvement in the conservation status of protected species and habitats** in the Region and to ensure alignment between the core objectives of the EU Birds and Habitats Directives and local authority development plans. **RPO 7.17**: Facilitate cross boundary co-ordination between local authorities and the relevant agencies in the Region to provide clear governance arrangements and coordination mechanisms to support the development of ecological networks and enhanced connectivity between protected sites whilst also addressing the need for management of alien invasive species and the conservation of native species
Southern	**RPO 1:** Environmental Assessment a. Any reference to support for all plans, projects, activities and development in the RSES should be considered to refer to 'environmentally sustainable development' that has no adverse effects on the integrity of European sites **and no net loss of biodiversity,** that shall be subject to appropriate feasibility studies, best practice site/route selection (to consider environmental constraints such as landscape, cultural heritage, the protection of water quality, flood risks and biodiversity as a minimum), environmental assessment including EcIA to support development management and where required, the completion of statutory SEA, EIA and AA processes as appropriate b. The RSES seeks to protect, manage, and through enhanced ecological connectivity, improve the coherence of the Natura 2000 Network in the Southern Region. c. RSES support for other plans/ programmes (and initiatives arising) is on the basis of appropriate SEA, SFRA, EIA and AA processes being undertaken in order to ensure the avoidance of adverse effects on European Sites and ensure implementation of mitigation measures where required. d. Development Plans shall include an objective for the protection of European sites and Natural Heritage Areas (designated and notified proposed NHAs). **RPO 124:** It is an objective to promote the concept of connecting corridors for the movement of wildlife and encourage the retention and creation of features of biodiversity value, ecological corridors and networks that connect areas of high conservation value such as woodlands, hedgerows, earth banks, watercourses and wetlands. The RSES recognises the necessity of protecting such corridors and the necessity to encourage the management of features of the landscape that support the Natura 2000 network; **RPO 126**: Biodiversity a. Promote biodiversity protection and habitat connectivity both within protected areas and in the landscape through promoting the integration of green infrastructure and ecosystem services, including landscape, heritage, biodiversity and management of invasive and alien species in the preparation of statutory and non-statutory land-use plans. The RSES recognises the role of the National Biodiversity Data Centre through its Citizen Science initiatives; b. Support local authorities acting together with relevant stakeholders in implementing measures designed to identify, conserve and enhance the biodiversity of the Region; seek and support the implementation of the All-Ireland Pollinator Plan, National Biodiversity Action Plan and National Raised Bog SAC Management Plan; c. Local Authorities are required to carry out required screening of proposed projects and any draft land-use plan or amendment/ variation to any such plan for

RSES	Biodiversity Policy
	any potential ecological impact on areas designated or proposed for inclusion as Natura 2000/ European Sites and shall decide if an Appropriate Assessment is necessary, of the potential impacts of the project or plan on the conservation objectives of any Natura 2000/European Site; d. Support local authorities to carry out, monitor and review biodiversity plans throughout the Region. Planning authorities should set objectives in their land use plans to implement and monitor the actions as set out in the National and County Biodiversity Plans, as the conservation of biodiversity is an essential component of sustainable development. Local authorities should address the issue of fisheries protection and invasive introduced species and encourage the use of native species for landscape planting in rural areas, in the review of their biodiversity plans; e. Support local authorities to work with all stakeholders to **conserve, manage and where possible enhance** the Regions natural heritage including **all habitats, species,** landscapes and geological heritage **of conservation interest** and to promote increased understanding and awareness of the natural heritage of the Region.

A.2.3 County and City Development Plans

Building on the guidance set out in the now superseded Regional Planning Guidelines, local authorities have prepared development plans. These typically include polices for the protection of natural heritage, including protected sites, protected species, areas of biodiversity value, wetlands, woodlands and trees. New Development Plans will now be required to meet with the requirements of the National Planning Framework and the Regional Spatial and Economic Strategies, and these are in preparation.

A.2.4 TII Corporate Policy

TII's corporate policy on biodiversity is set out in its Biodiversity Plan. It contains a medium term objective to strive to achieve no net loss of biodiversity on all new projects by 2025, and a long term objective to strive to achieve a net gain for biodiversity on all new projects by 2030 [1].

Appendix B – Biodiversity Impact Assessment

B.1 Screening for EIA

Environmental Impact Assessment (EIA) screening determines whether the project is likely to have a significant effect on the environment and therefore whether an EIA is required. EIA screening is explained in the EC publication on this topic [28], the EPA guidelines for EIA Reports [29] and in detail for public roads and greenways in the TII Publication RE-ENV-07008 [32].

Under the Roads Acts 1993 to 2023, new motorways, busways, service areas and prescribed roads (see glossary) are considered to have likely significant effects on the environment and are automatically 'screened-in' for a statutory EIA. They do not require a screening assessment.

The construction or improvement of any other type of public road, Greenway or Active Travel Project that is likely to have a significant effect on the environment must also be subject to an EIA, see TII publication RE-ENV-07008 [32]. The screening decision includes consideration of effects on European sites, statutory nature reserves, statutory refuges and Natural Heritage Areas, and the other criteria set out in Annex III of the EIA Directive. EIA screening is a statutory process which is completed by the relevant public authority.

The EIA screening assessment is likely to be undertaken once a Preferred Option has been selected (at the start of Phase 3) so there should be an understanding of the nature of the project, its activities and potential impacts and the baseline conditions, including the location of statutory designated sites.

If an EIA screening assessment is required, the Project Manager or biodiversity practitioner shall provide the relevant public authority with the information it may require. In accordance with Annex III of the EIA Directive, the information shall include:

- the potential effects of the project on:
  - biodiversity, with particular attention to the species and habitats protected under the Birds and Habitats Directives;
  - wetlands, riparian areas, river mouths;
  - coastal zones and the marine environment;
  - mountain and forest areas;
  - nature reserves and parks;
  - areas classified or protected under national legislation (e.g. Natural Heritage Areas and statutory wildlife refuges);
  - Natura 2000 [European] sites (designated under the Birds and Habitats Directives);
  - areas in which there has already been a failure to meet the environmental quality standards.
- whether there are likely significant effects on biodiversity arising from the project;
- the characteristics of the impacts; and
- the mitigation measures that could be employed to avoid likely significant effects on biodiversity.

The information shall be set out in a Screening for Environmental Impact Assessment Report.

TII Publication RE-ENV-07008 [28] explains how the outcome of EIA screening determines the consenting process.

B.2 Scoping for EIA

EIA scoping determines which aspects of the environment are likely to be significantly affected by the project and therefore which topics are to be included in the EIA. For those topics to be included, the level of detail to be provided in the EIA Report (EIA Report) is also determined.

EIA scoping is explained in the EC publication on this topic [30], the EPA guidelines for EIA Reports [29] and in outline for public roads and greenways in the TII Publication RE-ENV-07008 [32]. The latter distinguishes between the formal, statutory process in which An Coimisiún Pleanála provides its opinion on the content of the EIA, and the informal, non-statutory process carried out by the developer, involving consultation with relevant stakeholders and the opinion of its environmental consultants.

EIA scoping (whether formal or informal) is likely to occur when there is a Preferred Option so whether there are likely significant effects on biodiversity and the required scope of the assessment should be well understood.

When a formal EIA scoping opinion is sought, the Project Manager or biodiversity practitioner shall provide An Coimisiún Pleanála with the background information it may require, including an opinion on whether there are likely significant effects on biodiversity and on the methods and features to be included in the final assessment presented in the EIA Report. This information shall be presented in a chapter in an EIA Scoping Report and based on the process described Section B.3.

Any formal scoping opinion obtained from An Coimisiún Pleanála may be at a high-level but should identify whether effects on biodiversity should be described within the EIA Report, and the range of ecological features and types of impacts to be described in the assessment. It may indicate the requirements for ecological surveys and data collection. A formal scoping opinion is not binding on An Coimisiún Pleanála and it may request further information following its review of the submitted EIA Report.

If a formal scoping opinion is not sought, the results of informal EIA scoping can also be presented in an EIA Scoping Report, setting out the methods and features to be included in the final assessment presented in the EIA Report. If so, the Project Manager or biodiversity practitioner shall prepare a chapter on biodiversity based on the process described Section B.3.

B.3 Scoping for Biodiversity Impact Assessment

The purpose of scoping for Biodiversity Impact Assessment (BIA) is to determine what aspects of biodiversity should be included in the next part of the assessment process, culminating in the biodiversity chapter of the EIA Report or standalone BIA Report.

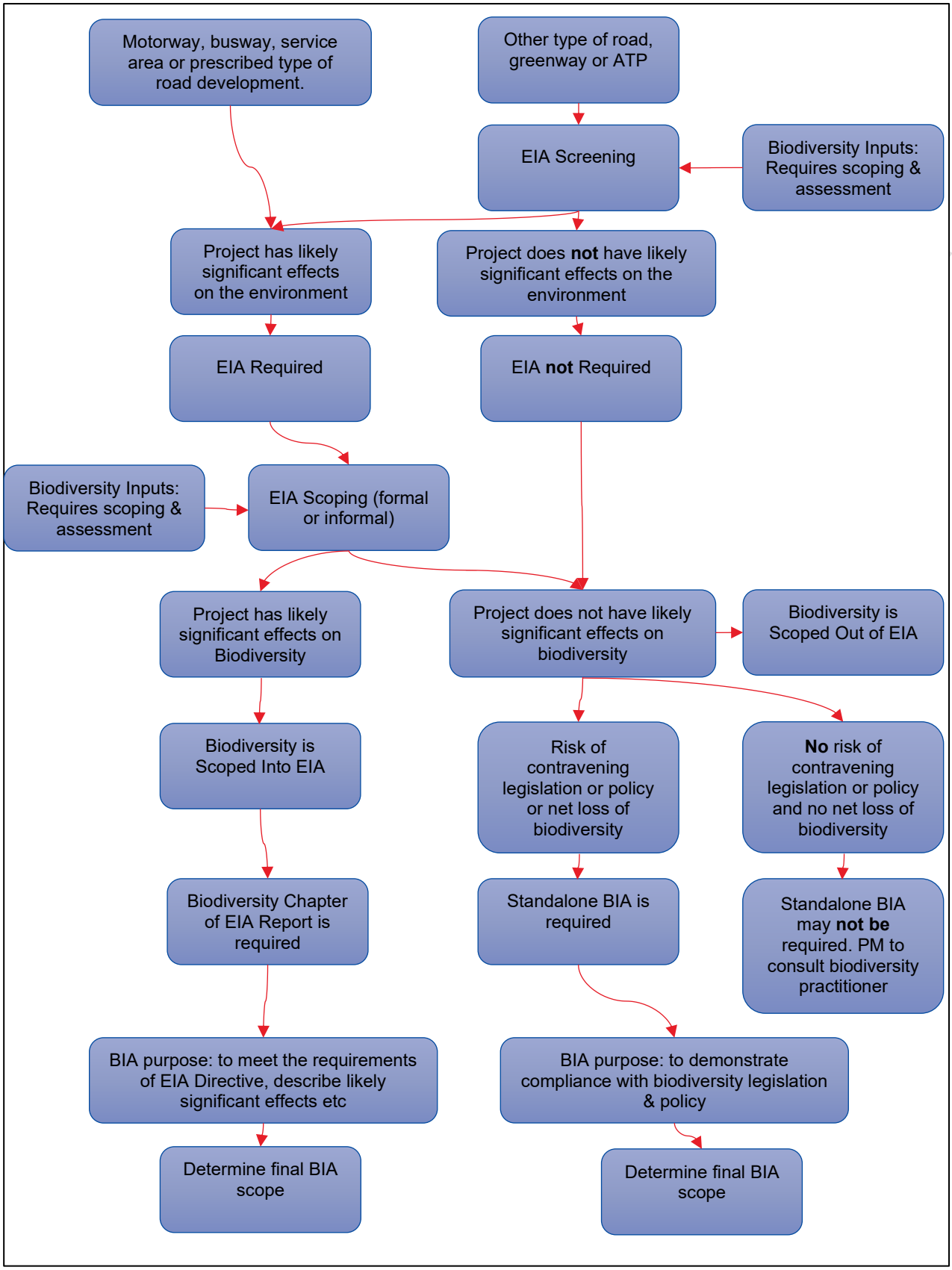
The scope of the biodiversity inputs must be determined for each Project Phase and Stage that includes a BIA (see Figure 3-2), including prior to providing inputs to EIA Screening and Scoping Reports.

The purpose of the final BIA is dependent on whether it is part of an EIA. If it is part of an EIA, then its principal purpose is meet the requirements of the EIA Directive including describing the likely significant effects on biodiversity. If it is not part of an EIA, then its principal purpose is to demonstrate compliance with relevant legislation, policy, plans and Standards. The purpose informs the scope of the BIA. See Appendix Figure B.2-1.

If a formal EIA scoping opinion has been obtained, this must inform the scope of the final BIA presented in the EIA Report.

In practice, the steps described for scoping from B.3.2 to B.3.12 are iterative and/or occur concurrently.

Appendix Figure B.2-1: Effect of EIA Screening and Scoping on the purpose and scope of the BIA



B.3.1 Understanding the Project and its Potential Impacts

For scoping, an understanding of the nature of the Option or project is required, as appropriate to the Project Phase and Stage. It could include start and end points, land take (amount), intended use (motorway, greenway etc), whether new or an upgrade to existing infrastructure, and traffic volumes. From this, the types of activities and their impacts on biodiversity should be predicted, considering site investigation, construction, operation (and maintenance) and, if relevant, decommissioning. Types of impacts are listed in Table 2-1. The Project Manager shall provide this information to the biodiversity practitioner.

B.3.2 Preliminary Biodiversity Baseline

Similarly, an understanding of the biodiversity baseline is required for scoping the next stages of assessment. For early Phases, this is likely to comprise information on designated sites, a review of aerial imagery and the known range of protected species. This information is then added to as the project progresses, with that gathered so far informing the scope of data gathering for the next Phase or Stage. The biodiversity practitioner shall review and, if necessary, update the biodiversity baseline as set out in the Standard for each Phase and Stage.

B.3.3 Establishing a 'Zone(s) of Influence' for the Project

The next step is to define an appropriate 'Zone(s) of Influence' (ZoI) [3]. For EIA projects, it must encompass the full extent of all Important Ecological Features (IEFs, see Section B.5.2.3) which may be significantly affected by the Option/proposed project, including cumulatively with other projects, and the biodiversity within and around the relevant area (be that the Constraints/Options Study Area, an Option or the proposed project site). For non-EIA projects, it must encompass the features with legal and policy protection that could be adversely affected by the project.

The ZoI will vary according to the project Phase, the likely extent of the project's effects, and the biodiversity and IEFs being considered. It may start out as simple buffer(s) of a set distance around the relevant area, based on a worse-case scenario. However, effects beyond this distance must not be discounted and the ZoI should be refined as the understanding of the baseline environment improves and the project design progresses. The ZoI must eventually include:

- The land within the Constraints/Options Study Area (Phase 1 and Phase 2 Stage 1) or the potential land take for the Option/proposed project (Phase 2 Stages 2 and 3 and Phase 3).
- The areas likely to experience increased noise, visual intrusion, light, dust, nitrogen deposition and/or elevated air pollution because of the Option/proposed project.
- The area likely to experience changes in ground and surface water quantity around the Option/proposed project.
- Ecological networks which may connect to the Constraints/Options Study Area, Option or proposed project site, or which will do so under any state or local authority restoration plan.
- Sites or habitats which could be isolated or fragmented by the Option/proposed project.
- Watercourses that could be bisected by the Option/proposed project, or may otherwise be affected, including upstream and downstream of the project location as far as effects may occur.

- Potential groundwater dependent terrestrial ecosystems (GWDTE) in the same ground waterbody as the Option/proposed project.
- Sites (including those in other countries) used by regularly occurring migratory and mobile species that may visit (or have visited in the recent past) the Option/proposed project site or nearby.
- Sites, habitats and species populations which are supported (by exchanging individuals, for example) by those that could be affected by the Option/proposed project.
- The home range or territory of mobile species that could be affected by the Option/proposed project.
- The area occupied by a defined species (sub-)population that could be affected by the Option/proposed project.
- Sites which may be subject to increased recreational pressure because of the Option/proposed project.
- Sites in proximity to the main transport routes for construction materials and workers, when this is known or can be assumed.

It may be appropriate to identify a series of ZoI for different features and types of impact. The Source-Pathway-Receptor (SPR) model should be used to define the ZoI [38].

Collaboration with other practitioners is required to determine the extent of the ZoI and to ensure that other practitioners include the relevant ecological features in their assessments. Given the consideration of migratory and mobile species, recreation and transport routes, some sites included in the ZoI may be distant from the Constraints/Options Study Area, Option or proposed project. Therefore, the ZoI may not be continuous. Additional guidance on establishing the ZoI is provided by CIEEM [3].

After Phase 1, the amount of detail/data required to inform the assessment is likely to vary across the ZoI, depending on (i) the project Phase, (ii) proximity to the Constraints/Options Study Area, Option or proposed project and (iii) the sensitivity of the feature.

B.3.4 Features to be Included/Excluded

Ecological features (see Section B.5.2.2) that will not be affected by the Options/proposed project (including cumulatively with other projects) should be scoped out of the next stage of the assessment. This should be determined using the SPR model. If there is no pathway for impact or the feature (receptor) is not sensitive to any adverse indirect impacts arising from the Options/proposed project, then the feature should be scoped out of the next stage of the assessment. The potential to mitigate impacts should not be considered when scoping out features from further assessment.

All other features shall be scoped into the next stage of the assessment (regardless of legal protection, importance or assigned value).

IEFs that may be significantly affected by the Options/proposed project (including cumulatively with other projects) shall be subject to detailed assessment (as appropriate to the Phase/Stage of the project). In accordance with the requirement to assess the effects on biodiversity, all other ecological features that may be adversely affected by the Option/proposed project must be scoped into the assessment but do not require assessment in detail [44] [81].

B.3.5 Legislation and Policy Review

As part of scoping, the biodiversity practitioner shall identify and review the relevant legislation, policies, plans and Standards, and collate the relevant requirements, see Appendix A.

B.3.6 Environmental Protection Objectives & Significance Criteria

This section applies to EIA projects only.

Within the legislation and policy, including TII policy, are objectives for the protection and restoration of the environment, including biodiversity and specific ecological features, see Appendix A. As these objectives come from a variety of sources and authorities, the objectives are expressed differently and have different weight. In addition, some designated sites have specific conservation objectives. In this SD, these are referred to collectively as Environmental Protection Objectives (EPOs).

Examples of EPOs include:

- To protect and restore biodiversity (NPF).
- To achieve or maintain favourable conservation status for the habitats listed on Annex I of the Habitats Directive and the animals and plants listed on Annex II, IV and V of the Habitats Directive (HD, NRL).
- To achieve Good ecological status for all Natural Surface Waters (WFD).
- Increase the populations of farmland birds, as measured by the Common Farmland Bird Index, by 15% by 2050 (NRL)
- Restore, including by rewetting, a quantity of drained peatlands, including agricultural land, peat extraction sites and other areas (NRL).
- All old growth forests are to be protected (NRL).

The EPOs provide benchmarks against which the significance of effects on biodiversity and IEFs can be judged (see B.7.4).

As part of scoping, the biodiversity practitioner shall identify the relevant EPOs for biodiversity and the ecological features that are scoped into the assessment and develop these into the criteria to determine whether an effect is significant.

It is important to note that (i) the EPO is the objective of the law or policy, which may not the same as a legal or policy requirement, and (ii) that assessing a project's effects against the EPOs does not necessarily determine legal or policy compliance.

B.3.7 Sources and Proposed Methods

As part of scoping, the biodiversity practitioner shall identify the sources of existing data and the proposed methods for data gathering and assessment, see Appendix Table B.5-1: and Appendix Table B.5-2.

B.3.8 Information Required to Inform the Assessment

In addition to gathering data on biodiversity and ecological features, the biodiversity practitioner shall identify the other information required to inform the BIA. These may include information on changes

in air quality, climate change, water quality and quantity, noise, light, resource use and transport model and predictions of use. Liaison with other topic specialists will be required, see Appendix C.

B.3.9 Gather Baseline Data

Scoping includes gathering baseline data within the ZoI in the form of an ecological desk study (see Section B.5.1.1) and, from Phase 2 Stage 2 onwards, habitat mapping and potentially a habitat or multidisciplinary walkover survey (see Sections B.5.1.2 and B.5.1.3). The results inform the next stage of the assessment including the requirements for further surveys. Further guidance on ecological desk studies and habitat surveys is provided by CIEEM for Preliminary Ecology Appraisals [62] and guidance on the multidisciplinary walkover surveys and triggers for carrying out further surveys is provided in NRA ecological survey guidance [5]. The Project Manager (Phase 1 and Phase 2 Stage 1 only) or biodiversity practitioner shall gather or update the baseline data required to scope the next stage of the assessment and the requirements for further surveys.

B.3.10 Identify other Projects

As described in Sections B.5.2.11 and B.7.1.3, other projects which have, are or will affect the same ecological features as the Option/proposed project need to identified and included in the description of the baseline conditions and/or the cumulative impact assessment. These should not be limited by a set distance. As part of scoping and in consultation with other topic practitioners and the EIA co-ordination team, the biodiversity practitioner shall prepare a list of projects to be considered in the next stage of the assessment.

B.3.11 Opportunities for Avoiding Significant and/or Non-compliant Effects

During scoping, the biodiversity practitioner shall identify potential opportunities for avoiding significant and/or non-compliant effects, and the opportunities for mitigation, enhancement and compensation which could be included in the Option/proposed project, see Section B.13.

B.3.12 Consult with relevant Stakeholders

As part of scoping, consultation with stakeholders shall be undertaken to inform the next stage of the assessment, as described in Section 2.8.

B.3.13 Scoping Outputs

The points in the process when scoping for an impact assessment is undertaken and the outputs are set out in Appendix Table B.2-1.

Appendix Table B.2-1: Scoping at each Phase and Stage

Which Phase/Stage?	When is it done?	Where is it reported?
Phase 1	Prior to the Feasibility Assessment of the selected Strategic Options.	No formal output, it is used to scope the Constraints, Risks & Opportunities Study and the Feasibility Report.
Phase 2 Stage 1	Prior to the High-Level MCA of each long-list Preliminary Option.	No formal output, it is used to scope the High-Level MCA and the Stage 1 summary.
Phase 2 Stage 2	Prior to the BIA of each short-listed Preliminary Option.	No formal output, it is used to scope the BIA and the Stage 2 summary.
Phase 2 Stage 3	Prior to the BIA of the Preferred Option.	No formal output, it is used to inform any amendments to the BIA and the Stage 3 summary.
Phase 3	Prior to the preparation of the Screening Report, if done.	No formal output, it is used to inform the scope of the EIA Screening Report.
	Prior to and during the preparation of the Scoping Report.	In the Scoping Report.
	During the preparation of the EIA Report to confirm or revise the features that are likely to be significantly affected by the project.	In the EIA Report.
	During the preparation of the standalone BIA Report to confirm or revise the features that are at risk of non-compliant effects.	In the standalone BIA Report.

The outputs of scoping [3] at any Phase/Stage shall include:

- The Zone(s) of Influence.
- The identification of the impacts to be addressed through Option selection or design amendments, or assessed in the final BIA.
- A summary of the biodiversity and a list of the ecological features to be given consideration in the next stage of the assessment.
- A list (or description) of the studies and surveys etc. to be undertaken to provide the necessary data to inform the next stage of the assessment, including sources, methods and timing.

- A list of relevant ecological features that will not be given detailed consideration in next stage of the assessment and a justification for their exclusion.
- Any opinion obtained from consultees and stakeholders on the scope of the assessment.

Reporting for EIA Projects

If an EIA Scoping Report is prepared at Phase 3, the biodiversity section shall include:

- A summary of the current baseline conditions (avoiding excessive technical detail).
- The approach to describing the evolution of the baseline.
- The types of activities and impacts to be considered.
- The anticipated Zone(s) of Influence and the area subject to baseline studies.
- The methods to be used to gather baseline data, including sources of data, season, timing, and number of survey visits.
- The approach to selecting ecological features to be included in the assessment and a provisional list of those to be included and excluded, with justifications.
- A list of the relevant legislation, policy, plans and Standards.
- The identified EPOs, the criteria for significant effects, and the impact assessment methodology.
- The approach to assessing cumulative effects and a provisional list of the main projects to be included.
- An outline of possible avoidance, mitigation, compensation and monitoring measures.
- A list of organisations to be consulted.
- Any opinion obtained from consultees and stakeholders on the scope of the assessment prior to completing the EIA Scoping Report.
- A list of supporting documents and assessments.
- If an AA is required, the intended approach to co-ordinate the two assessments and reduce duplication.
- A statement on whether significant effects on biodiversity are anticipated and the need to include this topic in the EIA Report.

The biodiversity practitioner should also contribute to other chapters of the EIA Scoping Report including the assessment of alternatives, cumulative effects, the use of resources and the risks posed by major accidents and disasters.

Reporting for Non-EIA Projects

It is good practice to prepare a scoping report for biodiversity for non-EIA projects before preparing the standalone BIA at Phase 3. If done, this shall include

- A summary of the current baseline conditions (avoiding excessive technical detail).
- The types of activities and impacts to be considered.
- The anticipated Zone(s) of Influence and the area subject to baseline studies.

- The methods to be used to gather baseline data, including sources of data, season, timing, and number of survey visits.
- The approach to selecting ecological features to be included in the assessment and a provisional list of those to be included and excluded, with justifications.
- A list of the relevant legislation, policy, plans and Standards.
- An outline of possible avoidance, mitigation, compensation and monitoring measures.
- A list of organisations to be consulted.
- Any opinion obtained from consultees and stakeholders on the scope of the assessment.
- A list of supporting documents and assessments.
- If an AA is required, the intended approach to co-ordinate the two assessments and reduce duplication.

All Projects

Importantly, the scope set out in the reports referred to above may not be the final scope of the assessment, which will continue to evolve as baseline data is collected and the project design advances. However, it must be based on any scoping opinion issued by the competent authority. A scoping report can also be used to set out the intended approach to data gathering and assessments under the Habitats Directive (AA Screening and AA) and to seek stakeholder feedback.

B.4 Define the Proposed Project

B.4.1 Define the Project and Activities

At each Project Phase/Stage, the Project Manager shall define and describe the Options or project to be assessed. In addition to the EIA Screening and Scoping Reports (if done), a formal Options/project description is provided in:

- Section 3 of the Feasibility Report.
- Sections 3 and 7 of the Options Report.
- A chapter of the EIA Report (if done).
- A section in a standalone BIA Report (if done).
- An AA Screening Report.
- A Natura Impact Statement (if done).

The description should be accurate and appropriate to the Phase/Stage of the project. The description shall include permanent and temporary works (including sites compounds and laydown areas), and include the site investigation, construction, operation (and maintenance) and, if relevant, decommissioning activities. The (likely) transport routes for construction activity should also be identified. The treatment of avoidance and mitigation measures in the definition of the project is explained in Section 4.4.9 and Appendix B, Section B.13.1. The treatment of compensation measures is explained in Section 4.4.12 and Appendix B, Section B.13.2.

The biodiversity practitioner shall review the description and request any additional information that is required for the BIA. The definition may evolve as the project design advances; the biodiversity practitioner should be proactive and make sure that the BIA is based on an up-to-date definition. The biodiversity practitioner shall refer to the description when determining the likely significant and/or non-compliant effects of the project.

B.4.2 Quantify Environmental Changes

From Phase 2 Stage 2 onwards, the Project Manager and topic practitioners shall quantify the environmental changes arising from the Option/proposed project. The biodiversity practitioner shall request quantified information on:

- The direct land take for permanent and temporary infrastructure.
- Quantity of emissions to air and the likely quantity and extent of deposition of air pollutants, including dust.
- Locations of discharges of surface water, and the type and quantity of waterborne pollutants.
- The change in noise and light levels arising from the Option/proposed project and the areas of land that will be subject to increases.
- The change in ground and surface water flows, and which areas will become wetter or drier and by how much.
- Any other likely environmental changes arising from the Option/proposed project, directly or indirectly, including changes in recreational activity.

The above applies to all permanent and temporary works, including the site investigation, construction, operation (and maintenance) and, if relevant, decommissioning activities, including transport routes. See Appendix C. This information shall inform the BIA.

B.4.3 Identify the use of Resources

This section applies to EIA projects only.

From Phase 2 Stage 2 onwards, the Project Manager and environmental team shall determine the likely use of resources (type and quantity) by the Option/proposed project, including natural resources (such as water, land, minerals, aggregates, soil, timber and biodiversity), other raw materials and energy during construction and operation of the Option/project [30] [31]. The information shall be provided to the relevant topic practitioners.

B.4.4 Determine potential for Major Accidents, Disasters, and Accidental Spills

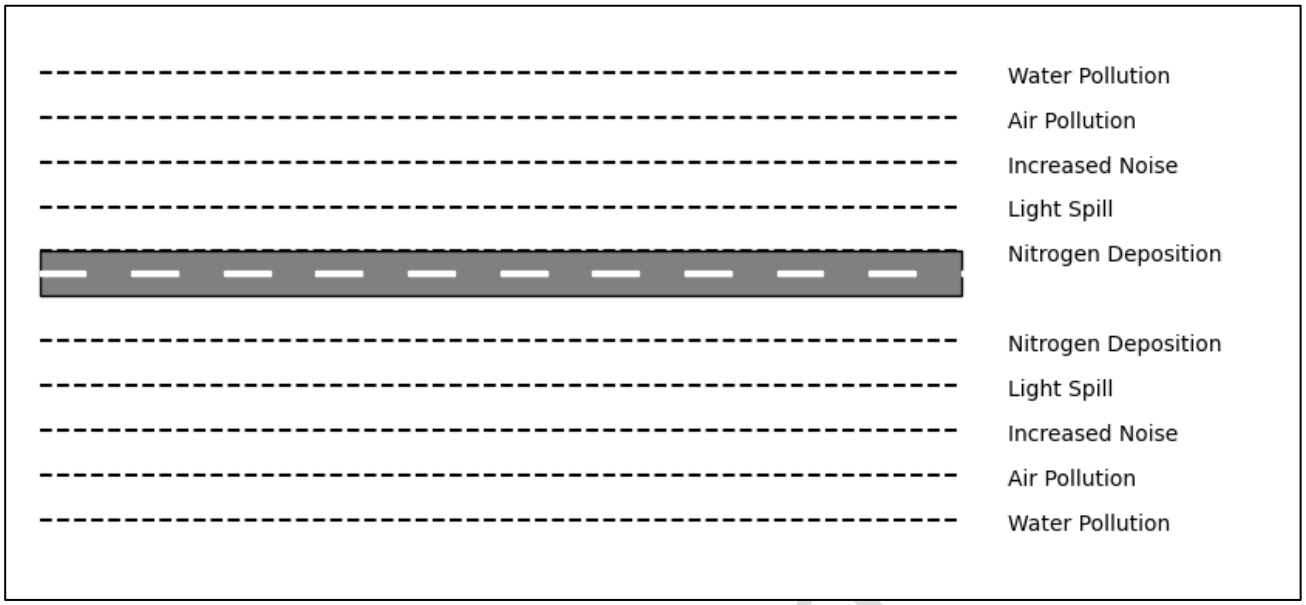
This section applies to EIA projects only.

From Phase 2 Stage 2 onwards, the Project Manager and the environmental team shall determine the potential of the project to cause major accidents, accidental spills and unintended suspended solid pollution of watercourses, and the vulnerability of the project to major accidents and disasters, such as flooding, wildfire and coastal erosion [30] [31]. The information shall be provided to the relevant topic practitioners in the form of scenarios.

B.4.5 Determine the Zones of Influence(s) for each impact type.

From Phase 2 Stage 2 onwards, the biodiversity practitioner and environmental team shall determine the areas around the Option/proposed project which will or could experience environmental changes that could affect biodiversity, see selected examples in Appendix Figure B.4-1. They should consider the information about the project (Sections B.4.1 and B.4.4), the types of impacts arising from transport projects (see Table 2-1), the guidance provided in Section B.3.3 and any scoping opinion.

Appendix Figure B.4-1: Schematic Diagram of selected Zone(s) of Influence for a Road



B.5 Describing the Baseline Conditions

B.5.1 Data Gathering

B.5.1.1 Ecological Desk Study

The Project Manager (Phase 1 and Phase 2 Stage 1 only) or biodiversity practitioner shall undertake an ecological desk study at:

- The start of Phase 1, which is reviewed and if necessary updated at Phase 2, Stage 1.
- The start of Phase 2 Stage 2 which is reviewed and if necessary updated at the start of Phase 3, EIA Screening and Scoping or scoping for a non-EIA project.
- Phase 3, as part of baseline data gathering to inform the final BIA or biodiversity chapter in the EIA Report.

The level of detail and extent of the desk study at each Phase/Stage is stated in the Section 4. The relevant guidance on undertaking ecological desk studies provided by CIEEM [62] should be followed. The CIEEM guidance refers to priority habitats and species[2] which are most relevant to the UK. In Ireland, the equivalents for the purpose of the desk study are the habitats referred to in the relevant development plan(s) and the protected and threatened species defined by the NPWS (see [49] and any updated red lists). The irreplaceable habitats and habitats of very high and high distinctiveness (see Appendix D) may also be treated as though they are priority habitats for the purpose of data

[2] Note that this is not the same as the priority habitats and species identified in the Annexes of the Habitats Directive.

gathering. A non-exhaustive list of data sources is provided in Appendix Table B.5-1. The source of any data should be stated in the relevant report.

Appendix Table B.5-1: Key Online Data Sources

Topic	Source
Existing projects	National Planning Application Map Viewer [82] An Coimisiún Pleanála Map Search [83] Local Planning Authority [84]
Natura 2000	Natura 2000 Network Viewer [85]
SPAs, SACs, NHAs, pNHAs	National Parks & Wildlife Service Designated Sites Viewer [86] with links to Site Synopses
Ramsar sites	Irish Ramsar Wetlands Committee [87]
Nature Reserves	Geohive maps –nature reserve layer must be enabled [88]
Habitats	Tailte Éireann and EPA's National Land Cover Map 2023 [89] The Status of EU Protected Habitats and Species in Ireland mapping – Annex I Habitats [90] Wetland Survey Ireland/Foss Environmental wetland habitat viewer [91]
Hedgerows	National Hedgerow Database or county dataset available from Hedgerows Ireland [52] or county council website.
Flora Protection Order Plants	National Parks & Wildlife Service dataset [92] FPO Bryophytes [93]
Invasive Species	National Biodiversity Maps [94] TII's dataset on Invasive Alien Plant Species (IAPS), which is available on request. Refer also TII's standard and technical documents on the management of IAPS [6] [95].
Species	National Biodiversity Data Centre Datasets (records) [96] National Parks & Wildlife Service datasets [97] The Status of EU Protected Habitats and Species in Ireland mapping [98]
Bats	Bat Conservation Ireland (records) [99] National Biodiversity Data Centre Datasets (records) [96]
Birds	Article 12 (Birds Directive) [100] Irish Wetland Bird Survey [101]
Fish	Fish monitoring reports for the Water Framework Directive [55] [102]

Topic	Source
Invertebrates	National Biodiversity Data Centre Datasets (records) [96] Freshwater Pearl Mussel - National Biodiversity Maps [103]
Reptiles and Amphibians	Reptiles and Amphibians of Ireland [104] Newts- National Biodiversity Maps [105]
Marine	The Marine Institute Data Catalogue – enable relative filters under 'Organisations' [106] Marine Irish Digital Atlas [107]
Soils	Environmental Protection Agency Maps – Soil layer must be enabled in the layer ribbon [54] GeoHive Maps [108] Teagasc Soil Map [109]
Geology	Geological Survey of Ireland [110]
Caves	Cave Database for the Republic of Ireland [111]
Water quality	Environmental Protection Agency maps – Water quality layer must be enabled in the layer ribbon under 'Water' [54]
River water quality	Environmental Protection Agency Maps – River water layers must be enabled in the layer ribbon under 'Water' [54]
River catchments	Environmental Protection Agency Maps – River catchments layers must be enabled in the layer ribbon under 'Water' [54]
Surface water	Environmental Protection Agency Maps – Lake/Flow Network layers must be enabled in the layer ribbon under 'Water' [54]
Groundwater bodies	Environmental Protection Agency Maps – Groundwater layers must be enabled in the layer ribbon under 'Water' [54]
Historic mapping and imagery	Irish Townland and Historical Maps – enable relative basemap in 'Basemap Gallery' [112]
Satellite Maps and Images	Google Earth [113] Google Maps [114]
Heritage (for potential bat roosts)	National Monuments Service [115] Historic Environment Viewer [116] National Inventory of Architectural Heritage [117] Heritage Council – enable relative layers in the 'Layer List' [118]

Data can also be obtained from organisations directly, such as the NPWS and Birdwatch Ireland, and extracted from EIA Reports undertaken for other projects in the same locality (agreement between the parties may be required if relying on this data).

B.5.1.2 Habitat Mapping and Surveys

The Project Manager (Phase 1 and Phase 2 Stage 1 only) or biodiversity practitioner shall co-ordinate habitat mapping and/or surveys at various points in the process, as follows:

- Habitat mapping and targeted habitat surveys may be undertaken at Phase 1 and at Phase 2 Stage 1.
- Habitat mapping is undertaken at Phase 2 Stage 2 and for some types of projects a habitat survey is also undertaken at this Stage.
- For all projects requiring a BIA, a habitat survey is undertaken at Phase 3.

The requirements for habitat mapping and surveys, including for hedgerows and watercourses, is explained in the Section 4. The survey method for habitats and hedgerows is provided by the Heritage Council [42] [53] and, for watercourses, the survey method is the River Habitat Survey [56] and/or the River Hydromorphology Assessment Technique (RHAT) [57]. At Phase 3, the data collected during the habitat surveys shall be suitable for the purpose of completing the BIA and shall also be suitable for use in the TII Full Biodiversity Metric Toolkit and include condition assessments of the habitats (as described in the TII BM User Guide (GE-ENV-01112)). The condition assessments shall be undertaken between April and September inclusive and should be undertaken at the optimum time of year for the habitat type(s) being assessed.

B.5.1.3 Protected Species Walkover Surveys

The biodiversity practitioner shall co-ordinate a protected species walkover survey, alongside, or in addition to, any habitat survey at Phase 2 Stage 2 and at Phase 3. The objectives of this survey are to:

- Gather some baseline data on protected and threatened species including badger setts, potential bat roosts and potential habitat features for the full range of other protected and threatened species.
- Inform the requirement for more detailed species surveys based on the presence of suitable habitats; it is therefore a key part of scoping.

The combination of habitat survey, hedgerow survey, watercourse survey and protected species walkover survey is referred to in Ireland as a ‘multi-disciplinary walkover survey’. The method for this survey is provided by TII [5]. The multi-disciplinary walkover survey is not a substitute for surveys which require specialist techniques, multiple survey visits or surveys in certain seasons.

B.5.1.4 Vegetation and Species Surveys

Vegetation and species surveys may be required at Phase 2 Stage 2 and will usually be required at Phase 3. At Phase 3, surveys for legally controlled and invasive alien species may also be required in accordance with TII guidance [6] [95]. Surveys for deer may be required for new road projects to assess the risk of deer vehicle collision.

As part of scoping, the biodiversity practitioner shall determine the need for vegetation (including fungi [119] [120], lichens [119] and bryophytes) and species surveys in accordance with:

- the NRA survey guidance [5];
- the requirement to identify, describe and quantify significant effects and/or determine compliance with relevant legislation, policy and plans;
- The requirements of other TII Standards, Technical Documents and Guidelines; and
- Any scoping opinion received.

When available, the published best practice guidelines set minimum standards for surveys. Field surveys should generally follow these, adjusted as necessary to meet the requirements set out above and any scoping opinion. A non-exhaustive list of survey guidance is provided in Appendix Table B.5-2.

The biodiversity practitioner shall co-ordinate the surveys in accordance with the above. A survey programme shall be agreed with the Project Manager.

Appendix Table B.5-2: Survey Guidelines and Methods

Survey Topic	Key References
Amphibians, Common Frog	Pg 83 of Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes [5] National Frog Survey of Ireland 2010/11 [121] Herpetofauna Workers' Manual [122]
Amphibians, Smooth Newt	Pg 80 of Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes [5] IWT National Smooth Newt Survey 2013 report [123] Herpetofauna Workers' Manual [122]
Birds, Barn Owl	Barn Owl Surveying Standards for National Road Projects [8] Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment [124] Raptors: A field guide for surveys and monitoring (3rd Edition) [125]
Birds, Barnacle Goose	Bird Monitoring Methods: A Manual of Techniques for UK Key Species [126] Low tide waterbird surveys: survey methods and guidance notes [127]
Birds, General	Common Bird Census CBC [128] Acoustic Bird Survey [129] Passive Audio Recording [130]
Birds, Greenland White-fronted Goose	Bird Monitoring Methods: A Manual of Techniques for UK Key Species [126] Low tide waterbird surveys: survey methods and guidance notes [127]
Birds, Greylag Goose	Bird Monitoring Methods: A Manual of Techniques for UK Key Species [126] Low tide waterbird surveys: survey methods and guidance notes [127]
Birds, Hen Harrier	Survey Guide: Hen Harrier Roost Types and Guidelines to Roost Watching [131] Raptors: A field guide for surveys and monitoring (3rd Edition) [33] Pg 107 Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes [5]
Birds, Kingfisher	Assessment of the distribution and abundance of Kingfisher *Alcedo atthis* and other riparian birds on two SAC river systems in Ireland [132]

Survey Topic	Key References
Birds, Lowland Waders	Changes in the status of waders breeding on wet lowland grassland in England and Wales between 1982 and 1989 [133]
Birds, Nocturnal Surveys	Nocturnal Bird Surveys [134]
Birds, Raptors	Raptors: A field guide for surveys and monitoring (3rd Edition) [125]
Birds, Red Grouse	The status of Red Grouse in Ireland and the effects of land use, habitat and habitat quality on their distribution [135]
Birds, Upland Waders	A method for censusing upland breeding waders [136]
Birds, Wetland Birds	Irish Wetland Bird Survey (I-Webs) [137]
Birds, Whooper swan	Bird Monitoring Methods: A Manual of Techniques for UK Key Species [126] Low tide waterbird surveys: survey methods and guidance notes [127]
Birds, Wintering Bird Surveys	Non-Breeding Bird Survey Methodology [138]
Birds, Woodcock	Breeding Woodcock Survey [139]
Fish, Freshwater	Pg 59 of Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes [5] Sampling Fish for the Water Framework Directive: Summary Report [140]
Fungi	Feest, A. (1999). A Practical Methodology for surveying the Macrofungus flora, Species diversity and Species richness of a site. *Journal of Practical Ecology and Conservation*, *3*, 23-32. Detheridge, A.P. and Griffith, G.W., 2021. Standards, methodology and protocols for sampling and identification of grassland fungus species. Natural England Commissioned Reports, Number NECR374. [120] Hill, D. A. (Ed.). (2005). Handbook of biodiversity methods: survey, evaluation and monitoring. Cambridge University Press. [119]
Habitats, Uplands	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland Version 2.0 [141]
Habitats, General	A Guide to Habitats in Ireland, 2007 reprint. [50] Best Practice Guidance for Habitat Survey and Mapping [51]
Habitats, Grasslands	The Irish Semi-natural Grasslands Survey 2007-2012 [142] The Monitoring and Assessment of Three EU Habitats Directive Annex I Grassland Habitats [143]
Habitats, Hedgerows	Hedgerow Appraisal System: Best Practise Guidance on Hedgerow Surveying, Data Collation and Appraisal [53]
Habitats, Woodland	A provisional inventory of ancient and long-established woodland in Ireland [144]

Survey Topic	Key References
Invertebrates, Aquatic	River Monitoring – Aquatic Invertebrates [145] Pg 46 of Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes
Invertebrates, Freshwater Pearl Mussel	*Margaritifera margaritifera* Stage 1 and Stage 2 Survey Guidelines [146] Monitoring Populations of the Freshwater Pearl Mussel, *Margaritifera margaritifera*, Stage 3 and Stage 4 Survey [147] Pg 49 of Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes [5]
Invertebrates, Kerry Slug	Threat Response Plan. Kerry Slug *Geomalacus maculosus* [148]
Invertebrates, Marsh Fritillary	Marsh Fritillary Larval Web Survey/Monitoring [149] Pg. 41-43 of Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes [5]
Invertebrates, Terrestrial	Surveying terrestrial and freshwater invertebrates for conservation evaluation [150]
Invertebrates, White-clawed Crayfish	Manual for monitoring Irish lake stocks of white-clawed crayfish, *Austropotamobius pallipes* (Lereboullet) [151] Pg 54 of Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes [5]
Invertebrates, Whorl Snails	Monitoring of Sites and Habitat for Three Annex II Species of Whorl Snail (Vertigo) [152] Monitoring and Condition Assessment of Populations of *Vertigo geyeri*, *Vertigo angustior* and *Vertigo moulinsiana* in Ireland [153]
Lichens	Hill, D. A. (Ed.). (2005). Handbook of biodiversity methods: survey, evaluation and monitoring. Cambridge University Press. [119]
Mammals, Badger	The badger and habitat survey of Ireland [154] Guidelines for the treatment of badgers prior to the Construction of National Road Schemes [13] Pg 129 of Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes [5]
Mammals, Bats	Bat Surveys for Professional Ecologists Good Practice Guidelines 4th Ed [63] Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes [10] Bat Mitigation Guidelines for Ireland [155] Guidelines for the Treatment of Bats During the Construction of National Road Schemes [12]
Mammals, Deer	Best Practice Guides for the Management and Control of Deer in Ireland: Recording and Surveys [156]

Survey Topic	Key References
Mammals, Hares	Status of hares in Ireland [157] UK BAP Mammals: Interim guidance for Survey Methodologies, Impact Assessment and Mitigation [158]
Mammals, Hedgehog	UK BAP Mammals: Interim guidance for Survey Methodologies, Impact Assessment and Mitigation [158]
Mammals, Otter	National Otter Survey of Ireland 2010/12 [159] Guidelines For the Treatment of Otters Prior To The Construction of National Road Schemes [14] Pg 133 of Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes [5]
Mammals, Pine Marten	All-Ireland Squirrel and Pine Marten Survey 2019 [160] National pine marten population assessment [161] Guidance note on the VWT fur snagging device for pine martens [162] UK BAP Mammals: Interim guidance for Survey Methodologies, Impact Assessment and Mitigation [158] Pg 138 of Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes [25]
Mammals, Red Squirrel	All-Ireland Squirrel and Pine Marten Survey 2019 [160] Practical Techniques for Surveying and Monitoring Squirrels [163] UK BAP Mammals: Interim guidance for Survey Methodologies, Impact Assessment and Mitigation [158]
Reptiles	Herpetofauna Workers' Manual [122] Pg 86 of Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes [25]
Vegetation	National Vegetation Database methods [59] Irish Vegetation Classification system [60] See also habitat specific guidance.

Additional references for surveys are provided by CIEEM [164] and in Hill (Ed) [119]. The use of novel techniques to collect data is encouraged where there is evidence from the scientific literature that these techniques can be effective. Examples include acoustic monitoring for birds [165], eDNA for aquatic animals [166] and camera ‘traps’ for mammals [167]. References should be provided for any non-standard techniques.

B.5.1.5 Data Management and Sharing

Existing data comes from a wide range of sources, much of which can be downloaded in GIS-compatible formats, such as geodatabases and shapefiles, or otherwise imported into GIS. Collated spatial data shall be incorporated into a project-specific GIS, with geodatabase as the preferred

storage option for optimal data management, performance, and scalability. This format facilitates easy sharing with the wider project team and ensures compatibility with most GIS software.

Survey data is often collected digitally or digitised after collection, and the volume of data can be substantial. To ensure consistency, survey data shall be recorded using standardised forms aligned with the survey methods. Quality assurance shall be conducted promptly after data collection to identify and rectify any issues before additional survey work is carried out or the survey season has passed. Similarly, sound and video recordings should be reviewed soon after collection to confirm that recorders functioned as expected and to refine survey methods if needed.

To ensure traceability, ease of data management, and long-term accessibility, all spatial and non-spatial data shall be linked using unique and consistent joining attributes. Key considerations include:

- Unique Identifiers (UIDs): Assigning a structured UID to each survey record ensures that spatial features (e.g., points, lines, polygons) can be linked reliably to qualitative and numerical datasets. This could follow a structured format, such as SiteCode_YYYY_SurveyType_ID.
- Consistent Attribute Naming: Standardised field names across datasets prevent mismatches and streamline data integration.
- Spatial Relationships: Establishing clear spatial relationships (e.g., survey point to habitat polygon, transect to survey area) allows for efficient analysis and visualisation.
- Temporal Data Tracking: Including survey dates in attribute tables ensures changes over time can be assessed.
- Metadata & Version Control: Maintaining detailed metadata on data sources, collection methods, and updates ensures clarity for future users.

Vegetation datasets shall be in the format of the National Vegetation Database [59].

All data shall be stored securely in the geodatabase and shared with the Project Manager and the wider project team.

Within 12 months of the data entering the public domain, for example, when the EIA Report is submitted to An Coimisiún Pleanála, the survey data shall be shared with the National Biodiversity Data Centre in an appropriate format.

B.5.2 Describe and quantify the biodiversity baseline

In addition to the EIA Screening and Scoping Reports (if done), the biodiversity practitioner will need to describe the biodiversity baseline in:

- the Feasibility Report (Phase 1, see 4.2.9).
- the Options Report (Phase 2, see 4.3.1.8 and 4.3.2.11, 4.3.3.2 and 4.3.3.3).
- an EIA Report or a standalone BIA (Phase 3).

Based on the collated data, the biodiversity practitioner will need to synopsize the biodiversity within the ZoI and identify ecological features, including IEFs, which will be described and form the basis of the impact assessment. Guidance on describing biodiversity, identifying ecological features and selecting IEFs follows below.

B.5.2.1 Biodiversity

The EIA Directive requires the description of baseline biodiversity. The definition of biodiversity according to the Convention (and referred to in the EIA Directive) '*is the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems*'. For the purpose of BIA, this may translate to the number and taxonomic range of species, and the genetic diversity of each species, in a particular place, and the intactness of the ecosystems. Therefore, biodiversity has a much broader definition than a list of selected ecological features [31] [42] [81].

The biodiversity practitioner must therefore describe the biodiversity within the Zone of Influence of the Option/proposed project. There are three options for achieving this:

- Option 1: To divide total biodiversity within the ZoI into a set of ecological features (see B.5.2.2) which encompass all taxa and ecosystems and describe each of these features, some of which may be very broad.
- Option 2: To select ecological features and assign the remaining taxa and ecosystems to a single category 'the rest of biodiversity', providing a description of the selected individual features and the rest of biodiversity.
- Option 3: To separately describe biodiversity as a whole and then selected individual ecological features.

The description of biodiversity should not attempt to list every species that is present in the ZoI.

The factors in Appendix Box B.5-1 and descriptors in Appendix Box B.5-2 can be used in the description of biodiversity.

Appendix Box B.5-1: Factors influencing Biodiversity (examples)

- The type, size, age and variety of habitat parcels.
- The soil type and underlying geology.
- Altitude.
- The degree to which habitats are connected.
- Grazing pressure.
- The use of agrochemicals.
- Presence of invasive alien species.
- Levels and type of human activity such as farming and recreation.
- Hunting, fishing and harvesting.
- Pollution.

Appendix Box B.5-2: Descriptors of Biodiversity (examples)

- Range of taxa across different orders, families, genus.
- Number of species.
- Number or endemic and near-endemic species and sub-species.
- Keystone species.
- Distinct populations and sub-species.
- Population sizes.
- Size, type and number of habitats/ecosystems.
- Connectivity with other areas, isolated, fragmented.
- Characteristics of the environment on which it depends (clean water, clean air, ecological networks etc.).
- Factors causing it to increase or decrease (non-native species, over-grazing, pollution, etc.).
- Comparison to other places.
- Intactness of ecosystems and ecological networks.

In the EIA Chapter or standalone BIA Report, the description of biodiversity should be quantified where practicable, and contain both qualitative and quantitative assessments, see [39]. The amount of biodiversity in a given place is relative, therefore a comparison to other areas or habitat types may aid the description.

B.5.2.2 Ecological Features

An ecological feature is a discrete component of biodiversity; examples are provided in Appendix Box B.5-3.

The biodiversity practitioner shall determine the features that will be described in the baseline, which may be refined as the project progresses. The features should be comprehensive (see options 1 – 3 in Section B.5.2.1) and efficient (towards the lower end of the possible number). In general, individual habitat parcels and species populations should be aggregated into a single feature when they have similar ecology, conservation status and protection, and are likely to be affected in similar ways by the project.

Appendix Box B.5-3: Examples of Ecological Features

- A designated site.
- A type of designated site (e.g. Peatland, river, etc).
- A site meeting the criteria for a designation.
- A site/cluster of habitats of varying types.
- All parcels of a particular habitat type in an area (e.g. Improved agricultural grassland, arable, etc.).
- A single habitat parcel.
- A species population.
- The combined populations of similar species (e.g. Common bat species).
- The combined populations of species with a similar status (red list invertebrates).
- A species community (e.g. A vegetation community).
- A guild of species (e.g. Pollinators, farmland birds, forest birds, etc.).
- A place used for breeding or roosting.
- A commuting corridor.
- A single tree and a group of trees.
- An ecosystem.

B.5.2.3 Important Ecological Features

Important Ecological Features (IEFs) are those that are protected by legislation and policy (and therefore have an Environmental Protection Objective (EPO, see Section B.3.6)) plus any other features determined to be important by the biodiversity practitioner, that occur within the Option/proposed project site or ZoI [3]. IEFs are a subset of the ecological features described in Section B.5.2.2. Appendix Box B.5-4: provides a non-exhaustive list of IEFs.

Appendix Box B.5-4: Important Ecological Features (examples)

- Ancient (old growth) Woodland, areas of.
- Annex I Birds of the Birds Directive & regularly occurring migratory species (ROMS), populations of.
- Annex I Habitat of the Habitats Directive, areas of.
- Annex II, V and V species of the Habitats Directive, populations of.
- Birds of Conservation Concern Ireland Red and Amber List species, populations of.
- Endemic and near endemic species/sub-species, populations of.
- European Sites (SAC, SPA), listed and proposed.
- Farmland Birds included on the Common Farmland Bird Index, communities of.
- Flora Protection Order species, populations of.
- Habitats protected by the County/City Development Plan, areas of.
- Hedgerow, or networks of hedgerows.
- Irreplaceable Habitats, areas of.
- Linear habitats such as rivers with their banks or the traditional systems for marking field boundaries which are essential for the migration, dispersal and genetic exchange of wild species (Article 10 of the HD), areas of.
- Migratory fish, populations of.
- Modified Surface Waters, areas of.
- Natural Heritage Area (NHA).
- Natural Surface Waters, areas of.
- Naturally occurring Wild Bird, populations of.
- Nature Reserves.
- Peatland other than Annex I habitat, areas of.
- Proposed Natural Heritage Area (pNHA).
- Pollinators, communities of.
- Ramsar sites, listed and proposed.
- Red Data Book species, populations of.
- Stepping stone habitats (such as ponds or small woods) which are essential for the migration, dispersal and genetic exchange of wild species, areas of.
- Wildlife (Fauna and Flora) Refuge.
- Wildlife Act Protected Species listed on Schedule 5, or added by Regulations S.I. No. 282/1980 2, S.I. No. 112/19903, S.I. No. 485/2022, populations of.
- Woodland (forest) Birds included on the Common Forest Bird Index, communities of.
- Woodland, areas of.

The biodiversity practitioner shall determine the IEFs that will be described in the baseline, which may be refined as the project progresses. The IEFs are likely to include individual designated sites, single habitat parcels and single populations of protected species however they can be aggregated when similar. Appendix Box B.5-5: gives an example of how ecological features in the ZoI may be identified and classified to facilitate their description.

Appendix Box B.5-5: Examples of ecological features in each category

Important Ecological Features	Other Ecological Features	Other Biodiversity
Blanket Bog A watercourse Population of Marsh Fritillary butterfly Population of Barn Owl Populations of birds listed on the Common Farmland Bird Index Population of Lesser Horseshoe Bats Common bats species (Common and Soprano Pipistrelle, Brown Long-eared Bat). Population of Pine Marten	Conifer Plantations Dense Bracken Improved Grasslands Other common bird species Terrestrial invertebrate communities (not protected or threatened species) Aquatic invertebrate communities (not protected or threatened species)	Fungi Soil Invertebrates & micro-organisms

B.5.2.4 Describe & Quantify the Ecological Features

Having identified the ecological features, the biodiversity practitioner needs to describe them in the relevant report. This should be based on the aggregate of information from all sources (existing data, protected species walkover and further species surveys) [168]. The specific results of individual studies and surveys should be confined to survey reports. Examples of descriptors for habitats and species are provided in Appendix Box B.5-6; many can also be applied to groups of species, communities and guilds. In the EIA Chapter or standalone BIA Report, the feature shall be quantified, where possible; for example, the area of a habitat parcel, the size (or size class) of the population or the area occupied by the population (see Appendix Box B.5-6).

Appendix Box B.5-6: Descriptors for Ecological Features (examples)

Habitat Parcels	Species Populations
• Size	• Size or area occupied
• Naturalness	• Rarity
• Condition	• Proportion of the total
• Rarity	• Endemic/near endemic
• Species Diversity	• Native
• Dominant species, rare species	• Position in natural range
• Typical species	• Territory/home range
• Connectivity	• Seasonal occurrence
• Stepping Stone	• Life cycle
• Synergy with adjoining habitats	• Critical habitats/places

B.5.2.5 Existing Processes

This section applies to EIA projects only.

The biodiversity and the IEFs within the ZoI are dependent on certain environmental conditions. For example, a diverse lichen community in a woodland is likely to be dependent upon the maintenance of good air quality. The biodiversity practitioner shall determine the quality of the environment and identify any critical environmental and ecological processes or interdependencies that support biodiversity and the ecological features in the ZoI. This information shall be included in the description of the baseline in the EIA Report. The biodiversity practitioner should consult as needed with the other topic practitioners. A non-exhaustive list of environmental and ecological processes or interdependencies is provided in Appendix Box B.5-7.

Appendix Box B.5-7: Process & Interdependencies

• Coastal erosion/deposition	• Presence of keystone species
• Groundwater dependency	• Presence of invasive (alien) species
• Surface water supply	• Presence of specific food plants
• Seasonal flooding	• Presence of host species
• Clean water	• Prey availability
• Clean air	• Predator control
• Low nutrients	• Nature conservation management
• Habitat size & connectivity	• Availability of roosting & breeding sites
• Staging sites of migratory species	• Availability of shelter & hibernation sites
• Exchange of individuals	• Light or shade
• Grazing	• Availability of dead wood
	• Availability of nectar/pollen

B.5.2.6 Legislation and Policy Protection

At the same time as identifying Important Ecological Features (IEFs), the biodiversity practitioner shall identify the legislation and planning policy protection for biodiversity and the IEFs within the ZoI, see Appendix A and the literature review [27]. A summary of the protection shall be included in the relevant report.

B.5.2.7 Environmental Protection Objectives (EPOs)

This section applies to EIA projects only.

As described in Section B.3.6, the biodiversity practitioner shall identify Environmental Protection Objectives (EPOs) for biodiversity and the IEFs that receive legal and policy protection as part of scoping and, based upon these, aim to agree the significance criteria with the planning authority. The EPOs and significance criteria shall be clearly stated in the EIA Report.

B.5.2.8 Conservation Status

This section applies to EIA projects only.

The biodiversity practitioner shall determine the integrity of designated sites, where possible, and the conservation status of other IEFs at the national level and within the relevant counties, and state these in the EIA Report.

For European sites, information on the integrity of the site can be found in the site-specific conservation objectives document. If all the targets are being met and all the qualifying/special interest features are in favourable condition, then the site has ecological integrity, and vice versa. The objective will be to maintain or restore ecological integrity, accordingly. This information is not available for other types of site designation; however, the biodiversity practitioner may use the available data and professional judgement to assess the integrity of these sites (see glossary).

Sources of information on conservation status at the national level include the following:

- For habitats and species listed on the Habitats Directive, the national conservation status can be found in the Article 17 reports [90] [100], and is expressed as either favourable or unfavourable.
- For bird species, the national conservation status can be found in the Birds of Conservation Concern Ireland [58] and in the Article 12 reports [169], and can be expressed using the red and amber list criteria for example ‘HD: Historical decline’.
- For other species, the national conservation status can be found in the NPWS checklist and any updated red lists and is expressed using the IUCN classification system.
- For common farmland birds and common woodland (forest) birds, this information can be obtained from the relevant index (when available).

The biodiversity practitioner should use the available data to determine conservation status within the relevant counties. A negative response to any of the questions in Appendix Box B.5-8 indicates that the overall conservation status in the county (or any other geographic scale) is negative unless the habitat or species is exceeding all of its targets (if any). Populations that have declined but have now stabilised at a new low level or begun to increase would still be regarded as having a negative status. The parameters in Appendix Box B.5-8: can also be applied to groups of species, communities and guilds.

Appendix Box B.5-8: Assessing conservation status of Habitats and Species

Habitats	Species
• Is the range of the habitat increasing, stable or decreasing? • Is the area of the habitat increasing, stable or decreasing? • Is the habitat quality (structure and function) improving, stable or declining? • Are the future prospects (next 12 years [78]) for the habitat good, stable or poor? • Is the conservation status of its typical species favourable or unfavourable? • Are any of the above measures above or below a target or reference value set for that habitat?	• Is the range of the species increasing, stable or decreasing? • Is the area occupied within that range increasing, stable or decreasing? • Is the population increasing, stable or decreasing? • Is the available habitat for the species increasing, stable or decreasing? • Is the habitat quality improving, stable or declining? • Are the future prospects (next 12 years) for the species good, stable or poor? • Are any of the above measures above or below a target or reference value set for that species?

For habitats and species that are below a target or reference value for the parameters defining conservation status, the EPO may be to restore the habitat or species population, as would be the case for the habitats and species listed in the Annexes of the Habitats Directive. As part of the baseline description, the biodiversity practitioner shall make clear in the EIA Report if the 'restore' objective applies to any ecological feature with records of occurrence in the ZoI, regardless of whether the feature was found in the surveys.

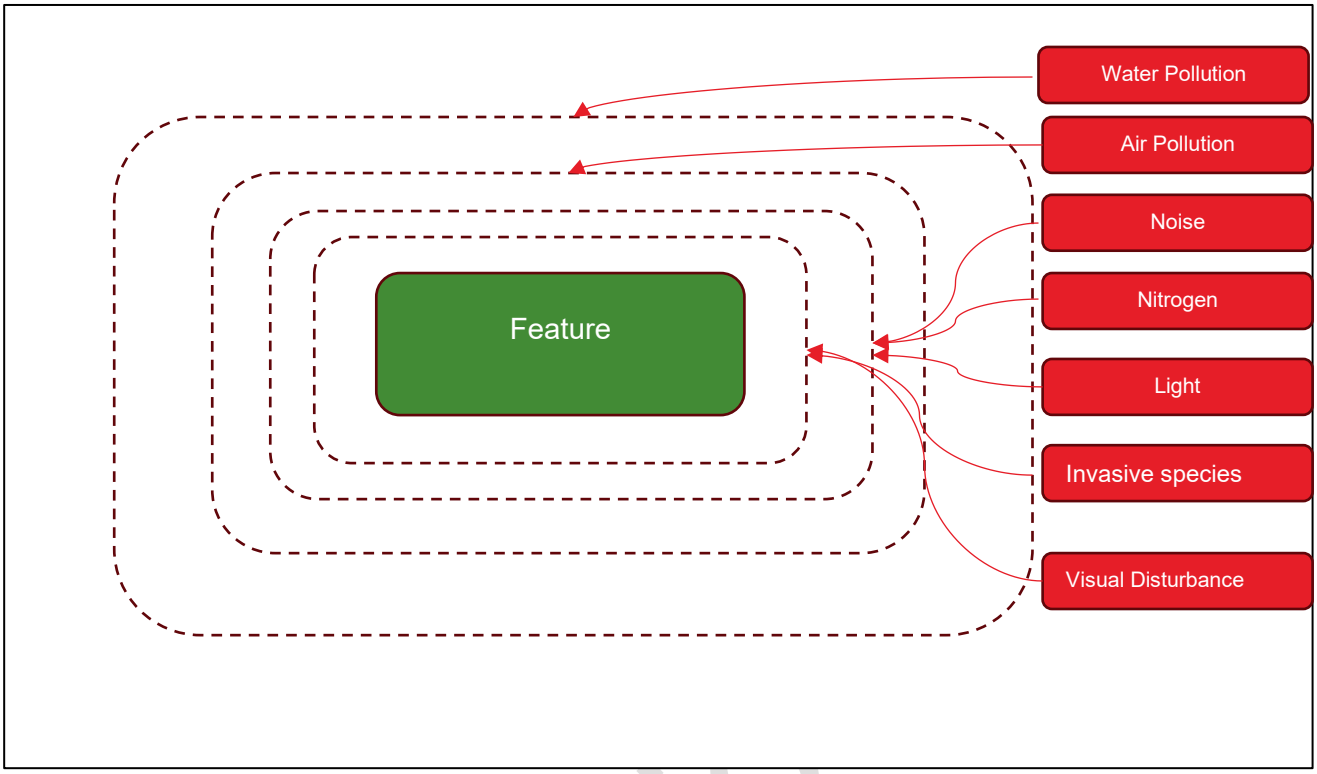
Additional guidance on these concepts and the use of favourable reference values for determining the conservation status for habitats and species of community interest are available in EC guidance [78].

For habitats and species without a published status or defined targets, the current conservation status is described by the current values for each of the parameters in Appendix Box B.5-8: .

B.5.2.9 Sensitivity

As part of the baseline description in the relevant report, the biodiversity practitioner shall indicate the sensitivity of the ecological features to environmental change and the geographic area to which this applies. For example, bird species vary in their sensitivity to construction related disturbance [170]. This can be expressed as 'Risk Zones' around each feature for different sources of impact, see Appendix Figure B.5-1.

Appendix Figure B.5-1: Schematic Diagram showing 'Risk Zones' for an Ecological Feature



B.5.2.10 Valuing Ecological Features

This section applies to EIA projects only (or if it is not known whether an EIA will be required).

The biodiversity practitioner shall evaluate each feature on the geographic scale. This may be in accordance with the professional jugdement of the biodiversity practitioner, the guidance in Appendix Table B.5-3, or alternative values agreed with the competent authority as part of scoping. The evaluation shall be stated in the EIA Report.

Appendix Table B.5-3: Assigning values to Ecological Features (Examples)

Geographic Scale	Sites	Habitat Parcels not included in a Site	Native Species Populations	Communities
International	Ramsar sites. Listed or proposed SPAs, SACs, NHAs and pNHAs designated for internationally important features. Statutory Nature Reserves and Statutory Wildlife refuges designated for internationally important features. Sites meeting the criteria for designation [79] [171], [172], HD Annex III which support internationally important features. Maternity or hibernation roost of Lesser Horseshoe Bats with 100 or more or 50 or more individuals, respectively [10]. Leisler's bat roost with more than 100 individuals [10].	Ecological networks that support internationally important sites.	>1% of biogeographic area population/ occupancy estimate, or the population is critical to the wider biogeographic population. >1% of European population/ occupancy estimate, or the population is critical to the wider European population. Any population of critically endangered, endangered or vulnerable migratory species (IUCN). Any population of a species or sub-species which is an Irish endemic, or a near endemic of Britain and Ireland.	>20,000 waterbirds >10,000 pairs of seabirds
National (and River Basin District)	Listed or proposed SPAs, SACs, NHAs and pNHAs designated for nationally important features. Statutory Nature Reserves and Statutory Wildlife Refuges designated for nationally important features. Sites meeting the criteria for designation [48] [144], [145], HD	Native woodland >5ha. Ecological networks that support nationally important sites. Ancient trees.	>1% of all-Ireland or Ireland population/ occupancy estimate, or the population is critical to the wider national population. Any population of critically endangered, endangered or vulnerable non-migratory species (IUCN). Any population of a nationally rare or	The most species-rich instances of a semi-natural vegetation community type, guild or taxonomic group found in Ireland (native species).

Geographic Scale	Sites	Habitat Parcels not included in a Site	Native Species Populations	Communities
	Annex III and support nationally important features. Bat hibernation sites with more than 50 bats or 2 or more species.		nationally scarce species. Population of any native bird species with less than 100 breeding pairs (rare) IRBBP.	
Regional	Sites <100ha but otherwise meeting the criteria for designation as an NHA.	Usually not applicable.	>1% of Regional population/ occupancy estimate.	Above average species richness or taxonomic diversity and abundance for a guild or taxonomic group in a regional context e.g. all common native species present plus some rarer species.
County	Listed or proposed NHAs designated for locally important features. Statutory Nature Reserves and Statutory Wildlife refuges designated for locally important features. Sites comprising mainly Irreplaceable/ Very High/ High Distinctiveness habitat(s). Sites supporting above average species richness and abundance across a range of taxonomic groups and guilds. Rivers and streams not meeting the above criteria.	Native woodland 1-5ha. Single parcel or aggregate of parcels of the same semi-natural habitat type >1% of the county total. Ecological networks that support 'county' important sites. Veteran trees. Hedgerows of High Significance – Heritage Hedgerows [53].	>1% of County population/ occupancy estimate. Any population of a near-threatened species not meeting the above criteria. A population of a species which is Locally Rare or Locally Scarce A population of a scarce breeding bird species monitored by the IRBBP not meeting the criteria above.	Above average species richness or taxonomic diversity and abundance for a semi-natural vegetation community, guild or taxonomic group in the county context e.g. all common native species present plus one or more uncommon, scarce or rare species.
City or Local (Higher)	Public parks which include semi-natural vegetation not meeting the above criteria.	Native woodland <1ha. Irreplaceable and Very High and High Distinctiveness	>1% of City or Local population/ occupancy estimate.	Above average species richness or taxonomic diversity and abundance for a semi-natural vegetation

Geographic Scale	Sites	Habitat Parcels not included in a Site	Native Species Populations	Communities
		habitat parcels not meeting the criteria above. Hedgerows of Moderate Significance or Significant [53]. Ecological networks not meeting the above criteria.		community, guild or taxonomic group in the local context e.g. all common native species present.
City or Local (Lower)	Public and pocket parks not meeting the above criteria.	Medium Distinctiveness habitat parcels not meeting the criteria above. Hedgerows not meeting above criteria.	-	Below average species richness and abundance for a semi-natural vegetation community, guild or taxonomic group in the local context but most common native species present.
Project	-	Most Low Distinctiveness habitats, including BC1, BC2 and BC3 arable, horticultural and tilled land and GA1 and GA2 improved grassland.	Populations of native species not meeting the above criteria.	Low species richness and abundance for a guild or taxonomic group in the local context e.g. only a few of the most common species present.
Negligible	-	Developed land with sealed surfaces (excluding buildings supporting roosting bats and nesting birds).	Invasive alien plant species and other non-native species populations (excluding archeaophytes of conservation importance).	-

Notes on using the table.

1. A site is a geographically defined area, whose extent is clearly delineated, which usually supports more than one type of semi-natural habitat, aggregated into a single unit. The areas of semi-natural habitats are usually adjacent, and the site is usually surrounded by highly modified habitats, a different ecosystem or a physical barrier. A site can be any size however it must be large enough to provide the physical and semi-natural conditions for the maintenance of a particular habitat, species population or community. It is either already designated or delineated by the biodiversity practitioner or a consultee.
2. A habitat parcel (not included in a site) is a geographically defined area of a single semi-natural habitat type which is generally small, isolated and/or vulnerable to external pressures or highly modified habitat.

3. Irreplaceable habitats and habitats of Very High, High, Medium and Low Distinctiveness are as listed in Appendix D.
4. In each case, the whole feature should be evaluated not just the part which overlaps with the Option/proposed project boundary.
5. Occupancy estimate is the estimate of 10km or 1km squares occupied and is used when population size data is unavailable.
6. For Plants: 'Nationally Rare' in Ireland is a species occurring in 5 or fewer hectads (out of just over 1000 on the whole island) and 'Nationally Scarce' is a species occurring in 6-35 hectads, recorded between 1987 and 2019 [173]. Locally Rare or Scarce species are as listed in the BSBI County Rare Plant Register (if one exists) or otherwise 'Locally Rare' is a species found at 3 or fewer sites in the County and 'Locally Scarce' is a species found at 4-10 sites in the County between 1987 and 2019 [174].
7. When neither population nor occupancy estimates are available, the biodiversity practitioner will need to estimate whether the 1% criteria is met, taking into account the precautionary principle.
8. Work downwards through each column until the closest match to the feature being evaluated is achieved.

B.5.2.11 Existing Impacts and Pressures

This section applies to EIA projects only.

As part of the description of the biodiversity baseline in the EIA Report, the biodiversity practitioner shall identify existing impacts and pressures that are having an adverse effect on biodiversity and the ecological features within the ZoI. A non-exhaustive list of types of impacts and pressures on biodiversity is presented in Appendix Box B.5-9: [175].

Appendix Box B.5-9: Types of Existing Impacts and Pressures

• Agricultural intensification	• Contaminated road run-off
• Over-grazing	• Air pollution and nitrogen deposition
• Lack of management, ecological succession	• Eutrophication
• Draining land for agriculture	• Noise pollution
• Afforestation	• Light pollution
• Draining land for forestry	• Invasive species & pathogens
• Extraction of resources, such as peat and rock	• Predation & other trophic changes
• Mortality from energy production	• Wildfire
• Mortality from transport	• Flood protection & coastal defences
• Hunting, fishing & harvesting	• Weirs & barriers in rivers
• Disturbance & trampling from recreation	• Water abstraction from rivers & aquifers
• Disturbance from construction activity	• Siltation in rivers
• Agricultural pollution from pesticides, fertiliser, animal waste	• Habitat loss from development
• Water pollution from industry, transport	• Habitat fragmentation & isolation from development
• Domestic wastewater contamination	• Climate change

In addition, the biodiversity practitioner shall identify existing projects that are already affecting the same features as may be affected by the proposed project being assessed [31]. This should be

determined using the Source-Pathway-Receptor (S-P-R) model and include projects within the identified risk zones around ecological features (see Section B.5.2.9). A list of projects included in the baseline as 'existing effects' shall be clearly stated in the chapter in the EIA Report. This list should be consistent with other environmental topics. However, there are likely to be more projects considered for effects on biodiversity due to the behaviour of mobile and migratory species, and the large size of designated sites.

B.5.2.12 Likely Evolution of the Baseline

This section applies to EIA projects only.

The biodiversity practitioner shall predict and describe in the EIA Report how the baseline will evolve over time for up to four scenarios:

1. At the intended start of construction of the project.
2. During the period that the project would be operational.
3. If relevant, at the time of decommissioning the project.
4. In the absence of the project over what would have been the project's lifetime.

This should not be a detailed rework of the survey results, but an outline of how the baseline might change based on the practitioner's understanding of current environmental trends, drawing on existing scientific literature and government policies, including those to restore biodiversity and mitigate climate change.

The description of the evolution of the baseline should also have regard to the cumulative effects of existing and approved projects [3] [43], see Appendix Table B.7-1.

Based on current trends, it may be predicted that an ecological feature will decline or disappear from the ZoI in the future. This should be described however not used as a reason to scope ecological features out of the assessment due to the policies to halt the loss and restore biodiversity and mitigate climate change.

B.5.2.13 Calculate the Biodiversity Baseline in Biodiversity Units (BU)

At Phase 2 Stage 2 and Phase 3, the biodiversity practitioner shall calculate the biodiversity baseline in biodiversity units (BU) using the appropriate version of the TII Biodiversity Metric (TII BM) and in accordance with the user guide (GE-ENV-01112). The TII BM should also be used at Phase 2 Stage 1.

The TII BM Options Selection Toolkit provides a measure of biodiversity within the boundary set for each Option. The final TII BM using the Full Biodiversity Metric Toolkit provides a measure for biodiversity within the 'red line boundary' of the proposed project.

B.6 Identify the Biodiversity that is likely to be Significantly Affected

For EIA Projects

Having described the biodiversity baseline (and its evolution) from the ZoI, the biodiversity practitioner shall identify the biodiversity and ecological features that are likely to be significantly affected by the Option/project and those at risk of non-compliance with relevant legislation, policy, plans and Standards.

This will include:

- the biodiversity (regardless of other protections) that is likely to be affected by the Option/proposed project on its own and cumulatively with other developments, taking into account the policies for the protection and enhancement of biodiversity.
- the IEFs that could be significantly affected by the Option/proposed project, on its own or cumulatively with other developments, taking into account the EPOs/significance criteria where these exist.
- the IEFs for which there is risk that the Option/proposed project, on its own or cumulatively with other developments, will contravene the law or policy protecting that feature.
- the ecological and environmental processes that may be affected by the Option/proposed project.

This is a scoping exercise to select features for the next stage of the assessment using the Source-Pathway-Receptor model [38].

For features with favourable conservation status (or otherwise meeting their EPOs): if there is no impact pathway or a very weak impact pathway (after considering the potential for cumulative effects and impact interactions) then the feature may be scoped out of further assessment.

For features with an unfavourable conservation status (or equivalent) and to which a 'restore' objective applies, the pathway may not exist now, as the feature (receptor) may be currently absent from its former locations. In this case, previously known habitat or populations (derived from the ecological desk study within the relevant time period) should be treated as extant; if there is no impact pathway or a very weak impact pathway (after considering the potential for cumulative effects) then the feature may be scoped out of further assessment.

The reasons for scoping out features within the ZoI shall be clearly stated in the EIA Report.

For non-EIA Projects

The biodiversity practitioner shall identify the biodiversity/ecological features for which there is a risk that the legislation and policy protection will be contravened by the Option/proposed project.

B.7 Describe the Likely Significant Effects

B.7.1 Predicting and Describing the Impacts

The biodiversity practitioner shall predict and describe the impacts of the Option/proposed project on biodiversity including the IEFs, taking into account the evolution of the baseline, supporting processes and existing impacts. The biodiversity practitioner must make use of the available scientific research (including purchasing relevant scientific papers) when predicting the impacts of the Option/proposed project. This research is increasingly available but can be lacking [176], in which case the precautionary principle shall be adopted.

The description must cover impacts arising from site investigation, construction, operational and, if relevant, decommissioning activity. Common types of impacts arising from these activities are provided in Table 2-1. The description must include direct impacts and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative impacts.

B.7.1.1 Direct Impacts

Direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat during the construction process.

B.7.1.2 Indirect and Secondary Impacts

Indirect and secondary ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process or receptor, e.g. the creation of access tracks which cause hydrological changes that lead to the drying out of adjacent peatland habitats.

B.7.1.3 Cumulative Impacts

This section may apply to EIA projects only; decided by the Project Manager.

Cumulative impacts can be defined as "*Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project*" [31] [177].

Cumulative impacts must to be considered (i) for the Option/proposed project itself and (ii) for the Option/proposed project with other projects that could affect biodiversity in the locality of the Option/proposed project [31] [43] [177] and the same IEFs [38] (i.e. the relevant ZoI overlaps with that of another project). In both cases, the assessment of cumulative impacts is not a pairwise assessment (the impact of the project being assessed plus one other impact or project) but an assessment of the total impact (the impact or project being assessed plus all other impacts or projects). Importantly, the lack of a significant effect arising from the Option/proposed project being assessed does not automatically mean that there is a lack of significant effects when the project is considered cumulatively with other projects [3]. The assessment needs to take into account the existing pressures and the projects which will have been described in the baseline scenarios and various types of proposed projects, see Appendix Table B.7-1.

Appendix Table B.7-1: Types of Project and Cumulative Effects, after CIEEM [3]

	Types of Project	Current baseline	Evolved baseline (see B.5.2.12)	Cumulative effects
A	Constructed developments whose full environmental effects are not yet felt.	✓	✓	
B	Projects which have been started but are not yet completed (i.e. under construction).		✓	
C	Projects which have been granted consent (not limited to planning permissions) but which have not yet been started.		✓	
E	Proposals for which consent has been applied which are awaiting determination in any regulatory process (not necessarily limited to planning permission).			✓
F	Proposals which have been refused permission but which are subject to appeal and the appeal is undetermined.			✓

	Types of Project	Current baseline	Evolved baseline (see B.5.2.12)	Cumulative effects
G	To the extent that their details are in the public domain, proposed projects that will be implemented by a public body and for which no consent is needed from a competent authority.			✓
H	Other developments specifically referenced in a Regional, County or City development plan (draft or adopted), if appropriate.			✓

As with existing projects, the biodiversity practitioner, in consultation with the wider environmental team and EIA co-ordinator, shall identify the proposed projects that may affect the same features as may be affected by the project being assessed [31]. This should be determined using the Source-Pathway-Receptor (S-P-R) model and include projects within the identified risk zones around ecological features (see Section B.5.2.9). A list of projects included in the in the assessment of cumulative effects shall be clearly stated in the chapter in the EIA Report or BIA Report. This list should be consistent with other environmental topics. However, there are likely to be more projects considered for effects on biodiversity due to the behaviour of mobile and migratory species, and the large size of some designated sites and the associated risk zones.

Further guidance on cumulative impacts and effects is available in CIEEM [3] and two EC documents [74] [177].

B.7.1.4 Impact Interactions

This section may apply to EIA projects only; decided by the Project Manager.

An impact interaction can be defined as "*the reactions between impacts, whether between the impacts of just one project or between the impacts of other projects*…." [128]. The total impact for biodiversity and the IEFs may be determined by the interactions between impacts. For example, increased noise and light in a habitat fragmented by development, or reduced water flows combined with suspended solid pollution, may interact to produce a greater impact than any one of these impacts on its own. The biodiversity practitioner shall describe impact interactions and take these into account when determining the impacts and effects of the Option/proposed project. This may require information from other practitioners, see Appendix C.

Further guidance on impact interactions is available specifically in relation to climate [74] and more generally [177].

B.7.1.5 Transboundary Impacts

This section may apply to EIA projects only; decided by the Project Manager.

Transboundary impacts are effects in other administrative areas from where the project will take place. The biodiversity practitioner shall identify any transboundary effects and ensure that these are included in the assessment.

B.7.1.6 Focus and Structure

The biodiversity practitioner will need to demonstrate whether the EPOs (or other agreed significance criteria) for biodiversity and each IEF will be supported or undermined by the Option/proposed project and/or demonstrate compliance with relevant legislation, policy, plans and Standards. Therefore, the assessment should be focused on achieving this outcome i.e. on the type of impacts most likely to affect an EPO and/or be non-compliant.

A systematic approach is required, covering all project activities, the impact types associated with each, and the biodiversity and IEFs that could be affected by the project, as identified in Section B.6. The assessment should be presented as efficiently as possible and avoid duplicated text; leading with project activity, followed by impact type and then ecological feature, grouped as required, is usually the most efficient layout.

B.7.2 Characterising the Impacts

This section applies to EIA projects only.

As part of the scientific assessment of impacts described in Section B.7.1, the biodiversity practitioner shall characterise the impacts as described in the CIEEM guidelines [3], which involves references to the following characteristics, as appropriate:

- Positive or negative;
- Extent;
- Magnitude;
- Duration (short-term, medium-term and long-term, permanent or temporary);
- Timing;
- Frequency; and
- Reversibility.

Importantly, the characterisation of the impacts should include information relevant to the EPOs (or other agreed significance criteria), for example, low magnitude impacts of short duration and frequency, and from which a species population would quickly recover, may be regarded as not affecting the objective of reaching or maintaining favourable conservation status, whereas an irreversible loss of a small amount of irreplaceable Annex I habitat would normally affect that objective.

B.7.3 Effects on Biodiversity

The biodiversity practitioner shall clearly express the effects of the identified impacts on biodiversity and the IEFs. Effects on biodiversity should be expressed in terms of the overall scale of loss or gain and make appropriate use of the descriptors in Appendix Box B.5-2. Effects on IEFs should be expressed in accordance with the parameters defining conservation status, see Appendix Box B.5-8, and any EPO/ significance criteria.

The biodiversity practitioner shall quantify the effect, wherever possible. This shall be expressed in factual scientific terms. The units will vary according to the ecological feature, see Appendix Box B.7-1. It may be helpful to put the amount of loss or gain in the national or county context (e.g. the percent of the total). The quantitative assessment should be supported by a qualitative assessment, see [44].

Appendix Box B.7-1: Examples of Units for expressing Effect Magnitude

• Hectares of habitat/suitable habitat • Length (Km, m) of habitat/suitable habitat • Individuals • Pairs • Territories • Sub-populations • Populations • Occupied 1km squares	• Roosting sites • Nesting sites • Staging sites • Dwellings (setts, dens, holts, etc). • Species in a community • Communities • Ecosystems

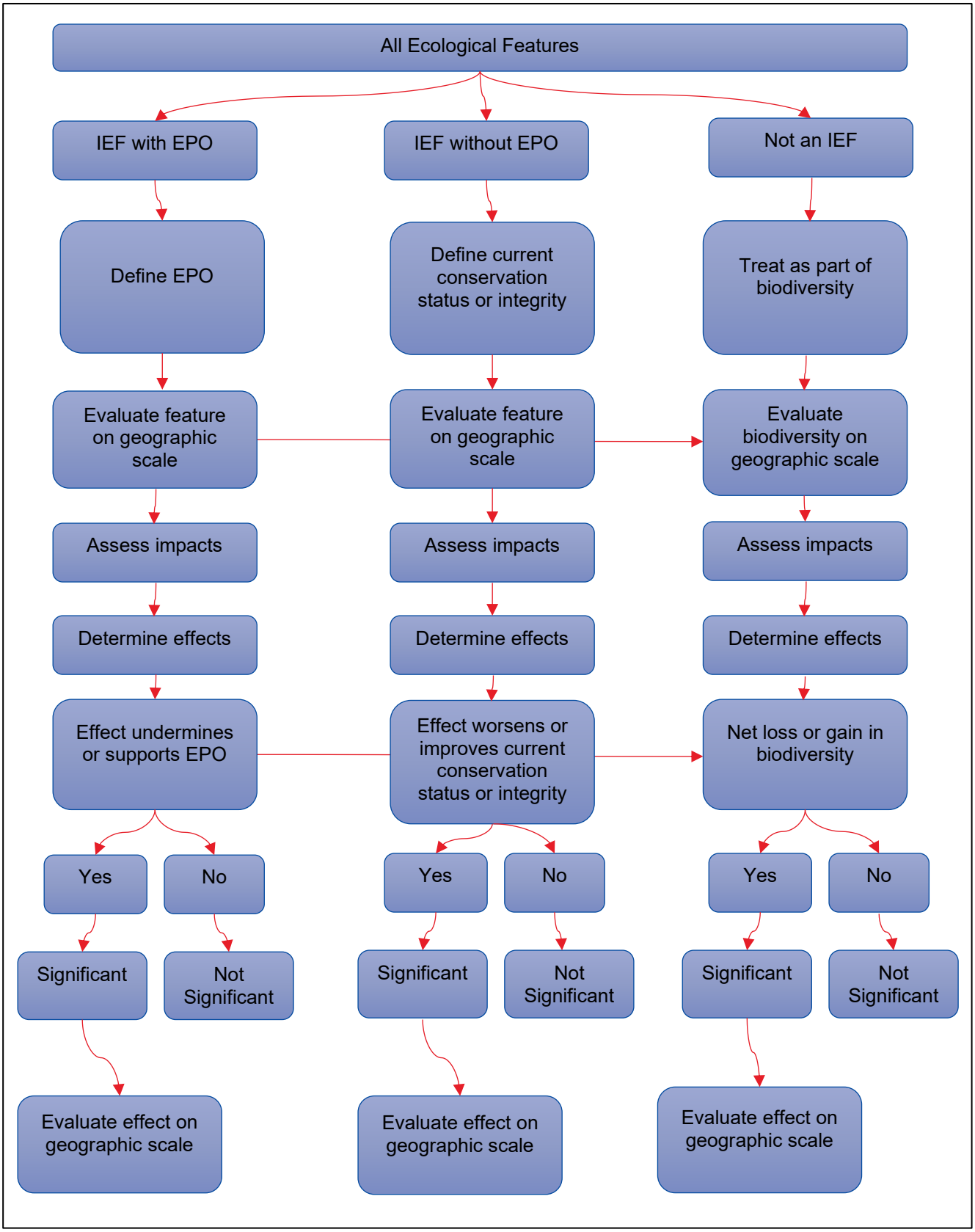
B.7.4 Significant Effects

B.7.4.1 Determining Significant Effects

This section applies to EIA projects only.

The biodiversity practitioner shall determine whether the effects on biodiversity and the IEFs are significant following the process set out in Appendix Figure B.7-1: . Significance is binary, with a significant effect being one which undermines or supports an EPO (or other agreed significance criteria), worsens or improves the conservation status of an IEF (with no EPO), or results in the loss or gain in biodiversity. Where significant effects are identified the origin(s) of the EPO (or other significance criteria) must be stated, whether from European law or other legislation or policy.

Appendix Figure B.7-1: Process for determining Significant Effects



B.7.4.2 Level of Significance

This section applies to EIA projects only.

The biodiversity practitioner shall assign a level of significance based on the geographic value assigned to the feature [3] (see Appendix Table B.5-3) or a combination of this value and the magnitude of the impact [178]. Since the assessment of significance is binary and quantified, assigning a level of significance is an additional step.

B.8 Legislation and Policy Compliance

The biodiversity practitioner shall review the compliance of the Option/proposed project with biodiversity related legislation, policy, plans and Standards continuously as the project progresses [3] and formally in the Feasibility Report, Options Report and, finally, in the EIA or the BIA Report. Legal and planning expertise should be sought to ensure legislative and policy compliance.

B.9 Legally Controlled Species

The biodiversity practitioner shall determine whether the Option/proposed project would result in the spread of legally controlled species including invasive alien species [6] [95]. The species are:

- Invasive alien species of Union concern pursuant to Article 4 of the EU Regulation on the prevention and management of the introduction and spread of invasive alien species.
- Those listed in the European Union (Invasive Alien Species) Regulations 2024.
- Those listed in the Noxious Weed Order 2025.

B.10 Use of Resources

This section applies to EIA projects only.

The environmental team shall determine the use of natural resources by the project. If required, the biodiversity practitioner shall assess the impacts of resource use on biodiversity for inclusion in a separate chapter of the EIA Report, which is dedicated to the use of natural resources.

B.11 Change in biodiversity in Biodiversity Units (BU)

At the end of Phase 3, the biodiversity practitioner shall calculate the predicted change in biodiversity in Biodiversity Units (BU) resulting from the proposed project using the full TII Biodiversity Metric (TII BM) Full Biodiversity Metric Toolkit. This requires a complete and final design for the project including the proposed landscaping.

B.12 Methods and Difficulties

As required by the EIA Directive, the methods used to gather baseline data should be described along with any technical difficulties or uncertainties, usually referred to as survey limitations.

The biodiversity practitioner shall:

- Summarise the methods used for surveys, modelling (if any), predicting the evolution of the baseline and the impact assessment.
- Describe the limitations in the methods used, or the ability to apply the methods, and the adequacy of the available evidence.
- Explain how this affected the assessment of effects and how this was addressed, for example, by adopting the precautionary principle.

The biodiversity chapter in the EIA Report or the BIA Report should not normally contain detailed descriptions of standard methods for survey, modelling and assessment. Instead, these details should be provided in survey reports included as technical appendices. The summary of survey methods in the EIA Report or the BIA Report could be a table, including a brief description of the survey, a reference to where more details can be found, and the dates and times.

B.13 Measures to avoid, prevent, reduce, offset and monitor

A sequential process should be adopted to avoid, mitigate and compensate adverse effects. This is referred to as the 'mitigation hierarchy'. Adopting the mitigation hierarchy is a precursor to providing a net gain for biodiversity. Additional guidance on this topic is provided by CIEEM [3].

B.13.1 Avoidance and Mitigation (Prevention and Reduction)

In accordance with the mitigation hierarchy (see Appendix Figure B.13-1:), the biodiversity practitioner shall set out the measures which will be implemented to avoid and mitigate the identified significant adverse and/or non-compliant effects on biodiversity arising from the proposed project.

Examples of avoidance and mitigation measures are provided in Table 2-3. The mitigation proposals should be based on scientific evaluation of their effectiveness [176] [179] [180] and published best practice, for example [7] [9] [12] [13] [14] [17] [47] [48] [155] [181] [182]. Importantly, mitigation measures should be finalised after considering cumulative effects and impact interactions to make sure that the mitigation is adequate.

As the measures to mitigate the effects of the project on the environment are developed for biodiversity and other topics, these must also be assessed for significant effects on biodiversity. For example, measures to mitigate flood risk could have positive or negative effects on biodiversity, and landscape planting alongside roads could increase bird mortality [183]. This will again require liaison with other practitioners. Similarly, measures to mitigate the effects on one element of biodiversity may have negative implications for others, for example grassland verges may benefit pollinators but increase mortality of barn owl.

B.13.2 Compensation

For those likely significant adverse effects not fully avoided or mitigated, the biodiversity practitioner shall describe and quantify the measures which will be implemented to offset or compensate for adverse effects on biodiversity and comply with the relevant legislation, policy, plans and Standards. Examples of compensation measures are provided in Table 2-3.

The predicted outcome of the compensation should be expressed in the same units as the magnitude of the impact that it addresses, to enable comparison, see Appendix Box B.7-1. The description should include a statement on the certainty of achieving that outcome.

The likely significant/non-compliant effects of any compensation must also be addressed in the biodiversity chapter of the EIA Report or standalone BIA Report. For example, creating a woodland habitat may have an adverse effect on ground-nesting birds or removing conifer trees from blanket bog may have an adverse effect on Red Squirrel, Pine Marten and woodland birds.

B.13.3 Enhancement

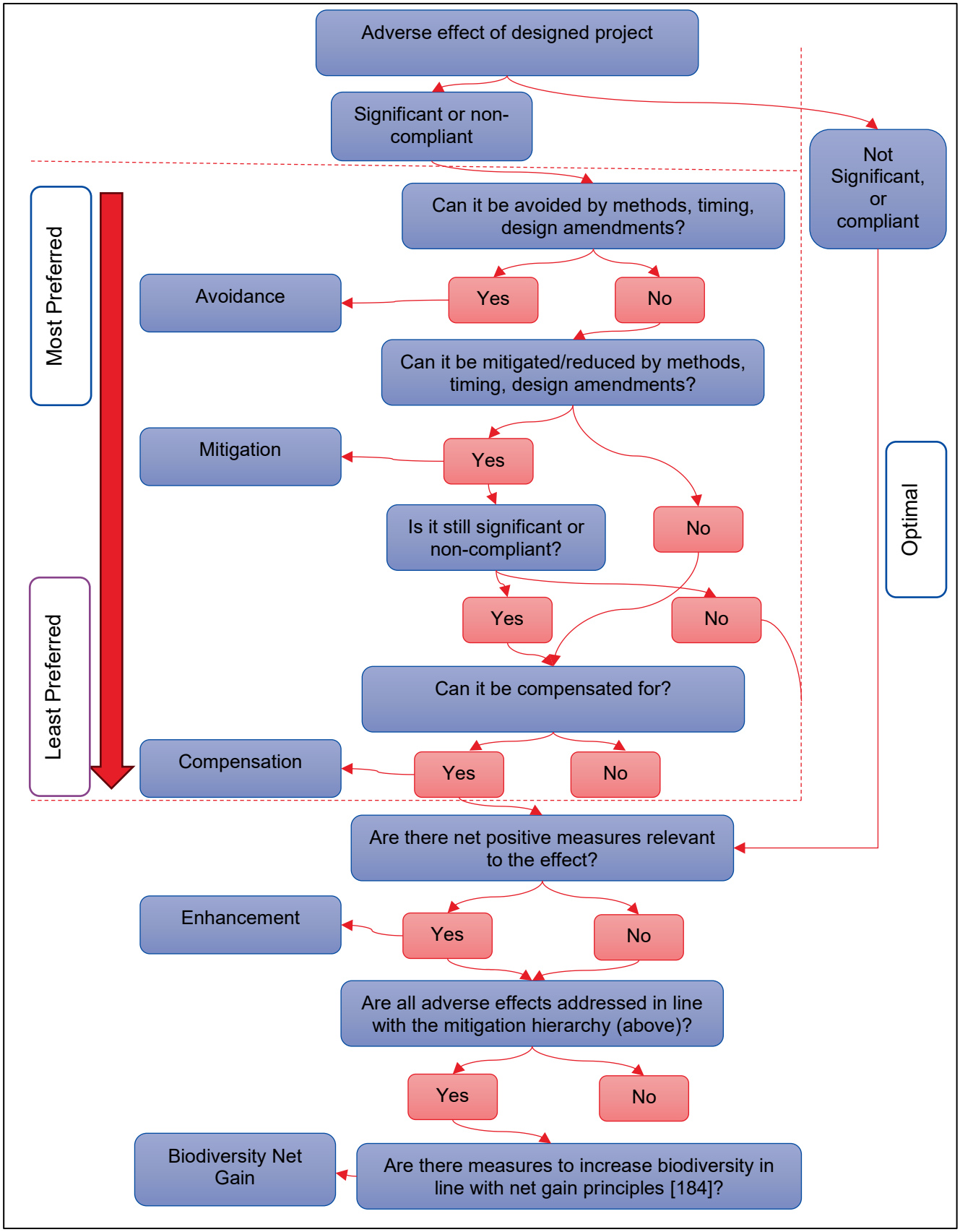
The biodiversity practitioner shall describe and quantify the enhancement measures which will be implemented. Examples of enhancement measures are provided in Table 2-3. An enhancement is the '*improved management of ecological features or provision of new ecological features, resulting in a net benefit to biodiversity, which is unrelated to a negative impact or is 'over and above' that required to mitigate/compensate for an impact*' [3].

B.13.4 Net Gain

Taking into account net gain principles [184], the biodiversity practitioner shall describe and quantify any measures that will be implemented to provide a net gain for biodiversity.

The bulk of the measures for any net gain can be determined using the TII BM Full Biodiversity Metric Toolkit. However, biodiversity is wider than measured by the Metric, and effects can occur outside the project boundary; therefore additional measures may be required to demonstrate that the net gain is genuine, following the guidance provided by CIRIA [44] and BSI [185].

Appendix Figure B.13-1: Application of the Mitigation Hierarchy



B.13.5 Uncertainties

The biodiversity practitioner shall identify any uncertainties in the efficacy of the measures proposed to avoid, mitigate, compensate or enhance biodiversity, or provide a net gain. Where uncertainties exist, the biodiversity practitioner shall describe how these will be addressed; for example, by providing additional habitat or remedial measures should an intended outcome not happen. If the latter, the triggers for remedial action shall be clearly stated.

B.13.6 Monitoring

The biodiversity practitioner shall set out the monitoring protocol if any. The monitoring must be proportionate to the nature, location and size of the project and the significance of its effects on the environment. It should not duplicate existing monitoring, for example that required under Article 17 of the Habitats Directive, Article 12 of the Birds Directive and Article 8 of the WFD. Monitoring may be required to audit the effects of the project and the effectiveness of the management, and to trigger remedial action in the event that targets are not met. Another purpose for monitoring is to confirm that the stated outcome in Biodiversity Units, as measured using the TII BM, is achieved by the project.

B.13.7 Schedule of Environmental Commitments

At Phase 3 or 4, the biodiversity practitioner shall provide input to the Schedule of Environmental Commitments; this document re-states the measures that will be implemented to avoid, mitigate, compensate and enhance biodiversity, and provide no net loss or a net gain in biodiversity.

The biodiversity practitioner shall prepare the plans for implementing these measures, as set out in Table 4-9.

B.14 Residual Impacts

EIA Projects

The biodiversity practitioner shall explain the extent to which significant adverse effects on the biodiversity are avoided, prevented, reduced or offset, or biodiversity is enhanced/improved, comprising the following:

- Taking into account the measures to avoid and mitigate the adverse effects of the project on biodiversity, the biodiversity practitioner shall determine whether these effects remain significant and adverse, their magnitude and the level of significance.
- Taking into account the measures to offset or compensate for significant adverse effects on biodiversity, the biodiversity practitioner shall explain to what degree these are compensated for and the remaining magnitude of the effect.
- Provide an overall statement on the outcomes for biodiversity and each of the IEFs arising from the project.

Included in the above, the biodiversity practitioner shall describe any residual adverse effects on biodiversity and IEFs arising from the proposed mitigation and compensation measures, including that proposed to mitigate effects on other environmental factors.

All Projects

Again, taking into account the measures to avoid and mitigate adverse effects on biodiversity, the biodiversity practitioner shall provide a clear final statement on compliance with the relevant legislation, policy, plans and Standards, and set out the requirements for derogations and licences.

If compensation and net gain is to be provided, the biodiversity practitioner shall re-calculate the final change in biodiversity in biodiversity units (BU) using the TII BM Full Biodiversity Metric Toolkit taking these into account.

B.15 Major Accidents and/or Disasters

This section applies to EIA projects only.

As set out in Appendix C, Section C.9, the environmental team working on the project shall determine scenarios for major accidents and disasters. The biodiversity practitioner shall provide a proportionate assessment of the potential effects on biodiversity arising from each scenario for inclusion in the 'Major Accidents & Disasters' chapter in the EIA Report. The impact assessment process is the same as for any other potential impact on biodiversity. The mitigation measures are likely to be engineering solutions aimed at preventing accidents and limiting the effects of accidents and disasters on the environment.

B.16 Design Iterations

The Project Manager shall have regard to the national goals, objectives, and actions to protect and restore biodiversity outlined in the National Biodiversity Action Plan and TII's published Biodiversity Plan. This means that:

1. the effects of the project on biodiversity must be considered at each project Phase, Stage and design iteration.
2. The effects on biodiversity should inform the location, layout, design and construction methods and timing for the project, as appropriate to the Phase/Stage.
3. The project engineers and designers should seek to avoid or reduce the loss of biodiversity, avoid significant adverse effects on IEFs and/or avoid effects that would contravene the relevant legislation, policy, plans and Standards, in accordance with the mitigation hierarchy.
4. The project engineers and designers should seek opportunities to enhance biodiversity and/or provide a net gain as part of the project.

The design and assessment processes are therefore iterative.

If and when a biodiversity practitioner is appointed, the practitioner should be a key member of the design team and contribute to the design process in accordance with the above.

For EIA projects, the Project Manager shall keep a record of the options considered and assessed, as part of the assessment of alternatives. The assessment of alternatives under the EIA Directive for National Roads and Greenways is explained in detail in the TII Publication RE-ENV-07008 [32] and in general in EC guidance [9]. This requirement is likely to be fulfilled by the Feasibility Report and the Options Report however design iterations at Phase 3 must also be included.

B.17 Related Assessments

B.17.1 Requirements of Other TII Standards

Other TII Standards, Technical Documents and Guidelines require specific information to be included in the Biodiversity Impact Assessment or provided by the biodiversity practitioner. These include:

- TII's Biodiversity Plan,
- Transport Infrastructure Ireland, 2022. Air Quality Assessment of Proposed National Roads - Standard (PE-ENV-01107).
- Transport Infrastructure Ireland, 2025. Water Impact Assessment of Proposed National Roads – Standard (forthcoming).
- Transport Infrastructure Ireland, 2012. Guidelines on the Implementation of Landscape Treatment on National Road Schemes in Ireland. (GE-ENV-01103)
- Transport Infrastructure Ireland, 2006. A Guide to Landscape Treatments for National Road Schemes in Ireland. (GE-ENV-01102)
- Transport Infrastructure Ireland, 2020. The Management of Invasive Alien Plant Species on National Roads - Standard. (GE-ENV-01104)
- Transport Infrastructure Ireland, 2020. The Management of Invasive Alien Plant Species on National Roads - Technical Guidance. (GE-ENV-01105).

These other TII Standards, Technical Documents and Guidelines are updated periodically. The biodiversity practitioner shall ensure that they are familiar with the latest requirements and design surveys and assessments accordingly.

B.17.2 Links to Plan-level Assessments

The proposed project may already have been included in a City or County Development Plan, or a Transport Strategy. These documents are subject to Strategic Environmental Assessment, screening for Appropriate Assessment and, usually, an Appropriate Assessment, with the latter supported by a Natura Impact Report or Statement. These are plan-level assessments which may have identified the potential effects of the project on the environment and European sites and included mitigation measures in the form of policies or amendments to policies. The biodiversity practitioner shall refer to these when undertaking the BIA and ensure that the project-level mitigation is consistent with the plan-level mitigation.

B.17.3 Integration with Appropriate Assessment

BIA and Appropriate Assessment (AA) are parallel and joined processes, with the AA restricted to the qualifying interests of European sites. Guidance on the streamlining the two process is provided by the EPA [34] and guidance on AA is provided by the EC [35] [36], the OPR [38], and the NPWS [37].

Importantly:

1. an adverse effect on the integrity of a European site is a significant effect in EIA terms.

2. any additional mitigation, construction stage management plans, compensation sites and post-construction management plans must be subject to AA screening, and if necessary, an AA.

B.17.4 Integration with Water Framework Directive Assessments

The BIA will normally include an assessment of the effects of the project on the aquatic habitats and species. The EPOs for surface waters are, *inter alia*, set by the Water Framework Directive. The information contained in the BIA can therefore inform the WFD assessment, which sets out whether the project could cause or contribute to the deterioration of the current ecological status of a waterbody, or jeopardise the waterbody achieving good ecological status.

B.18 Presentation in an EIA Report or BIA Report

The biodiversity chapter of a statutory EIA Report or the standalone BIA Report is the final output of the assessment. It is based on the designed project and does not need to describe the design process or iterations (which will instead be set out in the Assessment of Alternatives chapter in an EIA Report). The document is intended for public consultation and to aid decision-making. Lengthy descriptions using technical language and duplicated text are therefore unhelpful however it must be comprehensive and fully supported by scientific evidence.

EC guidance (for an EIA Report) [31] is that the report should, *inter alia*, (i) have a clear structure with a logical sequence, appropriate cross-referencing and a glossary; (ii) be concise, comprehensive and objective, without bias; (iii) use consistent terminology and clearly explain the methods and complex issues; (iv) make effective use of diagrams, illustrations, photographs and other graphics to support the text; (v) reference all information sources used; (vi) cover a topic in a way which is proportionate to its importance; and (vii) provide a clear commitment to deliver mitigation and compensation measures.

Use should be made of technical appendices to contain details which are not central to the description and assessment. For example, survey reports including survey methods, survey data, landscape/habitat management plans, invasive species management plans, construction stage mitigation plans, the biodiversity metric calculations and habitat condition sheets, and so on. Mitigation set out in other chapters or reports should be summarised and cross-referenced and not copied into the biodiversity chapter or BIA Reports.

Appendix C – Topic Interactions

C.1 Air Quality & Construction Dust

The TII Air Quality Standard PE-ENV-01107 [22] describes the interaction between air quality and biodiversity and the need for collaboration between the air quality and biodiversity practitioners. Importantly, the biodiversity practitioner shall identify sensitive designated sites and habitats to be included in the air quality assessment. Those included shall be based on the source-pathway-receptor (SPR) model, with the pathway based on the area over which perceptible changes in air quality and deposition of atmospheric pollution, including dust, arising from the project may occur. Once the outputs from the air quality assessment are available (in the form of chemical changes), the biodiversity practitioner shall determine whether the changes in air quality/deposition, taking into account existing levels and the cumulative effects arising from other projects, will affect biodiversity at the sensitive designated sites and habitats, and whether this has implications for their environmental protection objectives (EPOs). The biodiversity practitioner must therefore understand the effects of changes in air quality/deposition on vegetation [186] [187] and the knock-on effects on biodiversity. New baseline data may be required from some designated sites to inform the assessment of effects.

C.2 Climate

Biodiversity and climate change are interconnected, and the effects on biodiversity of climate change must be factored into the assessment. The baseline scenario may evolve in response to climate change; for example, the distribution and behaviour of species may change before the project is constructed or, more likely, while the project is operational. For most infrastructure projects, the biodiversity impact assessment shall consider the operational effects of the project under a future climate scenario(s). For example, linear infrastructure may hinder (as a barrier) or facilitate (as a corridor) changes in the range of terrestrial species in response to climate change which may in turn affect their populations and others. The biodiversity practitioner shall discuss future climate scenarios with the Climate Practitioner (see TII Climate Assessment Standard PE-ENV-01105 [188] and the National Climate Change Risk Assessment [189]. The European Commission provides guidance on how to integrate biodiversity and climate change into Environmental Impact Assessment [42].

~~Further,~~ The creation on new habitats may have a role in (i) mitigating the effects of the project on the climate (e.g. carbon sequestration); (ii) mitigating the effects of the project on the environment under a future climate scenario (e.g. moderating increased run-off into watercourses), and (iii) mitigating the effects of extreme weather on the project (e.g. moderating water flows onto a road surface during extreme rainfall events). The use of new habitats for these purposes may be referred to as a Nature-based Solution (NbS). With regard to the objectives and targets for NbS within the 4th National Biodiversity Action Plan, the design team shall consider the use of NbS in the Project design, with input from the biodiversity practitioner.

C.3 Water

Changes in surface and groundwater regime quantity can affect plant species composition of aquatic and terrestrial habitats (with knock-on effects for other taxa) and the species that inhabit watercourses. Deterioration of water quality can adversely affect the biodiversity of watercourses. Similarly to air quality, water practitioners (hydrologist and hydrogeologist) shall identify the changes in water quantity and quality in surface and groundwater, as a result of the project. The biodiversity practitioner shall work with the water practitioner(s) to identify those designated sites and habitats to be included in the assessment. The biodiversity practitioner shall make use of the findings of the water practitioners to

assess whether any changes affect the biodiversity of the identified designated sites and habitats, and whether this has implications for their EPOs. The biodiversity practitioner must therefore understand the relationship between biodiversity and water, for example, the functioning of ground water dependent ecosystems [190] and the effects of poor water quality and low flows on aquatic organisms (for example, suspended solids [191]).

The modification of watercourses, such as straightening the channel and adding structures, can change the hydromorphology of the watercourse and present barriers to migratory fish. Diverting and discharging water via new outflows into watercourses may change flow rates and hydromorphology. Since the hydromorphology of rivers and streams plays a key role in supporting biodiversity such changes can have a negative effect. If the project could affect the hydromorphology of a watercourse, the biodiversity practitioner shall work with a hydromorphologist to identify the changes and predict the effects on biodiversity.

C.4 Noise and Light

The relationship between noise, light and biodiversity is less well understood [192] however there is a risk that increased anthropogenic noise and light pollution reduce biodiversity and affect the distribution of sensitive species. The biodiversity practitioner shall work with the acoustic and lighting practitioners in the same way as described for air quality. The receptors are likely to be populations of sensitive species that occur close to the project, such as breeding birds and bats.

C.5 Land, Soils and Geology

The construction of new infrastructure will involve the movement of soils, with excess material often used in landscaping or otherwise deposited within the project boundary. Occasionally, deep cuttings will expose bedrock. The type of soil and its fertility will determine the habitats that develop within the project boundary. The biodiversity practitioner must understand the eventual position of soil types and their implications for habitat creation and the level of biodiversity it is likely to support. The biodiversity practitioner shall work with the project engineers, soil scientist (if appointed) and the design team landscape architect to determine the appropriate habitats to be created based on soil type. The biodiversity practitioner shall predict their eventual value for biodiversity. This information will inform calculations (the predicted condition of new habitats) made with the TII BM Full Biodiversity Metric Toolkit and therefore the outcomes for biodiversity in terms of Biodiversity Units (BU).

C.6 Landscape and Visual Impact

As set out in the TII landscape guidelines [19] [20] [193], the design team landscape architect requires input from the biodiversity practitioner to inform the retention of existing habitats and the design and function of new landscape treatments around the new infrastructure. The biodiversity practitioner shall be aware of these requirements and ensure that ecology data collection is adequate and timely. Moreover, the landscape design will determine the outcomes for biodiversity within the project boundary; the biodiversity practitioner shall work with the design team landscape architect to improve the design for biodiversity and input into the long term design strategy with an understanding of future maintenance requirements. The biodiversity baseline shall inform the scheme design and the landscape design, including the retention of existing high value habitats, the opportunities for enhancing existing habitats and the appropriate locations for creating new habitats and their type, considering the opportunities to restore or improve ecological connectivity.

As set out in TII GE-ENV-03001-01, the design team landscape architect shall engage in multidisciplinary collaboration with other design team members to maximise the benefit of the scheme

as defined within TII Objectives. This collaboration should include liaison with Project Ecologist/Biodiversity Professionals to maximise opportunities for Biodiversity Enhancement, see.

For some projects, a landscape management plan will be required. The landscape management plan shall be prepared jointly by the design team, design team landscape architect and the biodiversity practitioner. It is a multidisciplinary collaboration that may include TII, the Project Manager, Local Authorities, Engineers (Drainage, Civil, Structural etc,), Environmental Professionals (Arborists, Archaeologists, Ecologists, Hydrologists etc,.), social value, and cultural heritage professionals, see GE-ENV-03001-01. The landscape management plan will be developed into Landscape Maintenance and Habitat Management Manual, which is handed on to the operators of the new infrastructure for implementation. The biodiversity-related content of the landscape management plan can follow Section 11 of the Biodiversity Code of Practice for Planning and Development [61] and/or the HMMP templates provided by Natural England [194] (see Section C.11). A single or combined management plan should be sufficient covering both landscape and ecology (habitats). See also Section C.11.

The biodiversity practitioner and may also be involved in post-construction landscape restoration; the role may include advising on soil storage and reinstatement, management of seed banks, sourcing plants, input into programme of landscape restoration works and advising on site attendance by ecolgists.

Some animal species are disturbed by the presence of people, such as construction workers and the users of greenways and active travel projects. The biodiversity practitioner shall work with the landscape and visual impact practitioner to determine where people constructing and using the infrastructure will be visible, and make use of this information in the Biodiversity Impact Assessment.

Erecting fences, noise barriers or planting tall vegetation may act as a screen and mitigate the effects of disturbance on animals and can be included in the design. Again, the landscape and visual impact practitioner and biodiversity practitioners shall work together to determine where screening would be effective, and, if appropriate, propose the use of screening in the Project design.

C.7 Recreation

New and improved infrastructure, including Greenways. is usually designed to ease the flow of people and may have the effect of increasing accessibility to sensitive designated sites and habitats. Increased visitors to such places can be detrimental to biodiversity, especially if access is unmanaged. This topic may not be covered by other practitioners as part of the EIA. Nevertheless, the biodiversity practitioner shall seek to understand the likely behaviour of the users of the infrastructure, including their potential legitimate use of publicly accessible sensitive sites and habitats for recreation. Information on the use of the new infrastructure can be obtained from the transport model and predictions made by the design team. To inform the Biodiversity Impact Assessment, the biodiversity practitioner shall consult the scientific literature on the effects of recreation, such as bird disturbance, fire risk, contamination, trampling and harvesting of natural produce. For some projects, it may be appropriate undertake visitor surveys and baseline ecology surveys at sensitive sites, to understand the existing use, pressures and potential effects. The need for such surveys shall be considered as part of Scoping.

C.8 Resource Use

The EIA Directive requires an assessment of the use of natural resources (including biodiversity) by the project and an assessment of the impacts resulting from their use or depletion, including the subsequent availability of the resources [30] [31]. The environmental team shall determine the use of natural resources by the project. Taking into account any scoping opinion from the competent

authority, the environmental team shall assess the associated impacts. This topic is usually a standalone chapter in the EIA Report. The biodiversity practitioner shall provide inputs to the chapter, as required.

C.9 Major Accidents and Disasters

The EIA Directive requires '*a description of the likely significant effects of the project on the environment resulting from… the risks to… the environment (for example due to accidents or disasters)*' and '*a description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned'*. The first requirement relates to the potential of the project to cause accidents and disasters, and the second requirement relates to the vulnerability of the project to them and consequential adverse effects on the environment [31]. The Project Manager and the environmental team shall determine the accident/disaster scenarios to be assessed. Taking into account any scoping opinion from the competent authority, the environmental team shall assess the associated impacts. This topic is usually a standalone chapter in the EIA Report. The biodiversity practitioner shall provide an assessment of the potential effects on biodiversity arising from each scenario for inclusion in the chapter.

C.10 Interaction with other Factors

Article 3 of the EIA Directive requires an assessment of the significant effects of the project on (a) population and human health; (b) biodiversity; (c) land, soil, water, air and climate; and (d) material assets, cultural heritage and the landscape. It also requires an assessment of the significant effects of the project on the interaction between these factors. For example, the changes in groundwater flows may damage ground water dependent terrestrial ecosystems and reduce their ability to store or absorb carbon dioxide. These broad scale topic interactions are generally addressed in a separate chapter of an EIA Report to which the biodiversity practitioner should contribute.

C.11 TII Biodiversity Metric

At Phase 2, the Options Appraisal Toolkit within the TII BM shall be used to inform the selection of the Preferred Option; optional at Stage 1 and mandatory at Stage 2. This is based on existing mapping and assumed habitat condition; therefore no field data is required.

At Phase 3, the data collected during the habitat surveys for the biodiversity impact assessment ~~should~~ shall be suitable for use in the TII Biodiversity Metric (TII BM) Full Biodiversity Metric Toolkit; it ~~should~~ shall use the same habitat classification system (and identify Annex I habitats) and include the data needed to determine the condition of habitats within the project boundary and any other areas to be included in the TII BM, using the TII BM Habitat Condition Assessment Sheets (and undertake more detailed condition assessments, if required).

The baseline biodiversity, as measured in Biodiversity Units (BU), shall inform the project design and the landscape design, with efforts made to firstly retain high value habitats (measured in BU) and then provide new habitats with high value (BU), as appropriate to the project location. A final project and landscape design is required before the change in BU can be predicted with confidence.

Accompanying the final TII BM shall be a landscape management plan which must *inter alia* set out how the project will achieve its intended outcome in terms of Biodiversity Units and detail the commitment to manage habitats on and off-site for a defined period to ensure that they achieve their target habitat type and condition. The content can be informed by the templates provided by Natural

England [195] [194]. The plan shall be prepared jointly by the design team, design team landscape architect and biodiversity practitioner(s).

The effects of the project on biodiversity shall be expressed in terms of losses and gains in BU, and the resulting balance. This can inform but does not replace the BIA. The BIA and the TII BM can be viewed as parallel assessments, rather than integrated.

C.12 Ecosystem Services

As defined in the National Planning Framework First Revision "*Ecosystem services are the services that an ecosystem supplies and on which humans depend. Ecosystem services from which humans benefit are often categorised as follows: provisioning services such as food, water, wood, fibre and genetic resources; regulating services such as climate regulation, floods, disease and water quality; cultural services such as recreation and ecotourism; supporting services such as soil formation, pollination and nutrient cycling*". Although the EIA requires consideration of the sustainable availability of natural resources, it does not require a specific assessment of the effect of the project on ecosystem services. However, an ecosystem services assessment may be required to demonstrate compliance with regional and county policy on maintaining ecosystem services, and for the relevant public authority to demonstrate regard to the objectives and targets for ecosystem services within the 4th National Biodiversity Action Plan. The BIA can provide the information to support an assessment of the effects of the project on ecosystem services, which is a separate assessment undertaken by a specialist practitioner. If required, the biodiversity practitioner shall work together with other specialists to ensure that relevant data is collected as part of the BIA [3].

C.13 Natural Capital

As defined in the National Planning Framework First Revision "*Natural capital can be defined as the world's stocks of natural assets which include geology, soil, air, water and all living things*"; it is usually expressed in economic terms. The EIA Directive does not require a specific natural capital assessment however the National Planning Framework First Revision includes a policy objective for the sustainable management of natural capital and the 4th National Biodiversity Action Plan includes objectives and targets for natural capital assessments. As with ecosystem services, the BIA can provide the information to support an assessment of the effects of the project on natural capital, which is a separate assessment undertaken by a specialist practitioner. If required, the biodiversity practitioner shall work together with other specialists to ensure that relevant data is collected as part of the BIA.

C.14 Human Health & Wellbeing

Human health and wellbeing are dependent on healthy environment, and an increasing body of evidence demonstrates that contact with nature and biodiversity improves mental health and encourages physical activity [196]. The outputs from the BIA should therefore inform the assessment of the effects of the project on human health.

Appendix D - Irreplaceable Habitats & Habitat Distinctiveness

D.1 Irreplaceable Habitats

Areas of the following habitats as mapped in NPWS datasets are regarded as irreplaceable habitats wherever they occur in Ireland:

- Raised bog
- Blanket bog
- Machair
- Turloughs
- Limestone pavement
- Ancient or long-established woodland.

D.2 Habitat Distinctiveness

Distinctiveness	Habitat Name	Links to Annex I Habitat*
Very High (8)	CD1 Embryonic dunes	2110
	CD2 Marram dunes	2120
	CD3 Fixed dunes	2130, 2140, 2150, 2170
	CD4 Dune scrub and woodland	2160
	CD5 Dune slacks	2170, 2190
	CD6 Machair (unless classified as irreplaceable)	21A0
	CM1 Lower salt marsh	1310, 1320, 1330, 1420
	CM2 Upper salt marsh	1330, 1410
	FL6 Turloughs (unless classified as irreplaceable)	3180
	FP1 Calcareous springs	7220
	FP2 Non-calcareous springs	
	HH4 Montane heath	4060
	PB1 Raised bog (unless classified as irreplaceable)	7110, 7120, 7150
	PB2 Upland blanket bog (unless classified as irreplaceable)	7130, 7150
	PB3 Lowland blanket bog (unless classified as irreplaceable)	7130, 7150
	WN1 Oak-birch- holly woodland (unless classified as irreplaceable)	91A0
	WN2 Oak-ash-hazel woodland (unless classified as irreplaceable)	
	WN3 Yew woodland (unless classified as irreplaceable)	91J0
	WN4 Wet pedunculate oak- ash woodland (unless classified as irreplaceable)	91E0
	WN5 Riparian woodland (unless classified as irreplaceable)	
	WN6 Wet willow- alder-ash woodland (unless classified as irreplaceable)	
	WN7 Bog woodland (unless classified as irreplaceable)	91D0

Distinctiveness	Habitat Name	Links to Annex I Habitat*
High (6)	CS1 Rocky sea cliffs	1230
	CS2 Sea stacks and islets	1230
	CS3 Sedimentary sea cliffs	1230
	CW1 Lagoons and saline lakes	1150
	CW2 Tidal rivers	1130
	FL1 Dystrophic lakes	3160
	FL2 Acid oligotrophic lakes	3110, 3130
	FL3 Limestone/marl lakes	3140
	FL4 Mesotrophic lakes	
	FL5 Eutrophic lakes	3150, if natural
	FW1 Eroding/upland rivers	3260
	FW2 Depositing/lowland rivers	3260, 3270
	GS1 Dry calcareous and neutral grassland	6210, 5130, 6130
	GS3 Dry-humid acid grassland	6230, 6130
	HH1 Dry siliceous heath	4030, 5130
	HH2 Dry calcareous heath	4030, 5130
	HH3 Wet heath	4010
	PF1 Rich fen and flush	7230
	PF3 Transition mire and quaking bog	7140
	WD1 (Mixed) broadleaved woodland (unless classified as irreplaceable)	
	WD2 Mixed broadleaved/conifer woodland	
	WL2 Species Rich Native Hedgerow	
Medium (4)	BL1 Stone walls and other stonework	
	CB1 Shingle and gravel banks**	1220
	ED3 Recolonising bare ground	
	ER1 Exposed siliceous rock	8220

Distinctiveness	Habitat Name	Links to Annex I Habitat*
	ER2 Exposed calcareous rock (unless classified as irreplaceable)	8210, 8240
	ER3 Siliceous scree and loose rock	8110
	ER4 Calcareous scree and loose rock	8120
	EU1 Non-marine caves	8310
	EU2 Artificial underground habitats	
	FL7 Reservoirs	
	FL8 Other artificial lakes and ponds	
	FS1 Reed and large sedge swamps	
	FS2 Tall-herb swamps	6430
	GM1 Marsh	6430
	GS2 Dry meadows and grassy verges	6510
	GS4 Wet grassland	6410
	LR1 Exposed rocky shores	1170
	LR2 Moderately exposed rocky shores	1170
	LR3 Sheltered rocky shores	1170
	LR4 Mixed substrata shores	
	LR5 Sea caves	8330
	LS1 Shingle and gravel shores	1210
	LS2 Sand shores	1140, 1210
	LS3 Muddy sand shores	1140
	LS4 Mud shores	
	LS5 Mixed sediment shores	
	MW1 Open marine water	
	MW2 Sea inlets and bays	1160
	MW3 Straits and sounds	
	MW4 Estuaries	1130

Distinctiveness	Habitat Name	Links to Annex I Habitat*
	PB4 Cutover bog (unless classified as irreplaceable)	7120, 7130, 7150
	PB5 Eroding blanket bog (unless classified as irreplaceable)	7130
	PF2 Poor fen and flush	
	SR1 Exposed infralittoral rock	1170, 8330
	SR2 Moderately exposed infralittoral rock	1170, 8330
	SR3 Sheltered infralittoral rock	1170, 8330
	SR4 Exposed circalittoral rock	1170, 8330
	SR5 Moderately exposed circalittoral rock	1170, 8330
	SR6 Sheltered circalittoral rock	
	SS1 Infralittoral gravels and sands	1110, 1130
	SS2 Infralittoral muddy sands	1130
	SS3 Infralittoral muds	
	SS4 Infralittoral mixed sediments	
	SS5 Circalittoral gravels and sands	
	SS6 Circalittoral muddy sands	
	SS7 Circalittoral muds	
	SS8 Circalittoral mixed sediments	
	WD3 (Mixed) conifer woodland	
	WD5 Scattered trees and parkland	
	WL1 Hedgerows	
	WL5 Treelines	
	WS1 Scrub	5130
	WS2 Immature woodland	
Low (2)	BC1 Arable crops	
	BC2 Horticultural land	
	BC3 Tilled land	

Distinctiveness	Habitat Name	Links to Annex I Habitat*
	BC4 Flower beds and borders	
	BL2 Earth banks	
	BL3 Buildings and artificial surfaces	
	CC1 Sea walls, piers and jetties	
	CC2 Fish cages and rafts	
	ED1 Exposed sand, gravel or till	
	ED2 Spoil and bare ground	
	ED4 Active quarries and mines	
	ED5 Refuse and other waste	
	FW3 Canals	
	FW4 Drainage ditches	
	GA1 Improved agricultural grassland	
	GA2 Amenity grassland (improved)	
	HD1 Dense bracken	
	WD4 Conifer plantation	
	WL3 Other Native Hedgerows	
	WL4 Non-Native and Ornamental Hedgerows	
	WS3 Ornamental/non- native shrub	
	WS4 Short rotation coppice	
	WS5 Recently felled woodland (unless classified as irreplaceable)	

* For some habitats, the Fossitt classification [50] is directly equivalent to an Annex I habitat, in others it is broader than the Annex I habitats (i.e. the Annex I habitat equivalent is a sub-category) and vice versa.

** For habitats in **bold** text which meet the definition for the Annex I type [197], the distinctiveness level is increased to High or Irreplaceable.

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