

# **Environmental Appraisal Report**

**Transmission Development Plan Northern Ireland 2019-2028**

**September 2019**





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# 1.0 Introduction

SONI, as Transmission System Operator (TSO), plays an important role in the economy of Northern Ireland. Through the provision of a secure electricity supply, SONI is responsible for ensuring that the lights stay on for homes and businesses across the region. Sustaining a reliable supply of electricity is not just important for existing consumers, it is also crucial to attracting investment. In order to ensure continued secure, reliable, economic and sustainable electricity supply SONI must continue to plan investment in the Northern Ireland transmission network.

The Transmission Development Plan Northern Ireland (TDPNI) 2019-2028 is the plan for the development of the Northern Ireland transmission network and interconnection over the ten years from 2019. This ten-year plan presents projects that are expected to be needed for the operation of the transmission network. In addition, future needs that may drive future potential projects are also discussed. The TDPNI is an annual rolling plan, updated each year to reflect the continuously changing nature of electricity requirements.

The TDPNI 2018-2027 was subject to SEA (Directive 2001/42/EC of the European Parliament and of the Council of Ministers, of 27 June 2001, on the Assessment of the Effects of Certain Plans and Programmes on the Environment) and Appropriate Assessment under the provisions of Article 6(3) of the EU Habitats Directive (Directive 92/43/EEC).

This Environmental Appraisal Report (EAR) has been prepared to ensure that the TDPNI 2019-2028 is in accordance with the provisions of the adopted TDPNI 2018-2027 and associated Strategic Environmental Assessment (SEA). The Grid Implementation Plan (IP) details the policies and objectives that drive a sustainable approach to Grid development and together with Strategic Environmental Objectives, and mitigation measures developed through SEA, ensure significant environmental impacts are avoided wherever possible.

A commitment of the SEA process is to conduct an environmental appraisal of each TDPNI. Each annual TDPNI subsequent to the 2018 Plan will contain an Environmental Appraisal to monitor the impacts of the TDPNI, in line with the adopted environmental monitoring from the SEA. The appraisal identifies any updates to the programme of projects as set out in the TDPNI 2018-2027 and examines these projects against the Strategic Environmental Objectives adopted in the TDPNI 2018-2027. The TDPNI does not set out a framework for project consent. It sets out the network investments needs and the projects that have been identified as required to meet the needs of the Northern Irish transmission system with the approval of the Utilities Regulator (UR). Individual projects will be subject to environmental assessment, including screening for Appropriate Assessment (AA) under the relevant planning requirements.

As the timeframes for all the potential developments in the TDPNI are currently not defined the EAR will assess these options for potential impacts in the short term - construction phase, the medium term – re-

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establishment and initial operational phase (0-5 years post construction) and the long term – operational phase (5 years onwards). There is no discussion provided on the decommissioning of any of the proposed developments, unless this is specifically part of the proposal. For note, for new lines and substations it would be assumed that any decommissioning of infrastructure, in line with all best practices and competent working, would have similar impacts to the short term construction phase impacts assessed in this report, and would look to provide no long term or permanent residual impact on a site.

This report has been prepared in accordance with Article 22 of European Directive 72/2009 and Condition 40 of the SONI TSO Licence.

## 2.0 Framework for Grid Development

A key focus in the development of our projects is on matters of proper planning and sustainable development. This requires a careful balancing of the technical need and solutions for a project with appropriate and adequate opportunities for public participation in the project development process. It must also include significant emphasis and focus on the environmental impact of the project, primarily in reference to the EU Habitats Directive, but also in terms of social impact.

SONI has been proactive in developing clear structured processes for the planning and development of electricity transmission infrastructure. This includes the technical development of projects in collaboration with matters of planning, environment, public affairs, administrative, financial and corporate governance.

The SONI Programme Delivery Unit has overall oversight of project development. It includes experienced experts in the areas of ecology, public planning, wayleaving and landowner engagement. These experts are assigned to all SONI projects, to advise and assist project managers and their project teams with ensuring a consistent approach to the sustainable planning and development of all projects.

The planning of grid development projects by SONI is done under a three part process (Figure 3.1). Asset replacement projects are progressed separately by NIE Networks. The process includes for stakeholder and public participation in the development of projects.

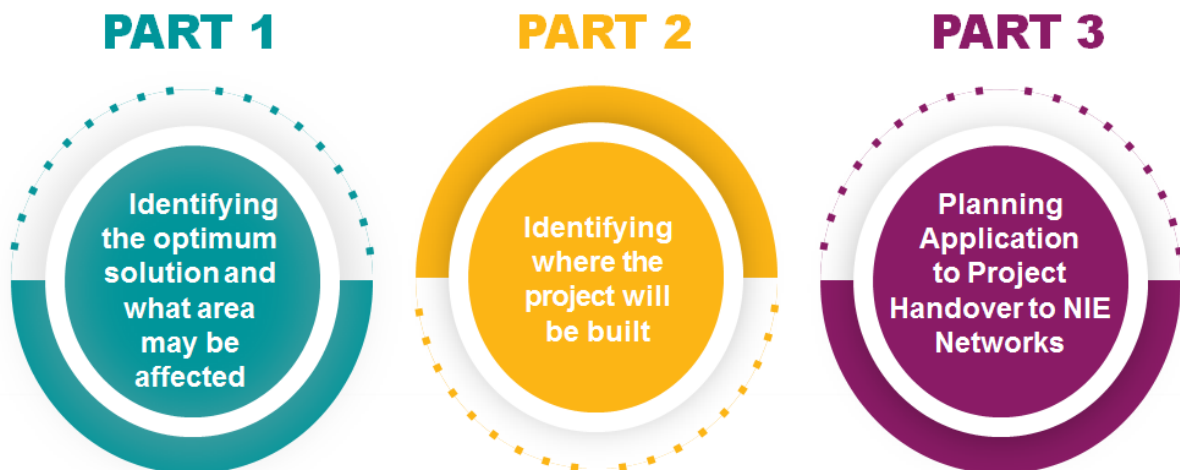


Figure 3.1: SONI's Grid Development Process

### Part 1: Planning: Identifying the optimum solution and what area may be affected

When a potential breach of the standards is identified, SONI will study the potential breach in detail including any other related issues. Consistent with good practice, as set out in the TSSPS, SONI may seek ways that would allow the potential breach to be managed operationally and put into place any changes to operational



practice as may be required. However, in certain cases where that operational mitigation would lead to unacceptable cost or risk for customers, SONI will prepare plans to develop the transmission system.

When we identify the need to develop a transmission project we then have to consider how it is best delivered. This means looking at a number of solutions and narrowing these down based on their technical viability, deliverability, cost, potential impact on the environment and on those living and working in the general area where the project may be located.

The steps in planning are to first identify a long list of options across a range of different technologies. Such options will include the need for any new substations or overhead line and underground cables. In some cases where appropriate the use of flexible AC transmission systems (FACTS) and HVDC will also be considered depending on the need identified. The long list of options will be assessed against multi-criteria analysis including at a high level, environmental and cost benefit assessments to identify a shorter list of potential options.

SONI will then consider the short list in greater detail and in some cases engage expert consultants to assist. These studies may include sensitivity studies to assess the performance of the options against different generation and demand assumptions. The process culminates with a recommendation for a preferred solution and tiering to establish the level of stakeholder engagement and consultation required. At this stage SONI will engage with the Utility Regulator in regard to cost recovery.

Depending on the nature of the project, SONI will seek to engage with key stakeholders before progressing the recommendation further. SONI will consider the stakeholder engagement findings and amend any plans accordingly before progressing further. It will also publicise the results of the stakeholder engagement process and its decision.

In parallel with the stakeholder engagement phase, and recognizing that the Utility Regulator is also a key stakeholder, SONI will seek approval for cost recovery through The Utility Regulator and progress the project to the outline design stage. This stage will identify any study areas for identification of new substations or corridors for overhead line and/or cable routes.

## **Part 2: Outline Design: Identifying where the project will be built**

SONI manages the pre-construction outline design of transmission projects once the need has been identified (part 1). This also includes consultation with the TAO, NIE Networks. The projects can involve the development of new substations, overhead lines or cable circuits operating at 110 kV and above.

SONI is responsible for preparing documentation required to apply for planning consent for the development of the projects - this entails developing the design to the level required for obtaining planning consent

including any necessary environmental reports or assessments, and consultations with stakeholders and landowners to obtain the right to gain access and install transmission equipment on their lands.

### **Part 3: Consents: Planning application to project handover to NIE Networks**

SONI submits planning applications with the relevant planning authority. SONI is also responsible for submitting any other consent applications that may be required, e.g. Marine License with the relevant consenting authority. The planning authority will make a legally binding decision on the project. It may grant full planning permission, grant permission on the basis that we make changes, or refuse permission. SONI is also responsible for the acquisition of any wayleaves, easements, access rights, land options, leases and any other legal rights required for the installation of the new infrastructure.

Following receipt of planning and landowner consents the project is handed over to NIE Networks for detail design. This includes a review of the SONI functional specification (outline design and consents) and preparation of a design specification. Separate preconstruction work for NIE Networks will include tendering and procurement. Following receipt and review of the design specification from NIE Networks, SONI issues a Transmission Project Instruction and enters into a Project Agreement with NIE Networks. NIE Networks then deliver the project.

### 3.0 Policies and Objectives

SONI has a legal responsibility to comply with planning law, including all relevant environmental legislation. In practice, this means that environmental issues inform the decision making process when it comes to developing the grid in Northern Ireland. This TDPNI is subject to Strategic Environmental Assessment as outlined in previous sections.

The planning and environmental considerations are embedded into the Framework for Grid Development and every grid development project that SONI undertakes in order to ensure that environmental issues are at the forefront of decision-making. Early involvement in projects allows potential environmental issues to be identified and avoided or managed in the course of project development.

### 3.1 Environmental Policies and Objectives

The following environmental policies (ENVP) have been compiled to ensure that SONI has due regard for existing environmental protection legislation and environmental best practice when developing projects. Environmental objectives (ENVO) have also been developed for a number of environmental topics. All of the environmental policies and objectives detailed below have been assessed against Strategic Environmental Objectives.

Table 3.1: Environmental Policies Objectives as set out in the TDPNI 2018-2029				
Topic	Policy			Objective
General	ENVP1	To promote best environmental practice in the design and appraisal of transmission development projects.		
Biodiversity	ENVP2	To exercise its functions as a TSO in line with the Wildlife and Natural Environment Act (Northern Ireland) 2011 and the Northern Ireland Biodiversity Strategy (2015) to further the conservation of biodiversity so far as is consistent with the proper exercise of those functions.	ENVO1	To prepare and utilise industry specific Ecology Guidelines for the development of Transmission projects. This will ensure a standard approach to ecological impact assessment for transmission projects.
	ENVP3	To avoid adverse effects on sites designated for nature conservation including, Special Conservation Areas, Special Protection Areas, RAMSAR Sites, Areas of Special Scientific Interest and National Nature Reserves.		
	ENVP4	To protect NI priority species and habitats and other species protected under legislation in the development of any transmission infrastructure and to preserve key ecological linkage features		
Climate Change	ENVP5	To integrate measures related to climate change into grid development, by way of both effective mitigation and adaptation responses, in accordance with available guidance and best		

		practice.		
Noise	ENVP6	To employ methods on transmission infrastructure which minimise noise emissions in line with best industry practice.	ENVO2	To give careful consideration to the siting of transmission infrastructure so as to ensure that noise-sensitive receptors are protected from potential noise emissions.
			ENVO3	To seek to preserve and maintain noise quality in accordance with good practice and relevant legislation.
Landscape	ENVP7	To have regard to the Northern Ireland Landscape Character Assessment 2000, and the Northern Ireland Seascape Character Assessment in the design and appraisal of its transmission development projects.	ENVO4	To protect landscapes through the sustainable planning and design of transmission infrastructure and to have regard to important landscape designations including AONBs and the World Heritage Site.
Cultural	ENVP8	To take reasonable measures to ensure that the special interest of protected structures, including their curtilages and settings, are protected when considering site or route options for the planning of transmission infrastructure.		
	ENVP9	To protect archaeological material when planning transmission infrastructure, by avoidance or by best practice mitigation measures.		
Water	ENVP10	That there is no increase in flood risk as a result of transmission development, and to ensure any flood risk to the development is appropriately managed.	ENVO5	That all grid development proposals, and in particular, transmission substation developments, shall carry out, to an appropriate level of detail, a site-specific Flood Risk Assessment that shall demonstrate compliance with all current Guidelines, standards and best practice. The Flood Risk Assessment shall pay particular emphasis to residual flood risks, site-specific mitigation measures, flood-resilient design and construction, and any necessary management measures.
	ENVP11	To promote the use of sustainable urban drainage systems in any new developments where it is appropriate.		
	ENVP12	To have regard to Planning Policy Statements and Supplementary Planning Guidance: PPS 15 Planning and Flood Risk Development Control Considerations in the preparation of grid development strategies and plans.		
Air Quality	ENVP13	To preserve and maintain air quality in accordance with good practice and relevant legislation in the proposed construction of its transmission projects.		
	ENVP14	To ensure appropriate dust suppression during construction works.		
Tourism	ENVP15	To consider the potential impact upon tourism in the planning of transmission projects.	ENVO6	To identify the nature of tourism in a project area; to consider the cumulative / in combination impact on tourism of a project and to consider short term and long term impacts of grid development projects on tourism as appropriate.

### 3.2 Strategic Environmental Objectives

The SEA of the TDPNI 2018-2028 set out nine Strategic Environmental Objectives (SEOs). SEOs are methodological measures against which the potential environmental effects of the TDPNI can be examined. The SEOs are set out under a range of environmental topics below. The SEOs guide sustainable grid development and are used as standards against which the provisions of the TDPNI can be evaluated. This is in order to help identify areas in which potential significant impacts may occur. The new projects as set out in the TDPNI 2019-2028 are evaluated against these SEOs. These SEOs will be used as part of a Monitoring Framework for the wider TDPNI 2019-2028 with targets, indicators data sources specified through the SEA process.

Table 3.2: Strategic Environmental Objectives as set out in the SEA of the TDPNI 2018-2029				
Topic	Objective	Sub-Objective		
Biodiversity, Flora & Fauna	1	Avoid damage to, and where possible enhance, biodiversity, flora and fauna.	A	Preserve, protect, maintain and where possible enhance internationally protected species and their key habitats.
			B	Preserve, protect, maintain and where possible enhance national and local nature conservation sites and protected species, or other know species of conservation concern.
Population & Human Health	2	Minimise the risk to and provide benefit for the community and human health.	A	Minimise disruption and displacement to the local population, while providing robust transmission infrastructure.
			B	Minimise risks to human health and social deprivation, while providing robust transmission infrastructure.
Soils, Geology and Landuse	3	Minimise damage to the function and quality of the soil resource in the study area in construction and operation of transmission infrastructure.	A	Minimise damage to the function and quality of the soil resource in the study area in construction and operation of transmission infrastructure.
Water	4	Avoid impacts and interaction with water quality, quantity and resource.	A	Avoid damage to or deterioration of water status, quality and resource.
			B	Avoid interactions with coastal, pluvial or fluvial flood extents.
Air	5	Minimise risk to local air quality and contribute to improving regional emissions	A	Minimise risk to local air quality and contribute to improving regional emissions
Climatic Factors	6	Adaption of infrastructure to potential climatic change and reduced GHG emissions	A	Adaption of infrastructure to potential climatic change and reduced GHG emissions
Material Assets & Infrastructure	7	Provide new, robust electrical transmission infrastructure with minimal disruption to other assets and infrastructure.	A	Provide new, robust electrical transmission infrastructure with minimal disruption to other assets and infrastructure.
Cultural, Architectural & Archaeological Heritage	8	Protect the historic environment and cultural heritage.	A	Protect the historic environment and cultural heritage.
Landscape & Visual	9	Minimise the potential for negative impacts on landscape and visual amenity.	A	Minimise the potential for negative impacts on landscape and visual amenity.

## 4.0 Update on Projects in TDPNI 2018-2027

To ensure adequate security of electricity supply, further market integration, and the integration of renewable energy sources, it is necessary to provide ongoing and timely reinforcement of the Northern Ireland electricity transmission system. These reinforcement needs can be divided into the following categories:

- Reinforcements to support changes in, or connection of new, demand;
- Reinforcements required to support changes in, or connection of new, generation;
- Reinforcements related to interconnection;
- Reinforcements to facilitate inter-regional power flows; and
- Reinforcements to address the condition of existing assets.

The TDPNI 2018-2027 included no. 47 projects. This list has been updated for TDPNI 2019-2028 with no. 81 projects now in progress. This is an increase of no. 34 projects in total. There are no. 23 projects which are new NIE Networks asset replacement projects, no. 9 new capital projects, one project has been split into no. 3 individual projects, one project which has been split into no. 5 individual projects, no. 5 projects were cancelled and no. 1 project has been connected. These no. 33 projects are new to the TDPNI 2019-2028 and therefore were not considered in the environmental appraisal carried out for TDPNI 2018-2028 or as part of the SEA process. Changes to SONI network development projects are listed in Tables 4.1 below.

No.	Project Title	Status	Type	Region
1	Curraghmulkin (Drumquin) 110/33 kV Cluster	Connected	New Build (Station)	N&W
2	Coleraine, Omagh, Tamnamore Reactive Compensation	Cancelled	Uprate/Modify (Station)	N&W
3	Compressed Air Energy Storage Scheme Connection	Cancelled	New Build (Line)	S-E
4	Fair Head/Torr Head Tidal Connection	Withdrawn	New Build (Line)	N&W
5	Kells Remote Control	Cancelled	Uprate/Modify (Station)	S-E
6	Kells Inter-bus Transformer 1 Replacement	Cancelled	Refurbish/Replace (Station)	S-E
-	Ballylumford – Castlereagh 110 kV Circuits Refurbishment	Scope change (Now 3 Projects)	Refurbish/Replace (Line)	S-E
7	Ballylumford – Eden Uprate		Refurbish/Replace (Line)	S-E
8	Eden Carnmoney Uprate,		Refurbish/Replace (Line)	S-E
9	Carnmoney – Castlereagh Uprate		Refurbish/Replace (Line)	S-E
-	NW of NI Reinforcement	Scope change (now 5 Projects)	New Build (Line)	N&W
10	North West of NI 110kV reinforcement		New Build (Line)	N&W
11	North West of NI Large-scale Reinforcement		New Build (Line)	N&W
12	Coolkeeragh – Strabane 110 kV Uprate		Uprate/Modify (Line)	N&W
13	Coolkeeragh – Killymallaght 110 kV Uprate		Uprate/Modify (Line)	N&W
14	Killymallaght – Strabane 110 kV Uprate		Uprate/Modify (Line)	N&W
15	Castlereagh, Tandragee and Tamnamore Reactors	Scope change	New Build (Within Station)	S-E
16	Gort 110/33 kV 2nd Transformer	New project	New Build (Within Station)	N&W
17	Coolkeeragh Reactive Compensation	New project	New Build (Within Station)	N&W
18	Coolkeeragh – Magherafelt 275 kV Switchgear	New project	Uprate/ Modify (Station)	N&W
19	Omagh Main – Dromore Third Circuit	New project	New Build (Line)	N&W
20	Strabane – Omagh 110 kV Uprate	New project	Uprate/Modify (Line)	N&W
21	East Tyrone Reinforcement Project	New project	New Build (Within Station)	N&W
22	Rasharkin Cluster 110/33 kV 2nd Transformer	New project	New Build (Within Station)	N&W
23	Tamnamore – Drumakelly 110 kV Uprate	New project	Uprate/Modify (Line)	S-E
24	Moyle 275 kV Reinforcement	New project	New Build (Line)	S-E

Table 4.2 summarises the no. 81 (active) projects into their respective categories as detailed in TDPNI 2019-2028. These projects are categorised as either “New Build”, “Uprate/Modify” or “Refurbish/Replace” projects<sup>1</sup>. Over 72% of projects relate to existing assets i.e. Uprate/Modify or Refurbish/Replace projects.

Table 4.2: Summary of Active Projects by Category TDPNI 2019-2028	
Project Category	No. of Projects
New Build	18
Uprate/Modify	22
Refurbish/Replace	38
Other	3
<b>Total</b>	<b>81</b>

Table 4.3 outlines where the projects sit in the context of the Framework for Grid Development, which is described in Section 2.0.

Table 4.3: No of Projects in Each Stage					
Part 1 Planning	Part 2 Outline Design	Part 3 Consents	Asset Replacement	Under Construction	TOTAL
31	2	7	40	1	81

Power flows on the transmission network are not contained within specific localities. Therefore, from a transmission planning viewpoint, it is more appropriate to represent planning areas that best reflect the conditions and power flows on the transmission network. For this purpose we refer to two planning areas in Northern Ireland: North and West; and South-East. Table 4.5 outlines where projects are situated.

<sup>1</sup> **New Build projects:** Projects that involve the construction of new stations or new circuits. This category also includes projects that involve the installation of new equipment in existing stations. An example of a new build project is the installation of new transformers or new reactive support devices within existing stations.

**Uprate/ Modify projects:** Projects that involve the uprating of existing assets. An example of an uprate project is changing equipment to increase the capacity rating of circuits or busbars. This can include changing the overhead line (conductor) with a more efficient and higher ‘rated’ conductor. This category also includes projects that involve the modification of existing assets. An example of a modification project is the installation of new couplers or new bays in existing stations. Reconfiguration of existing stations is also included in this category.

**Refurbish/ Replace projects:** Projects that involve the maintenance of existing stations or existing circuits. This category also includes projects that involve the replacement of existing assets. For example, the replacement of stations at or close to the end of their useful life or replacement and upgrading of protection in existing stations.

**Other:** Other: are projects that do not fall naturally into any of the three categories above.



Table 4.4: Summary of Number of Development Projects in Progress by Region and Project Category					
Project Category	North and West	South-East	Projects in Both Areas	Asset Replacement	TOTAL
New Build	9	9	0	0	18
Uprate/ Modify	8	7	5	2	22
Refurbish/ Replace	0	0	0	38	38
Other	0	3	0	0	3
<b>TOTAL</b>	<b>17</b>	<b>19</b>	<b>5</b>	<b>40</b>	<b>81</b>

The regions and planning areas that best reflect the conditions and power flows on the transmission network are illustrated in Figure 4.1 below.

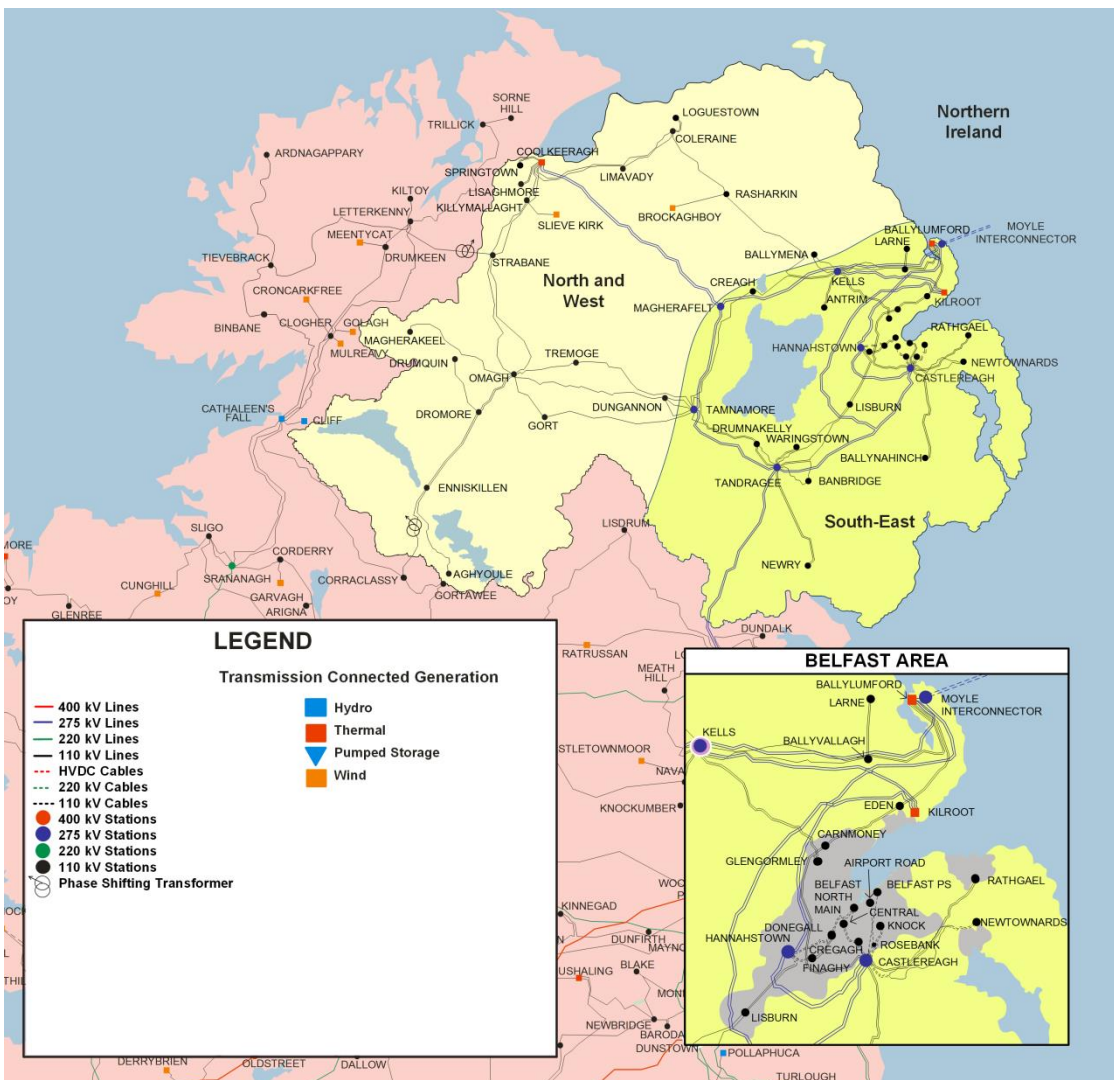


Figure 4.1 Illustration of the Northern Ireland planning areas



## 5.0 Evaluation of New Projects

### 5.1 New Projects

The TDPNI 2019-2028 has defined a list of the potential new projects that could be developed within the Plan period up to 2027. A number of these potential projects are screened out of requiring evaluation as the works are of such a scale as not to be considered significant and / or are localised to within existing electrical transmission sites / substations. Many of these proposals that have been screened in may require future environmental studies at the project level, such as Environmental Impact Assessment under the Environmental Impact Assessment (EIA) Directive 85/337/EEC as transposed by the Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 1999 and recent amendment The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2017.

#### 5.1.1 Ballylumford – Castlereagh 110 kV Circuits Refurbishment

##### 5.1.1.1 Ballylumford-Eden 110 kV Circuit Uprate

The driver for this project is security of supply. The conductor on the existing tower line as well as a number of towers and foundations will be replaced due to the condition and age of the existing assets. The conductor will also be uprated to cater for increased demand. **Completion date: 2022**

##### 5.1.1.2 Eden-Carnmoney 110 kV Circuit Uprate/Reconfiguration

The driver for this project is security of supply. The existing conductor is due for replacement due to the age of the assets. This project may involve reconfiguration of the circuits but the full scope will be determined in due course. **Completion date: 2023**

##### 5.1.1.3 Carnmoney-Castlereagh 110 kV Circuit Uprate/Reconfiguration

The driver for this project is security of supply. The existing conductor is due for replacement due to the age of the assets. This project may involve reconfiguration of the circuits but the full scope will be determined in due course. **Completion date: 2024**

#### 5.1.2 Castlereagh, Tandragee and Tamnamore Reactors

The driver of this project is security of supply. Further shunt reactors are planned to be installed at Castlereagh, Tandragee and Tamnamore substations in order to improve voltage regulation when the network is lightly loaded. **Completion date: 2022.**

### **5.1.3 Gort 110/33 kV 2nd Transformer**

The driver of this project is RES integration and security of supply. Slieve Divena wind farm is currently connected to the distribution system. A reduction in local demand and increase in small scale generation means that there is a risk of overload on this network. This project will involve the installation of a second 110/33 kV transformer at Gort to allow the transfer of Slieve Divena wind farm to Gort. Completion date: Summer 2022.

### **5.1.4 Coolkeeragh Reactive Compensation**

The drivers of this project are security of supply and RES integration. The continued development of wind generation in the North and West of Northern Ireland has resulted in a need for voltage support. Reactive support will be installed at Coolkeeragh, connected to the 110 kV busbar. Completion date: Winter 2023.

### **5.1.5 Coolkeeragh – Magherafelt 275 kV Switchgear**

The drivers of this project are RES integration and security of supply. During periods of high generation in the North West, there is a risk of overloading 110 kV circuits following tripping of the 275 kV line between Coolkeeragh and Magherafelt. This project involves installing single phase tripping and high speed auto-reclose circuit breakers on these circuits to minimise the impact of a fault, and to allow rapid reinstatement following a transient fault. **Completion date: 2024.**

### **5.1.6 Omagh Main – Dromore Third Circuit**

The drivers of this project are security of supply and RES integration. There is a significant amount of wind generation connected to the distribution network in Fermanagh and west Tyrone. During periods of high wind, there is a risk of overload on one of the Omagh – Dromore circuits in the event of the loss of the other. This risk constrains wind output in the area. This project will involve construction of a third circuit to alleviate these constraints and overload risk. Completion date: 2028.

### **5.1.7 Strabane – Omagh 110 kV Uprate**

The drivers of this project are RES integration. With increasing generation in the North West there is a risk of overload of the 110 kV circuits between Strabane and Omagh. This project will involve replacement of the conductor on the existing tower lines with new conductor of a higher rating. **Completion date: 2026.**

### 5.1.8 East Tyrone Reinforcement Project

The driver for this project is security of supply. The driver of this project is security of supply. There is a need to reinforce the distribution system supplying Cookstown and the surrounding area due to increasing demand. It is also forecast that demand will exceed capacity at the existing Dungannon 110/33kV substation. Options being considered include:

- Installation of a 2nd Transformer at Tremoge and reconfiguration of the distribution network supplying Cookstown;
- Construction of a 2nd 110/33 kV substation at Dungannon;
- Establishing a new 110/33kV substation at Cookstown with new 110kV circuits from Dungannon, Tremoge or Tamnamore.
- 

**Completion date: Winter 2022.**

### 5.1.9 Rasharkin Cluster 110/33 kV 2<sup>nd</sup> Transformer

The driver of this project is RES integration and security of supply. Gruig wind farm is currently connected to the distribution system. A reduction in local demand and increase in small scale generation means that there is a risk of overload on this network. This project will involve the installation of a second 110/33 kV transformer at Rasharkin to allow the transfer of Gruig wind farm to Rasharkin. **Completion date: Summer 2022.**

### 5.1.10 Tamnamore – Drumnakelly 110 kV Uprate

The driver of this project is security of supply. These circuits may be subject to overload under high wind generation conditions and are operated out of service. This project is to replace the conductor on these circuits with higher capacity conductor. This will allow these circuits to fully return to service. **Completion date: 2027.**

### 5.1.11 Moyle 275 kV Reinforcement

The drivers for this project are market integration, security of supply and RES integration. At present, full utilisation of the 500 MW export capability of the Moyle Interconnector is prevented by the potential for network overloads in the event of the loss of the 275 kV double circuit between the Moyle converter station at

Ballycronan More and the nearby Ballylumford substation. This project involves construction of a new 275 kV cable between Ballylumford and Ballycronan More in order to secure operation of the Moyle against this contingency. It will be subject to cost-benefit analysis before proceeding. **Completion date: 2028.**

## 5.2 Evaluation of New Projects against SEOs

As detailed in Tables 4 and 5 there are three types of new reinforcement projects in the TDPNI 2017-2027 – new builds, refurbishment/replacement projects and uprate/modifications projects. The integration of renewable energy sources is a key driver in new projects. This will be achieved through new build, uprate/modification and refurbishment projects. This key driver is in accordance with SEO7 and is likely to continue improve this SEO in the longer term. By making improvements to the existing transmission system through uprates/modifications and refurbishment/replacements, potential impacts to the receiving environment can be minimised. The utilisation of existing assets would have a neutral impact on SEOs related to landscape (SEO9), ecological connectivity (SEO1), population centres (SEO2) and sustainable land use (SEO 3). Potential issues can arise where (existing) transmission infrastructure assets are located in sensitive areas such as sites designated for nature conservation (SEO1A), areas of significance for cultural heritage (SEO8) and or sensitive water catchments (SEO4). In general, these issues can be identified early in the project planning process and mitigation measures developed to ensure that no significant effects arise. A detailed evaluation of each projects is contained in Appendix A.

The impact of any new build project is a function of the project type and the sensitivities of the environment in which it is to be developed. There is the potential for impacts on a range of environmental factors. However, with proper planning and robust environmental assessment, significant effects (and conflicts with SEOs) can be mitigated in the vast majority of cases. Certain new build projects have the potential to conflict with the SEO related to landscape. The application of mitigation through avoidance (of sensitive landscape areas), sensitive routing and screening may not be sufficient in all instances to remove significant effects on localised landscapes.

A high level review of the new projects listed on the TDPNI 2019-2028 indicates that there is unlikely to be any potential for significant residual impacts post mitigation for any of the new build projects. Table 5.2 summarises the evaluation of SEOs against the three different types of reinforcement projects. Mitigation measures as detailed in the SEA Environmental Report and Natura Impact Statement which remain relevant for this environmental appraisal of the TDPNI are presented in Appendix B.

Table 5.1 Summary evaluation of planned network developments (new to TDPNI 2018-2027)																														
Project Type	No. of Projects	SEO1A	SEO1B	SEO2A	SEO2B	SEO3A	SEO3B	SEO4	SEO5	SEO4	SEO5	SEO6	SEO7	SEO8	SEO9															
New Build (Line)	3	?	?	?	?	?	?	?	?	?	?	+	?	?	?															
New Build (Station)	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X															
Uprate/Modify (Line)	2	*	*	*	*	*	*	*	*	*	*	+	*	*	*															
Uprate/Modify (Station)	5	*	*	*	*	*	*	*	*	*	*	+	*	*	*															
Refurbish/Replace (Line)	1	*	*	*	*	*	*	*	*	*	*	+	*	*	*															
Refurbish/Replace (Station)	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X															
<i>Discussion</i>																														
<p>Where a modification, uprate, redevelopment or refurbishment is taking place within a station there is minimal work required and this work will typically be undertaken within the footprint of an existing station. Where a refurbishment or line uprate is taking place, there will be minimal change operationally but there is potential for some small-scale construction works. Therefore, there could be construction related impacts including but not be limited to the following:</p> <ul style="list-style-type: none"> <li>- habitat removal or disturbance to species for access requirements;</li> <li>- disturbance to local residents from construction works i.e. noise or dust emissions; and</li> <li>- Potential pollution of nearby watercourse.</li> <li>- Depending on the receiving environment, there may be potential for impacts on designated sites, therefore screening for the need for Appropriate Assessment is undertaken for all refurbishment and uprate projects</li> </ul> <p>These refurbishment projects will be subject to the inherent mitigation and in particular the construction best practice. The adherence to this construction best practice will facilitate the avoidance and reduction of significant effects. Therefore, the likely effects associated with the construction works from these refurbishments projects are not likely to be significant however, on a precautionary basis the magnitude of impacts have been determined to be unknown for three of the SEOs. There are no LSEs anticipated for the remaining SEOs. All new build projects will be subject to environmental assessment as part of the relevant planning process for these projects. Refurbishment/replacement and uprate/modification projects are generally considered to be permitted development under relevant sections of the Planning Act. Where there is potential for significant effects on a European Site, this permitted development status is lost and planning permission must be sought.</p>																														
<table border="1"> <thead> <tr> <th>Description of Effect</th> <th>Effect</th> </tr> </thead> <tbody> <tr> <td>Likely to have a positive effect</td> <td>+</td> </tr> <tr> <td>Likely to have a negative effect</td> <td>-</td> </tr> <tr> <td>Effects are uncertain/there is insufficient information on which to determine effect</td> <td>?</td> </tr> <tr> <td>Likely to have a neutral effect</td> <td>*</td> </tr> <tr> <td>Likely to have a mixed positive &amp; negative effect</td> <td>+/-</td> </tr> <tr> <td>Likely to have a mixed negative &amp; positive effect</td> <td>-/+</td> </tr> <tr> <td>Not Applicable</td> <td>X</td> </tr> </tbody> </table>															Description of Effect	Effect	Likely to have a positive effect	+	Likely to have a negative effect	-	Effects are uncertain/there is insufficient information on which to determine effect	?	Likely to have a neutral effect	*	Likely to have a mixed positive & negative effect	+/-	Likely to have a mixed negative & positive effect	-/+	Not Applicable	X
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Likely to have a mixed negative & positive effect	-/+																													
Not Applicable	X																													

## 5.3 Mitigation

Mitigation measures have been recommended where potential negative impacts have been identified. These mitigation measures aim to prevent, reduce and as fully as possible offset any significant adverse effects on the environment due to implementation of the projects within the TDPNI. The mitigation measures that have arisen in the TDPNI and SEA processes have been included Appendix B and should also be referred to.

The principal mitigation recommendation is that the predicted negative effects should be considered further during the next stage of detailed planning and design, when the specifics of the development infrastructure options can be optimised through detailed feasibility studies and design in order to limit the potential impacts on sensitive receptors. Further environmental studies based on the more detailed designs and construction methodologies should be undertaken as appropriate. These studies may involve, but are not limited to, marine, aquatic and terrestrial ecology surveys, ornithological and bat surveys, fish surveys, landscape and visual assessments, WFD assessments, geotechnical investigations and heritage surveys.

Before any works are carried out, detailed method statements and management plans (construction and environmental) should be prepared, including timing of works, information on the specific mitigation measures to be employed for each works area, and mechanisms for ensuring compliance with environmental legislation and statutory consents. The timing of construction and maintenance works should be planned to avoid any potential for negative cumulative impacts or inter-relationships with other schemes, plans or projects, yet look to optimise any potential positive cumulative impacts or inter-relationships.

Contractors should be required to prepare Construction Environmental Management Plans (CEMPs), which would include a requirement for related plans to be prepared, as appropriate, for project implementation, such as Erosion and Sediment Control, Invasive Species Management, Emergency Response, Traffic and Safety Management, Dust and Noise Minimisation, and Stakeholder Communication Plans.

Works should only be carried out once the method statements have been consulted on with competent authorities, such as the NIEA. At the project level it will not be sufficient to defer the production of construction method statements. These should be completed in the detailed design stage and may be subject to further Appropriate Assessment where potential impacts have been identified. Where there may be unavoidable impacts on protected habitats and/or species the necessary derogation licences should be applied for prior to seeking planning permission or approval for a scheme.

Marine construction and in stream works have the greatest potential for negative impacts during spawning / breeding and early nursery periods for aquatic and marine protected species. No marine or instream works should occur during restricted periods for relevant species and consultation should be undertaken with the appropriate authorities in this regard. Monitoring of project-level mitigation measures should be undertaken

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during and after works, to ensure effectiveness. All works and planning of works should be undertaken with regard to all relevant legislation, licensing and consent requirements, and recommended best practice guidelines. An ecological clerk of works should be appointed for environmental management of each infrastructure development, and where specific sensitive species may be impacted, an appropriate expert should also be appointed

## 6.0 Conclusion

The TDPNI 2019-2028 has been examined in terms of the provisions of the SEA of the TDPNI 2018-2027. There are no. 18 new projects are detailed in TDPNI 2019-2028 since the adoption of TDPNI 2018-2027. Therefore, to ensure consistency with the provisions of the most recent SEA, these projects have been examined against the strategic environmental objectives as detailed in the Environmental Report (2018).

These projects consist of new builds (lines, additional infrastructure within stations and cable connections), refurbishment/replacement projects and uprates/modification projects of existing assets. These categories of projects (as they relate to the project listed) have been assessed against the Strategic Environmental Objectives from the SEA and it has been determined that following the implementation of mitigation measures the SEOs will be achieved. The mitigation measures are included in Appendix B for information.

Environmental assessments, as part of Environmental Reports or Environmental Impact Assessments in respect of specific projects, will seek to minimise and where possible avoid significant effects on the natural environment and landscape.





# Appendix A: Detailed Evaluation of Projects

Detailed Evaluation of Projects in the TDPNI 2018-2029									
Project	Type	Area	Detail	Date	TDP 2018	SEA 2018	EAR 2019	Appraisal	Evaluation
Ballylumford Switchgear Replacement	Asset Replacement	S-E	The existing 110 kV switchgear at Ballylumford is to be replaced with a new 110 kV GIS double busbar and the 110 kV circuits diverted accordingly. The need for this project arises from the age, condition and obsolescence of the existing equipment as well as the potential for high short circuit currents in the event of a fault.	2020	X	O	O	Very localised impacts only within existing sites	N/A
Ballymena Transformer 3 and 4 Replacement	Asset Replacement	N&W	The 110/33kV transformers TX 3 and 4 at Ballymena Main are to be replaced due to the condition of the assets.	2020	X	O	O	Very localised impacts only within existing sites	N/A
Castlereagh Inter-Bus Transformer 1 Replacement	Asset Replacement	S-E	The 275/110kV 240 MVA interbus transformer IBTx 1 at Castlereagh is to be replaced due to the age and condition of the existing transformer.	2019	X	O	O	Very localised impacts only within existing sites	N/A
Coolkeeragh - Magherafelt 275 kV Circuits Refurbishment	Asset Replacement	N&W	The need for this project arises from the condition and rating of the existing conductor on the double circuit tower line, originally installed in the 1960s. Under certain scenarios there is a risk of overloading the existing conductor. The rating of the replacement conductor will be increased to cater for increased generation and will be defined as part of the redesign of the circuit.	2021	X	I	I	Already Assessed in SEA	N/A
Donegall Main (North) Transformer Replacement	Asset Replacement	S-E	The 60 MVA transformer Tx B at Donegall North is to be replaced by a new 90 MVA unit. The need for this arises because of the condition of the asset. The rating of 90 MVA is the standard rating now procured for 110/33kV transformer applications.	2021	X	O	O	Very localised impacts only within existing sites	N/A
Enniskillen Main Transformer 1 and 2 Replacement	Asset Replacement	N&W	The 110/33kV transformers TX 1 and 1 at Enniskillen are to be replaced due to the condition of the assets.	2024	X	O	O	Very localised impacts only within existing sites	N/A
Glengormley Main Transformer Tx B Replacement	Asset Replacement	S-E	The 110/33 kV transformer Tx B is to be replaced due to the age of the existing transformer.	2022	X	O	O	Very localised impacts only within existing sites	N/A
Hannahstown 110 kV Disconnectors Replacement	Asset Replacement	S-E	All of the 110 kV Current Transformers (CTs) at Hannahstown are to be replaced due to the age and condition of the existing transformers.	2020	N/A	N/A	O	Very localised impacts only within existing sites	N/A
Hannahstown 275 kV Structures, Busbars and Disconnectors Replacement	Asset Replacement	S-E	The 275 kV structures, busbars and disconnectors at Hannahstown are to be replaced due to the age and condition of the existing assets.	2022	N/A	N/A	O	Very localised impacts only within existing sites	N/A
Hannahstown Inter-Bus Transformer 1 and 2 Replacement	Asset Replacement	S-E	The 275/110kV 240MVA interbus transformers IBTx 1 and 2 at Hannahstown are to be replaced due to the age and condition of the existing transformers.	2024	X	O	O	Very localised impacts only within existing sites	N/A
Kells and Tandragee Shunt Reactor Replacement	Asset Replacement	S-E	The TR1 and TR2 reactors at Kells and Tandragee 275kV substations (respectively) are to be replaced by 2027 due to the age and condition of the existing assets.	2027	X	O	O	Very localised impacts only within existing sites	N/A
Limavady Main 110kV Refurbishment	Asset Replacement	N&W	The 110 kV mesh at Limavady Main is to be refurbished due to the condition and rating of the existing assets. Consideration will also be given to the installation of a GIS switchboard.	2024	X	O	O	Very localised impacts only within existing sites	N/A
Strabane Main 110kV Refurbishment	Asset Replacement	N&W	The 110 kV mesh at Strabane Main is to be refurbished due to the condition of the existing assets. Consideration will also be given to the installation of a GIS switchboard.	2024	X	O	O	Very localised impacts only within existing sites	N/A
RP6 275 kV Tower Maintenance	Asset Replacement	Both	This project includes maintenance of 275 kV towers and condition assessment of towers and foundations.	2024	X	O	O	Very localised impacts only within existing sites	N/A
RP6 110 kV Tower and Overhead Line Maintenance	Asset Replacement	Both	This project includes conductor replacement on some 110 kV spans, wood pole replacement, tower maintenance and tower and foundation condition assessments.	2024	X	O	O	Very localised impacts only within existing sites	N/A
RP6 110 kV Cable Maintenance	Asset Replacement	Both	This project includes 110 kV cable refurbishment, cable flushing and maintenance of ancillaries.	2024	X	O	O	Very localised impacts only within existing sites	N/A
RP6 110 kV Protection	Asset Replacement	Both	This project includes replacement, maintenance and upgrading of protection at 110 kV substations.	2024	X	O	O	Very localised impacts only within existing sites	N/A
RP6 275 kV Protection	Asset Replacement	Both	This project includes replacement, maintenance and upgrading of protection at 275 kV substations.	2024	X	O	O	Very localised impacts only within existing sites	N/A
Miscellaneous RP6 Works	Asset Replacement	Both	This includes a number of small, within-station works including asbestos removal, concrete refurbishment, transformer bunding, station electrical systems, civil works, painting, earthing transformer replacement, transformer cooler replacement, security upgrades, health and safety upgrades, and provision of spares.	2024	X	O	O	Very localised impacts only within existing sites	N/A
Ballylumford 275 kV CVT Replacement	Asset Replacement	S-E	The Capacitor Voltage Transformers (CVTs) on a number of 275 kV circuits at Ballylumford are to be replaced due to the age and condition of the existing assets.	2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A

Detailed Evaluation of Projects in the TDPNI 2018-2029										
Project	Type	Area	Detail	Date	TDP 2018	SEA 2018	EAR 2019	Appraisal	Evaluation	
Banbridge Main Transformer 1, 2, 3 and 4 Replacement	Asset Replacement	S-E	The 110/33kV transformers Tx 1-4 at Banbridge Main are to be replaced due to the age and condition of the existing transformers.	>2024	X	O	O	Very localised impacts only within existing sites	N/A	
Castlereagh 275 kV Structures, Busbars and Disconnectors Replacement	Asset Replacement	S-E	The 275 kV structures, busbars and disconnectors at Castlereagh are to be replaced due to the age and condition of the existing assets.	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
Castlereagh Interbus Transformer 3 Replacement	Asset Replacement	S-E	The 275/110kV 240 MVA interbus transformer IBTx 3 at Castlereagh is to be replaced due to the age and condition of the existing transformer.	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
Coolkeeragh 275 kV Structures, Busbars and Disconnectors	Asset Replacement	N&W	The 275 kV structures, busbars and disconnectors at Coolkeeragh are to be replaced due to the age and condition of the existing assets.	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
Coolkeeragh 110 kV Disconnectors	Asset Replacement	N&W	The 110 kV disconnectors at Coolkeeragh are to be replaced due to the age and condition of the existing assets	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
Hannahstown 110 kV Current Transformers Replacement	Asset Replacement	S-E	All of the 110 kV Current Transformers (CTs) at Hannahstown are to be replaced due to the age and condition of the existing transformers.	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
Kells 275 kV Structures, Busbars and Disconnectors Replacement	Asset Replacement	S-E	The 275 kV structures, busbars and disconnectors at Kells are to be replaced due to the age and condition of the existing assets.	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
Kilroot 275 kV CVT Replacement	Asset Replacement	S-E	The Capacitor Voltage Transformers (CVTs) on the 275 kV circuits at Kilroot are to be replaced due to the condition of the existing assets.	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
Magherafelt 275 kV Structures, Busbars and Disconnectors Replacement	Asset Replacement	S-E	The 275 kV structures, busbars and disconnectors at Magherafelt are to be replaced due to the age and condition of the existing assets.	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
Rathgael 110 kV Structures and Disconnectors Replacement	Asset Replacement	S-E	The 110 kV structures and disconnectors at Rathgael are to be replaced due to the age and condition of the existing assets.	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
Tandragee Inter-Bus Transformer 1 and 2 Replacement	Asset Replacement	S-E	The 275/110kV 240MVA interbus transformers IBTx 1 and 2 at Tandragee are to be replaced due to the age and condition of the existing transformers.	>2024	X	O	O	Very localised impacts only within existing sites	N/A	
Tandragee 275 kV Structures and Disconnectors Replacement	Asset Replacement	S-E	The 275 kV structures and disconnectors at Hannahstown are to be replaced due to the age and condition of the existing assets.	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
RP7 275 kV Tower and Overhead Line Maintenance	Asset Replacement	Both	This project includes maintenance of 275 kV towers and lines and condition assessment of towers and foundations.	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
RP7 110 kV Tower and Overhead Line Maintenance	Asset Replacement	Both	This project includes conductor replacement on some 110 kV spans, wood pole replacement, tower maintenance and tower and foundation condition assessments.	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
RP7 110 kV Cable Maintenance	Asset Replacement	Both	This project includes 110 kV cable refurbishment, cable flushing and maintenance of ancillaries.	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
RP7 110 kV Protection	Asset Replacement	Both	This project includes replacement, maintenance and upgrading of protection at 110 kV substations.	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
RP7 275 kV Protection	Asset Replacement	Both	This project includes replacement, maintenance and upgrading of protection at 275 kV substations.	>2024	X	O	O	Very localised impacts only within existing sites	N/A	
Miscellaneous RP7 Works	Asset Replacement	Both	This includes a number of small, within-station works including station electrical station upgrades, auxiliary transformer replacement, transformer cooler replacement, refurbishment of earthing systems, health and safety upgrades, transformer bunding, civil works, and provision of spares.	>2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
Agivey 110/33 kV Cluster	Renewable Generation Substations and Connections	N&W	The driver of this project is RES integration. It is planned to establish a 110/33 kV cluster substation near Garvagh to allow connection of new wind generation. This will be connected to the existing 110kV Brockaghboy to Rasharkin overhead line.	2020	X	I	I	Already Assessed in SEA	N/A	
Airport Road 110/33kV substation	Load Related and Security of Supply	S-E	The driver of this project is security of supply. It is planned to construct a new 110/33 kV substation in the Belfast Harbour Estate, close to the existing Airport Road 33/6.6 kV substation. The substation will be connected to the existing Rosebank substation via the existing 110 kV tower line (currently operated at 33kV) from Rosebank to Sydenham Road. The need for this project arises from the increasing load in the Belfast Harbour and city centre area.	2022	X	I	I	Already Assessed in SEA	N/A	

Detailed Evaluation of Projects in the TDPNI 2018-2029										
Project	Type	Area	Detail	Date	TDP 2018	SEA 2018	EAR 2019	Appraisal	Evaluation	
Ballylumford-Eden 110 kV Circuit Uprate	Asset Replacement/ Load Related and Security of Supply	S-E	The driver for this project is security of supply. The conductor on the existing tower line as well as a number of towers and foundations will be replaced due to the condition and age of the existing assets. The conductor will also be uprated to cater for increased demand.	2022	X	I	I	Already Assessed in SEA	N/A	
Ballymena Transformer 3 and 4 Replacement	Asset Replacement	N&W	The 110/33kV transformers TX 3 and 4 at Ballymena Main are to be replaced due to the condition of the assets.	2020	X	O	O	Very localised impacts only within existing sites	N/A	
Belfast Power Station Connection	Renewable Generation Substations and Connections	S-E	The driver of this project is connecting new generation. Belfast Power Station Ltd. are proposing a new 480 MW CCGT, to be located in Belfast Harbour Estate. The project is in the early stages of development. It is assumed that this power station will connect to the transmission network via underground cable at Castlereagh substation. This project will encompass the connection of the power station to the network.	TBA	X	I	I	Already Assessed in SEA	N/A	
Carnmoney-Castlereagh 110 kV Circuit Uprate/Reconfiguration	Asset Replacement/ Load Related and Security of Supply	S-E	The driver for this project is security of supply. The existing conductor is due for replacement due to the age of the assets. This project may involve reconfiguration of the circuits but the full scope will be determined in due course.	2024	X	I	I	Already Assessed in SEA	N/A	
Castlereagh – Knock 110 kV Cables Uprate	Fault Level Replacements	S-E	The driver for this project is safety. The protection on this circuit will be replaced and uprated as well as the cable sealing ends and a section of cabling. This project is necessary due to the fault level exceeding the short circuit rating of the cable under certain conditions.	2020	X	I	I	Already Assessed in SEA	N/A	
Castlereagh 110 kV Switchgear Replacement	Fault Level Replacements	S-E	The driver for this project is safety. Due to increasing fault levels it is planned, subject to detailed study, to replace 110 kV circuit breakers and current transformers at Castlereagh.	2021	X	O	O	Very localised impacts only within existing sites	N/A	
Castlereagh 275 kV New no. 4 Inter-Bus Transformer	Load Related and Security of Supply	S-E	The driver of this project is security of supply. There is a need to provide additional capacity at Castlereagh to meet expected demand growth.	2022	X	O	O	Very localised impacts only within existing sites	N/A	
Castlereagh, Tandragee and Hannahstown Reactors	Load Related and Security of Supply	S-E	The driver of this project is security of supply. Further shunt reactors are planned to be installed at Castlereagh, Tandragee and Hannahstown substations in order to improve voltage regulation when the network is lightly loaded.	2022	X	O	O	Very localised impacts only within existing sites	N/A	
Coolkeeragh – Killymallaght 110 kV Uprate	Renewable Integration Developments	N&W	The drivers for this project are security of supply and RES integration. As a result of increasing growth in renewable generation in the northwest of NI there will be a need to uprate the 110 kV circuit between Coolkeeragh and Killymallaght.	2028	x	I	I	Already assessed in SEA	N/A	
Coolkeeragh – Magherafelt 275 kV Switchgear	Renewable Integration Developments	N&W	The drivers of this project are RES integration and security of supply. During periods of high generation in the North West, there is a risk of overloading 110 kV circuits following tripping of the 275 kV line between Coolkeeragh and Magherafelt. This project involves installing single phase tripping and high speed auto-reclose circuit breakers on these circuits to minimise the impact of a fault, and to allow rapid reinstatement following a transient fault.	2028	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
Coolkeeragh – Trillick New 110 kV Line	Renewable Integration Developments	N&W	The drivers for this project are security of supply, RES integration and market integration. A need has been identified to strengthen the electricity network on both sides of the border in the north-west to assist in the integration of renewable power sources. This project will interact with the North West of NI Reinforcement (see below) and the scope of the solution required to be delivered through that project.	2025	X	I	I	Already Assessed in SEA	N/A	
Coolkeeragh Reactive Compensation	Renewable Integration Developments	N&W	The drivers of this project are security of supply and RES integration. The continued development of wind generation in the North and West of Northern Ireland has resulted in a need for voltage support. Reactive support will be installed at Coolkeeragh, connected to the 110 kV busbar.	2023	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
Coolkeeragh – Strabane 110 kV Uprate	Renewable Integration Developments	N&W	The drivers for this project are security of supply and RES integration. As a result of increasing growth in renewable generation in the northwest of NI there will be a need to uprate the 110 kV circuit between Coolkeeragh and Strabane.	2028	X	I	I	Already Assessed in SEA	N/A	
Coolkeeragh T1 Transformer Cabling Uprate	Load Related and Security of Supply	N&W	The driver for this project is security of supply. The increase in wind generation in the north-west of NI has resulted in an increase in power flows at Coolkeeragh. The project is to uprate the 110 kV cabling associated with Transformer 1 in order to accommodate these flows.	2021	X	O	O	Very localised impacts only within existing sites	N/A	



Detailed Evaluation of Projects in the TDPNI 2018-2029										
Project	Type	Area	Detail	Date	TDP 2018	SEA 2018	EAR 2019	Appraisal	Evaluation	
Creagh/Kells-Rasharkin New 110 kV Circuit	Renewable Integration Developments	N&W	The drivers of this project are security of supply and RES integration. As a result of increasing growth in renewable generation there will be a need to construct a second 110 kV circuit between either Creagh or Kells and Rasharkin 110/33 kV cluster substation.	2026	X	I	I	Already Assessed in SEA	N/A	
Cregagh Transformer 1 and 2 Replacement and Realignment	Asset Replacement/ Load Related and Security of Supply	S-E	The 110/33kV transformers Tx 1 and 2 at Cregagh Main are to be replaced due to the age and condition of the existing transformers. These transformers will also be realigned to increase clearances and improve security of supply.	2024	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
Cregagh Transformer B Switchgear Replacement	Fault Level Replacements	S-E	The driver of this project is security of supply. This project is to replace and uprate the 110 kV switchgear on Tx B at Cregagh. This project is needed as there is potential for the fault level to exceed the short circuit rating of the equipment under certain conditions. Consideration is being given to incorporating this project into the "Cregagh Transformer 1 and 2 Replacement and Realignment" project.	2022	X	O	O	Very localised impacts only within existing sites	N/A	
Drumnakelly and Armagh Reinforcement	Load Related and Security of Supply	S-E	The driver of this project is security of supply. There is a need to reinforce the distribution system supplying Armagh city and the surrounding area due to increasing demand. It is also forecast that demand will exceed capacity at the existing Drumnakelly 110/33kV substation. Options being considered include: • Establishing a new 110/33kV substation adjacent to the existing Drumnakelly Main along with associated 33kV reinforcements to the Armagh area; and • Establishing a new 110/33kV substation at Armagh with new 110kV circuits from Tandragee or Drumnakelly.	2026	X	I	I	Already Assessed in SEA	N/A	
East Tyrone Reinforcement Project	Load Related and Security of Supply	N&W	The driver for this project is security of supply. The driver of this project is security of supply. There is a need to reinforce the distribution system supplying Cookstown and the surrounding area due to increasing demand. It is also forecast that demand will exceed capacity at the existing Dungannon 110/33kV substation. Options being considered include: Installation of a 2nd Transformer at Tremoge and reconfiguration of the distribution network supplying Cookstown; Construction of a 2nd 110/33 kV substation at Dungannon; establishing a new 110/33kV substation at Cookstown with new 110kV circuits from Dungannon, Tremoge or Tamnamore.	2022	N/A	N/A	I	Potential for impacts	If the new 110 kV transmission line is developed there is the potential for short term, temporary, construction phase, slight to moderate negative impacts on biodiversity, flora and fauna, population and human health, geology, soils and land use, water, air, climatic factors, material assets, cultural heritage, and landscape and visual amenity. These moderate negative impacts may include disturbance impacts to SAC sites and associated species, along with disturbances, such as power supply disruptions, to transport networks, during the construction of the new line. Following the construction of the new 110 kV transmission line, there is the potential for medium and long term, slight to moderate negative impacts on cultural heritage, and landscape and visual amenity. These moderate negative impacts may include permanent, negative, landscape and visual amenity impacts. Development of the new 110 kV transmission line has the potential for short, medium and long term, slight to moderate positive impacts on population and human health, air, climatic factors and material assets. These moderate positive impacts may include permanent reductions in air emissions and improvements in air quality, as a result of increased connection to renewable energy. There may be the potential for habitat loss, water quality and habitat deterioration, and disturbance and displacement impacts on European Sites, from this project. The possibility of likely significant effects cannot be discounted on these sites at the Plan level assessment. Project level Appropriate Assessment including further evaluation and analysis, and the application of measures intended to avoid or reduce the harmful effects of the potential project on European sites, as necessary, will be required	
Eden-Carnmoney 110 kV Circuit Uprate/Reconfiguration	Asset Replacement/ Load Related and Security of Supply	S-E	The driver for this project is security of supply. The existing conductor is due for replacement due to the age of the assets. This project may involve reconfiguration of the circuits but the full scope will be determined in due course.	2023	X	I	I	Already Assessed in SEA	N/A	
Gort 110/33 kV 2nd Transformer	Renewable Generation Substations and Connections	N&W	The driver of this project is RES integration and security of supply. Slieve Divena wind farm is currently connected to the distribution system. A reduction in local demand and increase in small scale generation means that there is a risk of overload on this network. This project will involve the installation of a second 110/33 kV transformer at Gort to allow the transfer of Slieve Divena wind farm to Gort.	2022	N/A	N/A	O	Very localised impacts only within existing sites	N/A	
Kells 110/33 kV Cluster	Renewable Generation Substations and Connections	S-E	The driver of this project is RES integration. It is planned to establish a 110/33 kV cluster substation near to the existing Kells 275/110kV substation to connect new renewable generation to the transmission system. This will be connected to the existing Kells 110kV station via an underground cable.	2020	X	I	I	Already Assessed in SEA	N/A	



Detailed Evaluation of Projects in the TDPNI 2018-2029

Project	Type	Area	Detail	Date	TDP 2018	SEA 2018	EAR 2019	Appraisal	Evaluation
Killymallaght – Strabane 110 kV Uprate	Renewable Integration Developments	N&W	The drivers for this project are security of supply and RES integration. As a result of increasing growth in renewable generation in the northwest of NI there will be a need to uprate the 110 kV circuit between Killymallaght and Strabane.	2028	X	I	I	Already Assessed in SEA	N/A
Moyle 275 kV Reinforcement	Interconnection	S-E	The drivers for this project are market integration, security of supply and RES integration. At present, full utilisation of the 500 MW export capability of the Moyle Interconnector is prevented by the potential for network overloads in the event of the loss of the 275 kV double circuit between the Moyle converter station at Ballycronan More and the nearby Ballylumford substation. This project involves construction of a new 275 kV cable between Ballylumford and Ballycronan More in order to secure operation of the Moyle against this contingency. It will be subject to cost-benefit analysis before proceeding.	2028	N/A	N/A	I	Potential for impacts	If the new 275 kV transmission line is developed there is the potential for short term, temporary, construction phase, slight to moderate negative impacts on biodiversity, flora and fauna, population and human health, geology, soils and land use, water, air, climatic factors, material assets, cultural heritage, and landscape and visual amenity. These moderate negative impacts may include disturbance impacts to SAC sites and associated species, along with disturbances, such as power supply disruptions, to transport networks, during the construction of the new line. Following the construction of the new 275 kV transmission line, there is the potential for medium and long term, slight to moderate negative impacts on cultural heritage, and landscape and visual amenity. These moderate negative impacts may include permanent, negative, landscape and visual amenity impacts. Development of the new 275 kV transmission line has the potential for short, medium and long term, slight to moderate positive impacts on population and human health, air, climatic factors and material assets. These moderate positive impacts may include permanent reductions in air emissions and improvements in air quality, as a result of increased connection to renewable energy. There may be the potential for habitat loss, water quality and habitat deterioration, and disturbance and displacement impacts on European Sites, from this project. The possibility of likely significant effects cannot be discounted on these sites at the Plan level assessment. Project level Appropriate Assessment including further evaluation and analysis, and the application of measures intended to avoid or reduce the harmful effects of the potential project on European sites, as necessary, will be required
North West of NI Reinforcement 110 kV reinforcement	Renewable Integration Developments	N&W	The drivers for this project are security of supply and RES integration. As a result of increasing growth in renewable generation in the west there will be a need to construct a new circuit between the 275kV system and the 110kV system electrically close to Coolkeeragh. A long list of options shall be narrowed down to a short list. A combination of these may be required. The long list of main and supporting options will include the following: <ul style="list-style-type: none"> <li>• HVDC link from Kilroot to Coolkeeragh;</li> <li>• 275 kV or 110 kV circuit from Magherafelt to Coolkeeragh;</li> <li>• 275 kV or 110 kV circuit from Magherafelt to Strabane (new s/s); and</li> <li>• Turleenan - Omagh South – Co. Donegal New 275 kV Line.</li> </ul>	2026	X	I	I	Already Assessed in SEA	N/A
North West of NI Large-scale Reinforcement	Renewable Integration Developments	N&W	The drivers for this project are security of supply and RES integration. As a result of increasing growth in renewable generation in the west there will be a need to construct a new circuit between the 275kV system and the 110kV system electrically close to Coolkeeragh. A long list of options shall be narrowed down to a short list. A combination of these may be required. The long list of main and supporting options will include the following: <ul style="list-style-type: none"> <li>• HVDC link from Kilroot to Coolkeeragh;</li> <li>• 275 kV or 110 kV circuit from Magherafelt to Coolkeeragh;</li> <li>• 275 kV or 110 kV circuit from Magherafelt to Strabane (new s/s); and</li> <li>• Turleenan - Omagh South – Co. Donegal New 275 kV</li> </ul>	2026	X	I	I	Already Assessed in SEA	N/A



Detailed Evaluation of Projects in the TDPNI 2018-2029

Project	Type	Area	Detail	Date	TDP 2018	SEA 2018	EAR 2019	Appraisal	Evaluation
			Line.						
North West Special Protection Scheme Upgrade	Load Related and Security of Supply	N&W	The drivers of this project are security of supply and RES integration. This scheme was installed to protect the network in the north-west in the event of faults on the 275 kV network before the large-scale installation of wind generation in the north and west of NI. As wind generation capacity has increased, a need has been identified to replace and upgrade the existing special protection scheme.	2019	X	O	O	Very localised impacts only within existing sites	N/A
North-South Interconnector	Fault Level Replacements	S-E	The drivers for this project are market integration, security of supply and RES integration. This project involves construction of a new 400 kV circuit from existing Woodland 400 kV station in County Meath (Ireland) to a proposed 400/275 kV station at Turleenan in County Tyrone (Northern Ireland). This project is needed to remove constraints within the single electricity market, improve security of supply and facilitate safe and secure operation of renewables.	2023	X	O	O	Already Assessed in SEA	Planning Approved.
Omagh Main – Dromore Third Circuit	Renewable Integration Developments	N&W	The drivers of this project are security of supply and RES integration. There is a significant amount of wind generation connected to the distribution network in Fermanagh and west Tyrone. During periods of high wind, there is a risk of overload on one of the Omagh – Dromore circuits in the event of the loss of the other. This risk constrains wind output in the area. This project will involve construction of a third circuit to alleviate these constraints and overload risk.	2028	N/A	N/A	I	Potential for impacts	If the new 110 kV transmission line is developed there is the potential for short term, temporary, construction phase, slight to moderate negative impacts on biodiversity, flora and fauna, population and human health, geology, soils and land use, water, air, climatic factors, material assets, cultural heritage, and landscape and visual amenity. These moderate negative impacts may include disturbance impacts to SAC sites and associated species, along with disturbances, such as power supply disruptions, to transport networks, during the construction of the new line. Following the construction of the new 110 kV transmission line, there is the potential for medium and long term, slight to moderate negative impacts on cultural heritage, and landscape and visual amenity. These moderate negative impacts may include permanent, negative, landscape and visual amenity impacts. Development of the new 110 kV transmission line has the potential for short, medium and long term, slight to moderate positive impacts on population and human health, air, climatic factors and material assets. These moderate positive impacts may include permanent reductions in air emissions and improvements in air quality, as a result of increased connection to renewable energy. There may be the potential for habitat loss, water quality and habitat deterioration, and disturbance and displacement impacts on European Sites, from this project. The possibility of likely significant effects cannot be discounted on these sites at the Plan level assessment. Project level Appropriate Assessment including further evaluation and analysis, and the application of measures intended to avoid or reduce the harmful effects of the potential project on European sites, as necessary, will be required
Omagh Main – Dromore Uprate	Renewable Integration Developments	N&W	The drivers of this project are facilitation of a connection and RES integration. With the connection of Curraghamulkin cluster substation to Dromore it is necessary to restring the Omagh Main – Omagh South tower line with higher capacity conductor.	2022	X	I	I	Already Assessed in SEA	N/A
Rasharkin Cluster 110/33 kV 2 <sup>nd</sup> Transformer	Renewable Integration Developments	S-E	The driver of this project is RES integration and security of supply. Gruig wind farm is currently connected to the distribution system. A reduction in local demand and increase in small scale generation means that there is a risk of overload on this network. This project will involve the installation of a second 110/33 kV transformer at Rasharkin to allow the transfer of Gruig wind farm to Rasharkin.	2022	N/A	N/A	O	Very localised impacts only within existing sites	

Detailed Evaluation of Projects in the TDPNI 2018-2029									
Project	Type	Area	Detail	Date	TDP 2018	SEA 2018	EAR 2019	Appraisal	Evaluation
Strabane – Omagh 110 kV Uprate	Renewable Integration Developments	N&W	The drivers of this project are RES integration. With increasing generation in the North West there is a risk of overload of the 110 kV circuits between Strabane and Omagh. This project will involve replacement of the conductor on the existing tower lines with new conductor of a higher rating.	2026	N/A	N/A	I	Potential for impacts	Development of the restring has the potential for short term, temporary, construction phase, slight negative impacts on biodiversity, flora and fauna, population and human health, geology, soils and land use, water, air, climatic factors, material assets, and landscape and visual amenity. There are unlikely to be any further medium or long term negative impacts following the restring of the transmission line. There is the potential for medium and long term, slight positive impacts on population and human health, air, climatic factors and material assets, following the restring of the transmission line. The HRA of the TDPNI has identified the potential for water quality and habitat deterioration impacts on three European Sites, from this project The possibility of likely significant effects cannot be discounted on these sites at the Plan level assessment. Project level Appropriate Assessment including further evaluation and analysis, and the application of measures intended to avoid or reduce the harmful effects of the potential project on European sites, as necessary, will be required.
Tamnamore – Drumnakelly 110 kV Uprate	Load Related and Security of Supply	S-E	The driver of this project is security of supply. These circuits may be subject to overload under high wind generation conditions and are operated out of service. This project is to replace the conductor on these circuits with higher capacity conductor. This will allow these circuits to fully return to service.	2027	N/A	N/A	I	Potential for impacts	Development of the restring has the potential for short term, temporary, construction phase, slight negative impacts on biodiversity, flora and fauna, population and human health, geology, soils and land use, water, air, climatic factors, material assets, and landscape and visual amenity. There are unlikely to be any further medium or long term negative impacts following the restring of the transmission line. There is the potential for medium and long term, slight positive impacts on population and human health, air, climatic factors and material assets, following the restring of the transmission line. The HRA of the TDPNI has identified the potential for water quality and habitat deterioration impacts on three European Sites, from this project The possibility of likely significant effects cannot be discounted on these sites at the Plan level assessment. Project level Appropriate Assessment including further evaluation and analysis, and the application of measures intended to avoid or reduce the harmful effects of the potential project on European sites, as necessary, will be required.
Tamnamore – Turleenan 275 kV Uprate	Renewable Integration Developments	S-E	The drivers of this project are security of supply and RES integration. Pending the establishment of Turleenan substation it is planned to uprate the conductors between Turleenan and Tamnamore 275kV substation in order to improve inter-region power flow.	2023	X	I	I	Already Assessed in SEA	N/A
Tandragee 110 kV Switchgear Replacement	Fault Level Replacements	S-E	The driver for this project is safety. Due to increasing fault levels it is planned, subject to detailed study, to replace 110 kV circuit breakers and current transformers at Tandragee.	2021	X	O	O	Very localised impacts only within existing sites	N/A
Tandragee 275 kV Second Bus Coupling Circuit Breaker	Load Related and Security of Supply	S-E	The driver of this project is security of supply. This project is to install a second busbar coupler onto the existing 275 kV double busbar. This project will improve resilience and redundancy of the protection at Tandragee.	2022	N/A	N/A	O	Very localised impacts only within existing sites	
Turleenan - Omagh South – Co. Donegal New 275 kV Line (on hold)	Renewable Integration Developments	N&W	The drivers for this project are security of supply, RES integration and market integration. A need has been identified to strengthen the electricity network on both sides of the border in the north-west to assist in the integration of renewable power sources. This project is on hold and may be replaced by the North West Reinforcement (see below) but still has Project of Common interest (PCI) status.	2025	X	I	I	Already Assessed in SEA	N/A



## Appendix B: SEA Mitigation Measures



**SONI**  
**Transmission Development Plan for**  
**Northern Ireland 2018 - 2027**  
**Strategic Environmental Assessment**  
**Environmental Report**  
**DOCUMENT CONTROL SHEET**

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## ABBREVIATIONS

AA	Appropriate Assessment
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
ASSI	Area of Special Scientific Interest
DAERA	Department of Agriculture, Environment and Rural Affairs
DAFM	Department of Agriculture, Food and the Marine
DCCAE	Department of Communications, Climate Action and the Environment
DCHG	Department of Culture, Heritage and Gaeltacht
DEFRA	Department for Environment, Food & Rural Affairs
DfI	Department for Infrastructure
DHPLG	Department of Housing, Planning and Local Government
DSD	Department for Social Development
EPA	Environmental Protection Agency
HRA	Habitats Regulation Assessment
LAQM	Local Air Quality Management
MCZ	Marine Conservation Zones
NHA	Natural Heritage Area
NIE	Northern Ireland Electricity
NIEA	Northern Ireland Environment Agency
NIO	Northern Ireland Office
PAH	Polycyclic Aromatic Hydrocarbons
PM	Particulate Matter
PNHA	Proposed Natural Heritage Area
PPC	Pollution Prevention and Control
RBD	River Basin District
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SEO	Strategic Environmental Objective
SLNCI	Sites of Local Nature Conservation Importance
SMR	Site and Monuments Record
SONI	Systems Operator for Northern Ireland
SPA	Special Protection Area
TDPNI	Transmission Development Plan for Northern Ireland
TSO	Transmission System Operator
WFD	Water Framework Directive





## 9 MITIGATION AND MONITORING

### 9.1 MITIGATION

Mitigation measures have been recommended where potential negative impacts on environmental topic areas have been identified from developing the alternative options. These mitigation measures aim to prevent, reduce and as fully as possible offset any significant adverse effects on the environment due to implementation of the projects within the TDPNI. The mitigation measures that have arisen in the TDPNI and SEA processes have been included within Section 10 of the TDPNI.

#### 9.1.1 General Mitigation

The principal mitigation recommendation is that the predicted negative effects should be considered further during the next stage of detailed planning and design, when the specifics of the development infrastructure options can be optimised through detailed feasibility studies and design in order to limit the potential impacts on sensitive receptors.

Further environmental studies based on the more detailed designs and construction methodologies should be undertaken as appropriate. These studies may involve, but are not limited to, marine, aquatic and terrestrial ecology surveys, ornithological and bat surveys, fish surveys, landscape and visual assessments, WFD assessments, geotechnical investigations and heritage surveys. Further Appropriate Assessment, to meet the requirements of the Habitats Directive, of the detailed designs and construction methodologies will be required at the project level, where potential impacts have been identified in this SEA and accompanying HRA for the TDPNI.

Before any works are carried out, detailed method statements and management plans (construction and environmental) should be prepared, including timing of works, information on the specific mitigation measures to be employed for each works area, and mechanisms for ensuring compliance with environmental legislation and statutory consents.

The timing of construction and maintenance works should be planned to avoid any potential for negative cumulative impacts or inter-relationships with other schemes, plans or projects, yet look to optimise any potential positive cumulative impacts or inter-relationships.

Contractors should be required to prepare Construction Environmental Management Plans (CEMPs), which would include a requirement for related plans to be prepared, as appropriate, for project implementation, such as Erosion and Sediment Control, Invasive Species Management, Emergency Response, Traffic and Safety Management, Dust and Noise Minimisation, and Stakeholder Communication Plans.

Works should only be carried out once the method statements have been consulted on with competent authorities, such as the NIEA. At the project level it will not be sufficient to defer the production of construction method statements. These should be completed in the detailed design stage and may be subject to further Appropriate Assessment where potential impacts have been identified in this SEA

and accompanying HRA for the TDPNI. Where there may be unavoidable impacts on protected habitats and/or species the necessary derogation licences should be applied for prior to seeking planning permission or approval for a scheme.

Marine construction and in stream works have the greatest potential for negative impacts during spawning / breeding and early nursery periods for aquatic and marine protected species. No marine or instream works should occur during restricted periods for relevant species and consultation should be undertaken with the appropriate authorities in this regard.

Monitoring of project-level mitigation measures should be undertaken during and after works, to ensure effectiveness.

All works and planning of works should be undertaken with regard to all relevant legislation, licensing and consent requirements, and recommended best practice guidelines. An ecological clerk of works should be appointed for environmental management of each infrastructure development, and where specific sensitive species may be impacted, an appropriate expert should also be appointed.

### 9.1.2 Mitigation by SEA Topic

**Table 9.1** provides specific mitigation measures that should be adopted within the project stage development of options from the TDPNI to minimise the potential for any negative effects on the wider environment. For transmission development options that are selected to be further investigated these mitigation measures should be implemented and further developed at the next stages of more detailed design / feasibility and project level study.

**Table 9.1 Proposed SEA Mitigation Measures**

Potential Impact	Proposed Mitigation
<p>1 - Construction phase disturbance, such as noise and habitat degradation, to International, National or locally designated sites and species that are within close proximity to developments.</p>	<p>Good planning and timing of works, and good construction and management practices to keep impacts to a minimum. Environmental Management Plan (EMP) and Construction Management Plan (CMP) to be developed and agreed with relevant authorities and consultees prior to commencement of works. Adhere to SONI / EirGrid / best practice guidelines. Scoping of relevant specialist ecological surveys during the detailed planning stage and prior to any construction works.</p> <p>Where applicable, prior to any vegetation clearance an ecologist should be contracted to undertake a 'pre-vegetation clearance' survey for signs of nesting birds and important species. Should important species be found during surveys the sequential approach of avoid, reduce or mitigate should be adopted to prevent significant impacts. Vegetation clearance should only occur outside the main breeding bird season - September to March.</p> <p>Following construction, replanting, landscaping, natural revegetating and habitat enhancement, should be undertaken in line with appropriate guidelines that aim to improve local biodiversity and wildlife. This is likely to provide for medium and long term benefits to the biodiversity, flora and fauna near the working areas. Where possible, original sediment/soil should be reinstated to original levels to facilitate natural restoration and</p>

Potential Impact	Proposed Mitigation
	<p>recolonisation of habitat. Restricted working areas should be imposed to ensure minimal disturbance to sensitive habitats.</p>
<p>2 - Construction phase sedimentation impacts on International, National or locally designated sites and species that are within close proximity to developments and where pathways are evident, as constructions works may mobilise sediments into watercourses.</p>	<p>Consultation with environmental bodies on construction methodology and appropriate timing of works to provide the least potential for sediment mobilisation to watercourses. Good planning and timing of works, and good construction and management practices to keep the potential for impacts to a minimum. Minimise requirement for near or in-stream works through good planning. During construction and site establishment operations, silt fencing should be used to prevent disturbed soil reaching the aquatic zone. Any in-stream works should be carried out during low flow conditions and should cease during heavy rainfall and flood conditions, to reduce suspended solids in the river. Buffer zones along waterways can provide mitigation during construction activities. Buffer zones must be of adequate dimensions and impede all free flow to waterways. Heavy machinery and site traffic should be excluded from these areas.</p>
<p>3 - Increased risk of direct physical disturbance to International, National or locally designated sites and species that are within close proximity to developments, including hazards to birds through collision and electrocution.</p>	<p>To avoid or minimise the potential for bird collision with overhead conductors, bird flight deflectors or bird warning spheres should be installed in areas identified as being of high risk, or having bird species vulnerable to such impacts. Ornithological surveys should be undertaken during the detailed design stage to identify these sensitive areas and species. Any mitigation measures require monitoring programmes to ensure that they are effective,</p>
<p>4 - Increased rate of spread of invasive species during resting or line development works. Mobile construction equipment traversing through areas of invasive species, potentially carrying these species into new areas.</p>	<p>Cleaning of equipment and machinery along with strict management protocols to combat the spread of invasive species. Pre and post construction surveys for invasive species may be recommended in areas of known invasive species risk. If invasive species are found to be present, an Invasive Species Management Plan should be prepared to outline control and or removal measures to ensure such species are not spread during construction or operation of any future projects.</p>
<p>5 - Creation of a new vector for mobile invasive species in the development of new transmission lines. Corridor clearing may act as a pathway for invasive species.</p>	<p>Cleaning of equipment and machinery along with strict management protocols to combat the spread of invasive species. Pre and post construction surveys for invasive species may be recommended in areas of known invasive species risk. If invasive species are found to be present, an Invasive Species Management Plan should be prepared to outline control and or removal measures to ensure such species are not spread during construction or operation of any future projects.</p>
<p>6 - Electromagnetic disturbances to mobile / migratory, marine and aquatic species, e.g. Atlantic salmon, from the development of underwater / subsea transmission lines.</p>	<p>Some studies suggest that marine and aquatic species that use magnetic fields for navigation can be affected by EMF and thus mitigation measures may need to be adopted in some underwater/subsea transmission lines. The Fair Head/Torr Head Tidal Scheme Connection and the Kilroot – Coolkeeragh HVDC Link projects both encompass areas where Salmonid Rivers flow into the sea and therefore significant salmon migration activity is likely to occur. The extent and magnitude of the EMF produced by subsea transmission lines in these areas, and the potential for these aquatic species to come into close contact with the lines, may need to be further studied for potential impacts at a more detailed level on a case by case basis.</p>
<p>7 - Construction phase disturbance impacts to marine or aquatic nursery</p>	<p>Consultation with DAERA Inland Fisheries and DAERA Marine Environment Division at the detailed feasibility stage. Known marine spawning and nursery grounds should be avoided where</p>

Potential Impact	Proposed Mitigation
and spawning grounds, such as noise / vibration pollution and physical habitat disturbance.	possible, or invasive works minimised in these areas. All works involving open cut crossings should be carried out during the period May to September to avoid interruption of salmonid spawning runs, spawning, incubation of eggs and the early developmental stages.
8 - Construction phase sedimentation impacts to marine or aquatic nursery and spawning grounds, as construction works may cause sediment displacement and blanketing / smothering.	The planning of developments should aim to avoid known marine or aquatic nursery or spawning grounds. Where this cannot be avoided, construction timing should be well planned and works duration and invasive workings should be kept to a minimum in these areas.
9 - Construction phase disturbance impacts, such as noise pollution (e.g. cable laying or excavation), to mobile marine and aquatic species (e.g. cetaceans) that are known to frequent the study area.	The planning of developments should aim to avoid known hotspot areas for mobile marine and aquatic species. Where this cannot be avoided, construction times should be kept to a minimum in these areas. Employing Marine Mammal Observers (MMOs) on board construction works vessels can help ensure that impacts of coastal works are minimised. Consultation with DAERA Inland Fisheries and DAERA Marine Environment Division at the detailed feasibility stage. Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise (JNCC, 2010 <sup>5</sup> ) should be followed for marine based cable laying activities.
10 - Construction phase noise pollution disturbance impacts to people in close proximity to developments.	Disturbances can be kept to a minimum with good working practices, planning and timing. Adoption of Construction Best Practice. Noise-producing activities such as excavation and piling should only take place during daylight hours and monitoring of these activities should be ongoing. Continued liaison with local communities is advised with regard to complaints concerning noise and vibration emissions resulting from construction works.
11 - Construction phase dust and sediment releases in close proximity to the developments, causing disturbance and negative health impacts to local people.	Disturbances can be kept to a minimum with good working practices, planning and timing. Adoption of Construction Best Practice. Development of dust minimisation plans in advance of works. Dust suppression measures in place during construction, for example establishing appropriate speed limits over unmade surfaces and establishing wheel washing facilities on construction sites. Continued liaison with local communities is advised with regard to complaints concerning dust releases resulting from construction works.
12 - Construction / maintenance phase compaction or destabilisation of peat and other sensitive soils, from heavy equipment traversing an area.	The development of transmission infrastructure across areas of significant soil sensitivity should be avoided where possible at the design stage (e.g. areas of deep and active peat should be avoided where possible). Where areas of sensitive habitat need to be crossed during construction/maintenance works, measures to reduce the impact of vehicles on wetland or bog should be considered including the use, for example, of low pressure vehicles, wide wheel/tracks and the laying of protective geotextile on the vegetation to be crossed. Construction machinery should also be restricted to site roads and designated access routes. Machinery should not be allowed to access, park or travel over areas outside development construction zones. Where impacts cannot be avoided or reduced, further works should be carried out to compensate for these impacts, or to restore some aspect of the natural environment to an approximation of its previous condition

<sup>5</sup> JNCC, 2010. Handbook for Phase 1 habitat survey – a technique for environmental audit.

Potential Impact	Proposed Mitigation
	(e.g. where disturbance of peat soils cannot be avoided, there should be some consideration given to possible re-seeding with native species to stabilise the peat and accelerate recovery of the vegetation).
13 - Temporary or permanent loss of crops and/or agricultural land due to the disturbance of construction works required for the uprating of existing or development of new transmission infrastructure over agricultural areas.	Good site management practices and construction management plans and consultation with the competent and statutory authorities prior to any works should enable all impacts to be kept to a minimum over a short timescale. Adoption of Construction Best Practice. Consultation with landowners and/or tenants to identify speciality agricultural crops or lands that may require protection during construction. Consultation with landowners to develop compensation for lost crop value caused by construction works. Land within the working area should be reinstated as near as practical to its former condition.
14 - Construction phase disruption to current land uses, such as noise pollution and dust release from construction works.	Good site management practices and construction management plans and consultation with the competent and statutory authorities prior to any works should enable all impacts to be kept to a minimum over a short timescale. Adoption of Construction Best Practice. Noise and vibration producing activities such as piling and excavation should only take place during daylight hours and monitoring of these activities should be ongoing in sensitive areas. Development of dust minimisation plans. Dust suppression measures in place during construction, for example establishing appropriate speed limits over unmade surfaces and establishing wheel washing facilities on larger construction sites. Continued liaison with local communities is advised with regard to complaints concerning noise pollutions and dust release resulting from construction works.
15 - Construction phase potential for contaminated materials to be mobilised and tracked through the study area from historically contaminated sites or hazardous soils and activities, impacting on nearby soils and land uses.	Identification of historically contaminated areas and sites and careful route planning during the design stage to avoid these sites where possible, to prevent further contamination. Good management, planning and working practices to minimise contamination of nearby soils and land uses if works crossing historically contaminated sites or hazardous soils cannot be avoided. Good working practices may include installation of wheel wash and plant washing facilities. Strict management and regulation of construction activities. Sampling and analysis of sites prior to construction works in potentially hazardous areas, to establish potential risk.
16 - Access difficulties in topographically unsuitable areas, such as upland and steep slope areas or historic mine sites, and where transport of construction equipment across these areas may be problematic.	Careful route planning during the design stage to avoid topographically unsuitable areas where possible. In some cases, where access for machinery is particularly difficult due to the sensitive nature of habitats or difficult terrain, the aerial transport of materials and machinery by helicopter may be considered.
17 - Construction phase sedimentation impacts to water bodies e.g. construction works may destabilise soil materials, river banks and shorelines.	Good management and planning to keep water quality disturbance to a minimum. Precautions should be put into place to avoid or minimise the generation and release of sediments into any watercourses. Any potential water quality issues from construction should be contained and treated to ensure no damage to natural waterbodies. Construction will have to be planned appropriately, using Best Available Techniques / Technology (BAT) at all times, to ensure water quality issues are kept to a minimum, with no significant adverse effects. Develop, implement and enforce an Erosion and Sedimentation Control Plan (ESCP) where risks are identified to downstream European sites.



Potential Impact	Proposed Mitigation
18 - Construction phase pollution impacts to water bodies, e.g. construction works may accidentally release pollutants, such as fuels, oils and lubricants.	Pollution prevention guidance notes (PPGs) should be consulted, which provide detailed guidance and appropriate mitigation measures to avoid or reduce the impact on the water environment. Develop, implement and enforce a Water Pollution Prevention and Environmental Emergency Response Plan for all work sites. This should include good site practices as described in the Good Practice Guidance notes proposed by EA/SEPA/NIEA. All protective coatings used would be suitable for use in the aquatic environment and used in accordance with best environmental practice. Storage facilities would contain and prevent the release of fuels, oils and chemicals associated with plant, refuelling and construction equipment into the environment. Emergency and spill response equipment should be kept on hand during construction.
19 - Difficult working conditions during construction and maintenance works due to interactions with coastal, pluvial or fluvial flood extents.	Individual developments to be subject to detailed Flood Risk Assessment at the detailed planning stage, where risk has been identified. Avoid flood extents where possible, or provide infrastructure that is both resilient to the potential flood risk and provides no transfer of flood risk once developed. Critical infrastructure should not be placed in floodplains where it may be impacted, or where it may be inaccessible during flood events.
20 - Increases in local air emissions and reductions in local air quality from construction plant emissions, in areas of the proposed developments.	Development of dust minimisation plans. Dust suppression measures in place during construction to include regular dampening down of stock piles, establishing appropriate speed limits over unmade surfaces and establishing wheel washing facilities on construction sites. Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
21 - Increases in local GHG emissions from construction plant emissions, in areas of the proposed developments.	Plan construction scheduling to minimise vehicle trips. Limit idling of heavy equipment unless needed for the safe operation of the equipment and verify through unscheduled inspections.
22 - Difficult working conditions during construction and maintenance works due to interactions with climate change exacerbated coastal, pluvial or fluvial flood extents.	Individual developments to be subject to detailed Flood Risk Assessment at the detailed planning stage, where risk has been identified, including for climate change scenarios. Avoid climate change flood extents where possible, or provide infrastructure that is both resilient to the potential flood risk and provides no transfer of flood risk once developed. Critical infrastructure should not be placed in floodplains where it may be impacted, or where it may be inaccessible during flood events.
23 - Temporary loss of GHG sequestering vegetation in clearance of development area, during and following the construction of new transmission lines, prior to re-establishment.	Good planning and timing of works to minimise construction footprint impacts. Following construction, replanting, landscaping, and natural revegetating, should be undertaken in line with appropriate guidelines that aim to improve local GHG sequestering vegetation cover.
24 - Construction phase disturbance impacts to existing material assets and infrastructure such as transport networks, agricultural, aquaculture, fisheries, and recreation and amenity areas as construction works may interfere with the functioning of these assets, e.g. road closure or temporary loss of	Development of good site management practices, traffic and construction management plans and consultation with the competent and statutory authorities prior to any works should enable all impacts to be kept to a minimum over a short timescale. Minimise the frequency and duration of road closures. Adoption of Construction Best Practice.

Potential Impact	Proposed Mitigation
agricultural lands.	
25 - Planning and construction constraints due to the presence of existing infrastructure or other planned developments.	Constraints should be identified, and described in as much detail as possible during the early stages of a project, so that awareness of them and their potential impact can be managed. Incorporation of potential impacts and risks associated with other planned developments at the detailed planning stage. Consultation with other asset owners to establish the best possible working arrangements with the least disturbance.
26 - Permanent, direct loss of existing material assets, such as agricultural land, in the development footprint of new transmission infrastructure, e.g. new substations.	Good spatial planning to minimise the potential for such impacts. Consultation with landowners to develop compensation for loss of assets, such as agricultural land, caused by development of new infrastructure. Good site management practices and construction management plans, and consultation with the competent and statutory authorities prior to any works should enable all impacts to be kept to a minimum over a short timescale. Adoption of Construction Best Practice.
27 - Construction phase impacts on the setting of heritage sites and features in close proximity transmission infrastructure, during uprating and construction works.	Where necessary a heritage impact assessment should be prepared in respect of any works to architectural or archaeological features in advance of any works being carried out to feed into detailed design. Consultation and agreement with the Department for Communities, Historic Environment Division, in advance of any works taking place in respect of protected archaeological or architectural features. Construction supervision by qualified project archaeologists, combined with sensitive construction methods and restoration to minimise potential for damages, in potentially sensitive areas. Heritage features damaged could be restored / preserved. Statutory consents and notices may be required prior to works taking place.
28 - Permanent impacts on the setting of heritage sites and features in close proximity transmission infrastructure.	Impacts could be kept to a minimum through sensitive design and planning. Planning and design advice from qualified archaeologists. Statutory consents may be required prior to works.
29 - Potential for loss of or damage to known and unknown heritage features in the development of transmission infrastructure.	Impacts could be kept to a minimum through sensitive design and planning. Planning and design advice from qualified archaeologists. Construction supervision by qualified project archaeologists, combined with sensitive construction methods and restoration to minimise potential for damages, in potentially sensitive areas. Statutory consents may be required prior to works.
30 - Construction phase impacts on the local landscape and local visual amenity from construction equipment and works.	Impacts could be kept to a minimum through good site practice and planning (e.g. screened laydown areas and traffic management). Adoption of Construction Best Practice. Landscape and Visual Assessment of options at the detailed feasibility and detailed planning stages to minimise the potential for impacts and provide site specific mitigation measures.
31 - Permanent impacts on landscape and visual amenity from the development of new transmission infrastructure.	Impacts could be kept to a minimum through sensitive design and planning (e.g. vegetative screening and landscape management planning). Landscape and visual assessment and advice during detailed design. Public consultation on draft designs. Landscape and Visual Assessment of options at the detailed feasibility and detailed planning stages to minimise the potential for impacts and provide site specific mitigation measures.



### 9.1.3 HRA Mitigation

In addition to the proposed SEA mitigation **Table 9.2** presents the HRA mitigation measures that should be adopted within the TDPNI project options to minimise the potential for any negative impacts on the European sites.

**Table 9.2 Proposed HRA Mitigation Measures**

Potential Impact	Proposed Mitigation
<p>1 – Construction phase disturbance impacts on feature species birds in European sites.</p>	<p>Mitigation measures to reduce disturbance effects on feature species birds may include the timing of works (e.g. avoiding works in or close to SPAs during the bird breeding season [March to August inclusive] or avoiding works in the vicinity of SPAs with over wintering birds between the months of November and March inclusive) and avoiding working simultaneously with other projects which could also cause disturbance. The screening of works could reduce disturbance impacts. On the advice of relevant ornithological experts and agencies, bird warning devices should be put in place where crossings of sensitive flight corridors cannot be avoided.</p> <p>Surveys focusing on feature species which can move outside the confines of a European site should be conducted to ensure any significant areas of supporting habitat (e.g. foraging areas for feature species birds in close proximity to, but outwith an SPA; or other holts out with an SAC, etc.) would be identified and avoided or appropriate mitigation measure put in place.</p>
<p>2 – Construction phase disturbance impacts on Otters.</p>	<p>Works should avoid active otter holts. In the event that an otter holt cannot be avoided by the works, it will be necessary to seek a derogation licence from NIEA to exclude otters from the holt. No works shall be undertaken within 150m of any holts at which breeding females or cubs are present.</p> <p>No wheeled or tracked vehicles (of any kind) should be used within 30m of non-breeding otter holts. Light work, such as digging by hand or scrub clearance should also not take place within 30m of such holts, except as agreed with NIEA under licence.</p>
<p>3 – Construction phase habitat loss of a European site.</p>	<p>Any and all works in or in proximity to a European site will be supervised by an experienced ecologist acting as an Ecological Clerk of Works (ECoW). Direct habitat loss within European sites should be avoided for new-build infrastructure and avoided where reasonably practicable for refurbishment of infrastructure within European sites.</p> <p>When construction occurs within a designated site, sensitive construction techniques will be used such as the use of bog mats for machinery access, particularly if underground cables are proposed or in remote peatland areas. Ecological monitoring will be undertaken at sensitive sites during construction as appropriate. Such sites will be identified on a case by case basis. Restricted working areas will be imposed to ensure minimal disturbance to sensitive habitats. Re-distribute vegetation and soil stripped from the construction areas to provide a seedbank and do not re-seed with Perennial Ryegrass. Land within the working area will be reinstated to its former condition or as near as is reasonably practicable.</p>