North-South 400 kV Interconnection Development

Environmental Impact Statement

Volume 3B

Appendix 7.1

Outline Construction Environmental Management Plan (CEMP)

TABLE OF CONTENTS

LIST OF ANNEXES

1 EXECUTIVE SUMMARY

This outline Construction Environmental Management Plan (outline CEMP) will be a key construction contract document, which will ensure that all mitigation measures, which are considered necessary to protect the environment, prior to construction, during construction and during operation of the proposed development, are implemented. A schedule of commitments (summary of the mitigation measures set out in the Environmental Impact Statement (EIS) and Natura Impact Statement (NIS)) accompanying the planning application is provided in Section 6 of this outline CEMP. These commitments must be fully complied with by the contractor(s). The employer (ESB) shall be responsible for ensuring that the contractor manages the construction activities in accordance with this outline CEMP. The contractor will prepare a final CEMP which implements all measures identified in the outline CEMP.

Accordingly, the employer (ESB) and its contractor(s) will ensure the implementation of the objectives and control measures set out in this outline CEMP with respect to:

- Human Beings – Population & Economic;
- Human Beings – Land Use;
- Human Beings – Tourism & Amenity;
- Human Beings – EMF;
- Flora and Fauna;
- Soils, Geology and Hydrogeology;
- Water ;
- Surface Water;
- Air – Noise & Vibration;
- Air - Quality and Climate;
- Landscape;
- Material Assets – General;
- Waste Management Plan;
- Material Assets – Traffic; and
- Cultural Heritage.

In the event that planning approval is granted for the North-South 400 kV Interconnection Development, any condition(s) relating to a CEMP which may be attached by the Board to such an approval, will be implemented in accordance with the requirements of the condition.

2 INTRODUCTION

All the elements of this outline Construction Environmental Management Plan (CEMP) will be included in the final CEMP, which will be produced prior to construction by the contractor with the approval of the employer (ESB). In addition, the final CEMP will implement conditions attached to any planning approval granted for the project.

The final CEMP itself will be subject to ongoing review (throughout the construction phase of the proposed development), through regular environmental auditing and site inspections. This will confirm the efficacy and implementation of all relevant mitigation measures and commitments identified in the application documentation.

Accordingly, the final CEMP will be a "live" document that will be continuously improved and updated throughout the construction phase of the proposed development.

EirGrid is the project proponent, while ESB will be responsible for the construction of the project, through its internal division of ESB Networks. Therefore, ESB will be responsible for the management of all contractors involved in the construction stage of this project whilst EirGrid will retain a monitoring and inspection role.

2.1 PURPOSE OF A CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

The purpose of a CEMP is to provide a methodology for the implementation of best practice and implementation measures associated with the construction works of a development. A typical CEMP includes:

- Provision of a mechanism for ensuring that measures to mitigate potentially adverse environmental impacts are implemented;
- Ensuring that good construction practices are adopted throughout the construction of the proposed development;
- Allowing for prompt response in the event that any particular issues in relation to the implementation of appropriate mitigation measures as identified in the Environmental Impact Statement (EIS) and other relevant application documentation; and
- Provision of a framework for compliance auditing and inspection to ensure the implementation and efficacy of the mitigation measures identified.

2.2 SCOPE OF CEMP

The scope of the CEMP for the proposed development includes:

- All construction elements of the proposed development;
- The proposed implementation and management of environmental controls and mitigation measures during each phase of construction works; and
- To ensure measures identified through the planning phase of the project will be applied in practice to the proposed development.

The final CEMP will contain:

- A statement of the environmental aims and policy objectives of the project;
- The potential environmental effects as identified in the EIS and other relevant application documentation;
- A schedule of identified potential environmental impacts, risks and mitigation measures;
- Roles and responsibilities of key individuals;
- Environmental management and reporting structure;
- Environmental awareness training programmes;
- Environmental monitoring programmes and monitoring specifications;
- Inspection and auditing programmes;
- Reporting programmes and procedures; and
- Emergency response plans and procedures for any environmental incidents.

To assist in understanding the final format, structure and content of a CEMP, **Annex 1** includes the Table of Contents for previous similar type CEMPs prepared for two recently constructed overhead line (OHL) projects.

3 PROJECT DESCRIPTION

3.1 THE PROPOSED DEVELOPMENT

The proposed development located within these two study areas comprises the following:

- **Cavan Monaghan Study Area (CMSA) New 400 kV Line:** The proposed development in the CMSA comprises a single circuit 400 kV overhead transmission circuit supported by 134 towers (Tower 103 to Tower 236) extending generally southwards from the jurisdictional border with Northern Ireland (between the townland of Doohat or Crossreagh, County Armagh, and the townland of Lemgare, County Monaghan) to the townland of Clonturkan, County Cavan for a distance of approximately 46km. It includes lands traversed by the conductor from the jurisdictional border to Tower 103, and from Tower 103 to Tower 236 inclusive and lands traversed by the conductor strung from Tower 236 to Tower 237 (the first tower on the MSA section of the proposed development).[1] It also includes modifications to existing 110 kV electricity transmission overhead lines, and all associated and ancillary development works including permanent and temporary construction and excavation works.

  The proposed development also comprises an associated temporary construction material storage yard to be located on a site of approximately 1.4ha in the townlands of Monaltyduff and Monaltybane, Carrickmacross, County Monaghan.

- **Meath Study Area (MSA) New and Existing 400 kV Line:** The proposed development in the MSA comprises a new single circuit 400 kV overhead transmission circuit supported by 165 new towers (Tower 237 to Tower 401) extending for a distance of approximately 54.5km from Tower 237 in the townland of Clonturkan, County Cavan to Tower 402 (an existing double circuit tower on the Oldstreet to Woodland 400 kV transmission line) in the townland of Bogganstown (ED Culmullin), County Meath. It also includes modifications to an existing 110 kV electricity transmission overhead line, and all associated and ancillary development works including permanent and temporary construction and excavation works.

  The proposed development also comprises the addition of a new 400 kV circuit for some 2.85km along the currently unused (northern) side of the existing double circuit 400 kV overhead transmission line (the Oldstreet to Woodland 400 kV transmission line) extending

[1] Between Tower 106 and Tower 107 the proposed transmission line crosses the jurisdictional border with Northern Ireland at two points - from the townland of Lemgare, County Monaghan into the townland of Crossbane, County Armagh and back into the townland of Lemgare, County Monaghan. This results in a section of the span between Tower 106 and Tower 107 oversailing Northern Ireland. The oversail section forms part of the SONI proposal.

eastwards from Tower 402 in the townland of Bogganstown (ED Culmullin), County Meath to Tower 410 and the Woodland Substation in the townland of Woodland, County Meath.

It also includes an extension to and works within the existing ESB Woodland Substation, in the townland of Woodland, County Meath.

3.2 CONSTRUCTION

3.2.1 400 kV Overhead Line (OHL) Construction

OHL construction is undertaken on a long linear alignment with isolated areas of construction activity at each tower location, these areas are limited in size. While a 400 kV OHL is a major infrastructural project, the machinery and equipment required to construct such a line is relatively modest and generally similar in size and scale to machinery utilised for farming activities, or construction of a domestic dwelling.

The proposed 400 kV line will consist of galvanised steel lattice towers of varying heights at intermediate and angle locations. The construction methodology will be similar to that used on the existing 400 kV lines previously constructed in Ireland and currently being constructed throughout Europe and internationally. To facilitate the construction of the 400 kV OHL, the proposed development also includes modifications to the existing Lisdrum – Louth 110 kV, Louth – Rathrussan 110 kV and Arva – Navan 110 kV OHL transmission lines. The modifications involve lowering the height of the existing 110 kV transmission lines, at the point of crossing of the proposed 400 kV route. This will be achieved by introducing new wood polesets and / or replacement of existing structures with lower wood polesets.

The construction of the 400 kV OHL and modifications to the 110 kV OHL will be undertaken by ESB. ESB may use external contractors who carry out transmission line construction on its behalf. The OHL construction will be split into two distinct contracts, namely foundation installation and tower erection followed by stringing. EirGrid will appoint a client engineer for this stage of the development. The client engineer will monitor and inspect the detailed designs, plant, material, and works including scheduling, to ensure they meet the requirements of its functional specification, designs and transmission standards.

The construction techniques to be used will fully comply with the Schedule of Commitments and any requirements of the approval granted by the Board all health and safety requirements. In general the construction phase can be broken down into the following parts:

- Verify that all planning and environmental conditions have been satisfied;

- Carry out pre-construction site investigations including access review and ground conditions to confirm the conditions as predicted;
- Delineation of any on-site working area (e.g. erection of temporary fencing to mark out for health and safety purposes the construction works area);
- Setting out of tower foundations (tower foundation areas are marked out on the ground using timber pegs to guide the excavator when digging to remove soil);
- Site preparation works including minor civil works such as removal of fences and erection of temporary fencing;
- Installation of tower foundations;
- Erection of towers; and
- Stringing of conductors and commissioning.

Annex 2 contains details of the construction equipment and duration for each construction activity type.

Annex 3 Volume 3B of the main planning application, contains Figures showing access routes, working area, all ancillary works and high level constraints. A sample construction detail map, which has been prepared as part of the overall environmental appraisal for construction at each structure location is provided in Annex 3. This map shows the locations within the represented area associated with the construction activities; these include the tower location, access routes to the tower for construction, working area, stringing area, guarding area. On recent overhead line (OHL) projects where construction has been completed, these type of maps have been submitted as part of the final CEMP and in the event that planning approval is granted for the North-South 400 kV Interconnection Development, will be included in the final CEMP.

3.2.2 Access Routes

Temporary access routes capable of accommodating construction plant, construction materials and personnel are required for the construction of each tower, installation of the conductor and the setting up of guarding locations. The proposed temporary access routes have been considered by the environmental consultants in their appraisal of the proposed development.

A detailed construction methodology for the North-South 400 kV Interconnection Development is included in Chapter 7 Construction of **Volume 3B** of the Environmental Impact Statement (EIS), which

details the construction methodology and outlines the construction techniques which will be used on the project, including the ancillary works and activities (e.g. access routes, guarding and stringing).

3.2.3 Construction Period

The construction period for the proposed linear development is anticipated to be approximately three years from the commencement of the site works. However construction at any one tower location is of short duration.

3.2.4 Overview of Overhead Line Construction Stages

The construction period for the proposed linear development is anticipated to be approximately three years from the commencement of the site works. However construction at any one tower location is of short duration as works at each tower take place in a series of different stages based on the estimated durations outlined below.

The construction of the OHL will be undertaken in five general stages, according to the following sequence, on a rolling programme of estimated durations:

- Stage 1 – Preparatory Site Work (1 – 7 days);
- Stage 2 – Tower Foundations; standard installation (3 – 6 days), pilling installation (5 – 10 days);
- Stage 3 – Tower Assembly and Erection and Preliminary Reinstatement (3 – 4 days);
- Stage 4 – Conductor / Insulator Installation (7 days); and
- Stage 5 – Final Reinstatement of Land (1 – 5 days).

Typically, Stages 1, 2 and 3 are carried out as part of one contract, and when completed, lands around the construction site are reinstated. Stages 4 and 5 can only be carried out when Stages 1, 2 and 3 are completed.

On a project of this linear distance, there is likely to be an interval of up to 12months between the completion of Stages 1, 2 and 3 and commencement of Stages 4 and 5. Lands will be reinstated so that they can continue to be used for agricultural activities during this interval.

Having regard to the estimated durations detailed previously for each individual stage, it is estimated that Stages 1, 2 and 3 would cumulatively take 7-17 days for standard installation or 9-21 days for pilling

installations. Lands will be preliminary reinstated and contractors will return approximately 12 months later for 8-12 days to complete the works and final land reinstatement.

Therefore, the cumulative time required at any one site over the 3 year construction period of the project is estimated at 15-29 days for the standard installation or 17-33 days for piling installation.

4 PLANNING DOCUMENTS & CONDITIONS

4.1 PLANNING DOCUMENTS

All construction practices and mitigation measures identified in the documents which have been submitted to the Board with the application for planning approval for the North-South 400 kV Interconnection Development will be implemented; these include in particular commitments and mitigation measures contained in the Environmental Impact Statement (EIS) and Natura Impact Statement (NIS).

4.2 PLANNING CONDITIONS

It should be noted that in relation to electrical infrastructure projects which have been recently granted planning approval by An Bord Pleanála (the Board) (Reg. Ref. VA0010, VA0011, VA0012, VA0013, VA0014, VA0015 and VA0016), a planning condition has been attached to each of the approvals requiring that prior to commencement of development a Construction and Environmental Management Plan (CEMP) shall be submitted to, and agreed in writing with, the planning authority.

In the event that planning approval is granted for the North-South 400 kV Interconnection Development, any similar condition(s) relating to a CEMP which may be attached by the Board to such an approval will be implemented in accordance with the requirements of any such similar condition.

5 OVERVIEW OF PROJECT ENVIRONMENTAL MANAGEMENT

The predominant environmental impacts of potential concern in relation to the proposed development include the avoidance of pollution of water, soil and air, the correct handling and disposal of waste, control of hazardous substances, control of noise, care and attention regarding the visual environment and wildlife, the avoidance of wastage of natural resources and the protection of biodiversity.

The employer (ESB) ensures the implementation of a certified Environmental Management System (EMS) and has gained certification to ISO 14000 standard. Contractors and ESB staff must comply with the requirements of the ESB Network's EMS procedures.

5.1 ENVIRONMENTAL MANAGEMENT PRINCIPLES

Contractors shall be required at all times to ensure the proper management of all relevant environmental aspects and associated risks while executing the works.

The contractor will also be required to use an EMS in keeping with the nature and scale of its business operations, a recognised and appropriate EMS, such as ISO 14001, EMAS, BS 8555 (Acorn Scheme) would be appropriate for large business operations.

5.2 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP) DEVELOPMENT RESPONSIBILITIES

ESB, as employer, will ensure that project construction activities shall implement the mitigation measures set out in the Environmental Impact Statement (EIS), Natura Impact Statement (NIS) and the conditions in the planning approval (if granted).

The CEMP will set out the arrangements for preventing, mitigating and controlling environmental issues, risks and impacts, by those carrying out the work and all others who may be affected by it, in accordance with the measures set out within this outline CEMP.

The contractor employed to undertake the construction of the proposed development will be responsible under legislation and the contract, for minimising and controlling the potential environmental impacts of all contract activities.

5.3 CONSULTATIONS

A range of consultations have been undertaken as part of the Environmental Impact Assessment (EIA) process, with statutory and non-statutory bodies and the public, in order to ascertain the interests and

concerns of key consultees and authorities, (as set out in Chapter 3, Scoping the EIS, of **Volume 3B** of the EIS). These consultations provided useful information for formulating constraints avoidance and mitigation measures to be implemented to ameliorate impacts of significance.

Communication protocols will be established and recorded within the final CEMP in respect of parties potentially affected by the project. ESB and the contractor will also liaise with local communities, individual landowners and other interested parties during the construction phase. The results of ongoing and future consultations will feed into the development of the CEMP including detailed restoration proposals and working method statements, consistent with measures set out in this outline CEMP.

5.4 COMPLIANCE WITH ENVIRONMENTAL LEGISLATION

There are numerous standards that will be incorporated into the CEMP to ensure that the potential environmental effects of the project are addressed. Issues relating to health and safety will be addressed in a separate Health and Safety Plan. Environmental management throughout the life of the North-South 400 kV Interconnection development project will be dictated by a number of requirements including those:

- Prescribed in legislation (including the need for other licenses or permits);
- Established under industry codes of good practices; and
- Contained within ESB Networks *Environmental Policy Statement* and the requirements of ISO 14001.

The contractor is required to comply with all applicable Irish legislation (in addition to the relevant European legislation) in relation to the environment

In addition, the contractor will be required to notify the employer of any correspondence, notices, or observations received from the planning authority or any other prescribed body.

5.5 ENVIRONMENTAL POLICY

The ESB Network's *Policy Statement on the Environment* outlines the employer's principles in relation to overall environmental management and provides a framework for action and for the setting of environmental objectives and targets. For the duration of the contract the contractor must work in a manner that is consistent with the employer's environmental policy.

5.6 ENVIRONMENTAL ROLES & RESPONSIBILITIES

A project team organisational chart will be incorporated into the final CEMP by the contractor for the construction phase of the works.

This section describes the key roles and responsibilities assigned to each party in relation to environmental management and the implementation of all aspects of best construction practice and mitigation measures identified in the documentation submitted with the application for approval.

The ESB project manager is supported on environmental issues by the Employers Ecological Clerk of Works.

5.6.1 Roles

The key roles involved in the environmental management process are:

- The employer; and
- The contractor.

5.6.2 Responsibilities

The responsibilities for each of the key roles are:

5.6.2.1 The Employer shall

- Appoint a suitably qualified and experienced employer environmental officer for the period of the construction of the project.
- Appoint a project archaeologist - in line with the Code of Practice between the National Monuments Service of the DoEHLG (now DAHG) and ESB Networks (2009). ESB will appoint, or ensure the appointment of, a project archaeologist to oversee the archaeological elements of the proposed works.
- Appointment of an Ecological Clerk of Works (ECoW) (who is a qualified Ecologist) on site during construction, to advise on the detailed design approach and ecological mitigation as detailed in the EIS.
- Appoint under contract appropriately permitted and licenced service providers to collect all employer's waste, including scrap metal and scrap oil filled equipment from contractor' stores / depots / construction sites. This will include the provision of bins in contractor stores / depots /

construction sites as appropriate and removal and disposal of the waste / retired materials at suitable intervals in accordance with agreed procedures.

- Co-ordinate systems for removal of employer's waste and retired materials from the contractor's material depot / site.
- Notify the contractor immediately in writing of any identified non-conformance in the contractor's approach to environmental management.
- Conduct regular audits of the contractor's environmental management processes.
- Provide appropriate environmental training to all employers' staff and service providers.

5.6.2.2 The Contractor shall

- Adhere to the requirements of environmental management procedure and final CEMP;
- Implement an EMS appropriate to its activities.
- Provide the Employer with updated versions of its environmental policy.
- Comply with all relevant environmental legislation and furnish details as set out above.
- Provide the employer with full access to relevant environmental audit information.
- Nominate a contractor environmental officer.
- Liaise with employer and its contracted service providers in the compliant management of the employer's waste / retired materials as appropriate.
- Provide appropriate environmental training to all staff.
- Prepare relevant emergency procedures.
- Maintain appropriate documentation systems and comply with all necessary environmental requirements.
- Be responsible for the proper management and compliant disposal of own waste in accordance with appropriate standards and applicable legislation.
- Ensure the correct management of all waste / retired materials from work sites and its appropriate segregation as required, to facilitate subsequent compliant collection / disposal.

5.6.3 Ecological Clerk of Works (ECoW)

The employer's appointed ECoW shall be responsible for supervising the implementation of the contractor's EMS. The contractor shall be required to appoint an environmental officer who shall be a suitably qualified / competent person who shall liaise with the employer's ECoW.

5.6.4 Environmental Officer

The environmental officer shall have the necessary authority to propose alternative or additional work methods necessary to satisfy any environmental aspect of the works, for the approval of the employer's ECoW, where such alternative or additional work methods have been considered in the application documentation submitted to the Board for approval and in circumstances where no such alternative or additional work methods contravene the measures set out in the Schedule of Commitments and any requirements of the approval granted by the Board.

5.7 ENVIRONMENTAL TRAINING AWARENESS & COMPETENCE

The employer's environmental officer will support the ESB project manager in managing the provision of environmental training for any ESB project personnel and contractor's personnel and / or sub-contractors in accordance with ISO 14001 System Training procedures.

- The contractor shall ensure that any sub-contractors, and / or person(s) performing tasks on its behalf which have the potential to cause a significant environmental impact are competent on the basis of appropriate education, training and / or experience, and shall retain all associated records in this regard.

- The contractor's nominated environmental officer must successfully complete any environmental induction programmes that may be required by the employer.

- The contractor must include all identified significant environmental aspects of their work, in any site induction delivered for works under their control. All visitors to site must be advised of the significant environmental aspects on site and relevant emergency procedures before entering onto the work site.

- The contractor is required to submit details of relevant environmental training and refresher training programmes as part of the tender submission. As part of the set-up phase of the works, the contractor shall put in place these programmes for all staff to develop and maintain environmental awareness. Records of all environmental training shall be provided to the employer upon request.

- The employer may inspect and audit the contractors training records at any stage of the works. Written findings of these audits shall be provided to the contractor.

- Produce a 'foreman type folder"' containing site rules, toolbox talks, key environmental constraints, briefing documents (e.g. temporary small scale sediment control measures), emergency response and reporting procedures and contact details. The folder will be provided for all supervisors working across the project as it is understood multiple teams may be working in different locations at the same time.

5.8 SITE WASTE MANAGEMENT PLAN

The contractor will develop a *Site Waste Management Plan* and procedures that will address the requirements set out in:

- The requirements of the EIS;

- This final CEMP (which will include all the elements of this outline CEMP);

- The ESB Networks *Environmental Policy Statement on Waste Management*; and

- All current waste management legislative obligations.

5.9 DOCUMENT & RECORD MANAGEMENT

Appropriate document and record management systems shall be maintained to provide evidence of compliance with the requirements of environmental management procedures. The contractor shall ensure that all relevant versions of applicable documents, permits, licences, consents and records are available at points of use and shall ensure that documents are legible and readily identifiable.

The employer may inspect and audit these documents and records at any stage of the works. Written findings of these audits will be provided to the contractor.

5.10 OPERATIONAL CONTROL

The contractor shall identify all operations and associated significant environmental aspects and impacts in order to ensure that such operations are carried out in an environmentally compliant manner.

While undertaking works on behalf of the employer, the contractor must carry out all works according to the employer's environmental management procedures, which include all measures identified in the Schedule of Commitments and the conditions attached to the approval granted by the Board.

Deviations from relevant employer's procedures can only be carried out with the prior consent of the employer. For the avoidance of doubt, there can be no deviation from the employer's procedures insofar as those procedures implement the Schedule of Commitments and any and all relevant conditions attached to the approval granted by the Board. All requests for deviations must be submitted to the employer's project manager in writing prior to the works commencing or in the case of an emergency, as soon as is practicable. Where a required operation control procedure does not exist in the employers procedures, the contractor shall draft an operational control procedure or revise the CEMP and submit to the employer for approval if and when requested.

5.11 EMERGENCY PREPAREDNESS & RESPONSE

The contractor shall make provision for any possible emergency that could arise as a result of its activities. This shall include a method for contacting the emergency services, taking immediate action to mitigate the consequences of the emergency, evacuation & assembly of site personnel, and administering any specialist first aid treatment that may be required. Emergency drills should be used where deemed appropriate.

An up to date list of emergency numbers must be available and displayed on all work sites at all times. This will include contact numbers for ESB, key environmental agencies and local authorities in order to deal with any environmental pollution incident which may arise.

In addition, contractors shall co-operate fully with the employer's emergency procedures when working on the employer's networks and plant and equipment. Contractors shall ensure that all their personnel are familiar with their own and the employer's emergency procedures.

5.12 ENVIRONMENTAL INCIDENTS & NON CONFORMANCE

Whilst every effort is made to reduce their occurrence, environmental incidents & non-conformances could potentially occur from time to time. Any breaches of the terms and conditions of any required licences or permits, any environmental non-compliance or environmental incident which occurs in relation to the operations undertaken by the contractor must be immediately reported to the employer and the relevant authorities.

Incidents that have the potential to impact on the environment include the following:

- Oil / Fuel Spills
- Waste Related Incidents
- Litter & Graffiti

- Land Damage
- Water Quality
- Planning Permission Breaches

The above is not an exhaustive list and there are other environmental incidents that may occur which are not listed.

In the event of an environmental incident occurring, the contractor, under the supervision of the employer's environmental officer and the ECoW shall take all mitigation actions appropriate (and as identified in the EIS and NIS) and shall inform all appropriate regulatory bodies.

5.13 ENVIRONMENTAL AUDITS

The contractor shall ensure that its EMS and associated procedures are audited at regular planned intervals. The contractor shall provide information on the results of such audits to the employer on request. These audits may be incorporated with health, safety and quality audits. The internal audit schedule shall be appropriate to the activities of the contractor and the nature of the works being undertaken.

Audit records shall be made available at all times to the employer‘s environmental officer for inspection.

The employer (ESB) may audit the contractor to ensure that the contractor is operating to the standards required as outlined in the environmental management procedure. The contractor shall co-operate at all times with such audits and will attend to all associated requests by the employer in a timely manner.

The employer reserves the right to carry out environmental audits of contractor's works. The employer shall notify the contractor of any identified non-conformances observed, and the contractor shall be responsible for subsequent remedial action as deemed appropriate, within a specified time-period.

Any audit non-conformances shall be actively tracked by the contractor to satisfactory closure. Significant audit non-conformances which have not been satisfactorily addressed by the contractor may be considered a breach of contract and the employer may terminate the contract without notice in accordance with the provisions of the contract.

The contractor must demonstrate how the provisions of the environmental management procedure are being complied with to ESB satisfaction. This will include a programme of monthly audits and daily site inspections by the contractor's environmental staff.

ESB will reassure itself that the contractor is complying with the CEMP by instigating inspection and monitoring and will conduct inspections to ensure that good environmental practice is being followed in all working areas

Both inspection and auditing results will play an important part in reviewing and updating the final CEMP as the project develops.

ESB will undertake audits and inspections of its contractors' EMS.

5.14 CONTROL OF SUB-CONTRACTORS

This procedure applies to both the main contractor and to any sub-contractors (including nominated sub-contractors and self-employed persons) under the contractor's control. The effective implementation / management of this procedure with respect to sub-contractors is entirely the main contractor's responsibility.

The contractor shall ensure that all appropriate environmental documentation is communicated and relevant training is provided to sub-contractors before commencement of associated works. The contractor shall prepare a written procedure outlining how all appropriate environmental requirements associated with sub-contractor activities, are compliantly managed. This shall include a methodology for ensuring sub-contractor's competence and compliance, and the availability and provision of necessary resources.

6 SCHEDULE OF COMMITMENTS (SUMMARY OF MITIGATION MEASURES)

Project environmental mitigation has been set out in the application documentation, in the EIS and NIS in particular, and will be detailed in the final Construction Environmental Management Plan (CEMP) in accordance with this outline CEMP. The final CEMP will provide a framework for compliance auditing and inspection to ensure that these construction practices and mitigation measures as set out in the EIS and NIS and the conditions in the planning approval are adhered to.

It should be noted that **Section 6.1** details the key mitigation measures which are outlined in the NIS, while **Section 6.2** details the key mitigation measures which are outlined in the EIS.

6.1 MITIGATION MEASURES – NATURA IMPACT STATEMENT (EUROPEAN SITES)

6.1.1 Design Stage Mitigation (Avoidance)

Structure locations have been identified to avoid impact on European sites.

The following mitigation measures or criteria were included at the design stage of the proposed development, as detailed in section 6.1 of NIS:

- No tower bases or other support elements of the development will be located within the boundary of the European sites (although conductors will oversail the sites). Tower bases and all associated construction activity will be located at least 50m from the European site river boundaries and will be located outside the actual cSAC boundary. Riparian semi-natural habitat will be retained undisturbed.

- The transmission line oversailing locations are selected at a relatively narrow section of the European sites at each of the two river crossings.

- Towers and all associated construction activity will be located away from all tributaries of designated rivers.

- No in-stream or bankside works will be required within the European site or their tributaries.

- No vegetation clearance will take place within European sites oversailed by the proposed development (River Boyne and River Blackwater cSAC / SPA). The design of adjacent towers and sag of the lowest conductor wire is such that it rules out potential interference from vegetation, particularly at the Boyne crossing, and thus no cutting of vegetation is required.

There is potential for tree cutting only at non-designated streams crossed and linked to the River Boyne and River Blackwater cSAC and SPA (main channel).

- Stringing of the transmission line will be conducted without a requirement to conduct works within the boundaries of the European sites and all stringing locations are at a remove from the European sites. All access by machinery will be marshalled so as to avoid habitats contained within the European site boundaries, such as river and riparian woodlands. Stringing of conductors across the European sites will be achieved by manually pulling (on foot) a light draw rope across the site and then using this draw rope to pull in a heavier draw wire from one tower to the next. Other than the transporting of the draw rope no work will be required at ground level in a European site.

6.1.2 Construction Stage Mitigation (section 6.2 of the NIS)

The key potential effects identified during the construction phase of the proposed development are disturbance to protected fauna (Kingfisher and otter) breeding sites and potential localised perturbations to water quality (which has potential to adversely affect protected aquatic species including salmon and River Lamprey) which have the potential to add to overall in-combination effects (with other projects / plans / land uses). In this regard specific mitigation measures for each of the identified relevant categories are detailed in **Volume 5** Natura Impact Statement**,** of the application documentation.

A general mitigation measure is to employ an Ecological Clerk of Works (ECoW) on site during the construction phase. The ECoW will monitor all construction activities in the vicinity of the River Boyne and River Blackwater and will monitor and ensure the implementation and effectiveness of the proposed mitigation measures. In addition, all tributaries (as detailed in the NIS) will be monitored in the vicinity of the crossings in particular to ensure there is no disturbance to protected fauna (Kingfisher and otter breeding sites) and that reduction in water quality, which has potential to adversely affect salmon spawning sites, is also avoided. In the unlikely event of mitigation measures under performing or failing, emergency measures will be implemented to prevent impacts to designated sites / features (e.g. spill kits, bunding) and all works will cease. This will be coordinated by the ECoW. This feedback loop will ensure mitigation is responsive to any unexpected issues that arise and, therefore, the construction phase of the proposed development will not adversely affect the integrity of either of the relevant European sites concerned.

Protection of Terrestrial Qualifying Fauna Breeding Sites (Section 6.2.1 of the NIS)

Kingfisher

Riparian areas at the following locations were identified as potential breeding sites for Kingfisher where disturbance of breeding sites associated with woody vegetation trimming / tree lopping may arise. These areas include:

- Boycetown River between Towers 376 and 377;
- Stream between Towers 358 and 359;
- Stream between Towers 350 and 351;
- Clady River, three crossings between Towers 344 and 347;
- Small stream between Towers 313 and 314;
- Small stream between Towers 317 and 318; and
- Kilmainham River between Towers 251 and 252.

Confirmatory pre-construction surveys will be undertaken at watercourses linked to the River Boyne and River Blackwater, where tree felling may lead to potential disturbance to Kingfisher breeding sites, in order to avoid impacts to this species. Such confirmatory surveying is required, given the likely timescale between the date upon which planning approval might be granted and the commencement of construction activities in the material locations, given the dynamic nature / changes in Kingfisher breeding site locations. If tree cutting is required at a breeding Kingfisher site, then this work will only take place once Kingfishers have finished breeding (as confirmed by ECoW) or outside the Kingfisher breeding season (typically March to end August). Thus, tree-cutting will be conducted in a manner which does not damage the breeding site / river bank through careful pollarding of tree limbs and retention of tree root structures and lower vegetation under which this species typically breeds.

Otter

Riparian areas at the following locations were identified as potential breeding sites for otter where disturbance of breeding sites associated with woody vegetation trimming / tree lopping may arise.

- Boycetown River between Towers 376 and 377;
- Stream between Towers 358 and 359;

- Stream between Towers 350 and 351;
- Clady River, three crossings between Towers 344 and 347;
- Small stream between Towers 313 and 314;
- Small stream between Towers 317 and 318; and
- Kilmainham River between Towers 251 and 252.

Again, in order to avoid impacts to otter, confirmatory pre-construction surveys will be undertaken at watercourses linked to the River Boyne and River Blackwater where tree felling may lead to potential disturbance to otter breeding or resting sites. Again, given the dynamic nature / changes in otter breeding site status / locations, such confirmatory surveying is required given the likely timescale between the date upon which planning approval might be granted and the commencement of construction activities in the relevant locations. If an otter breeding site is determined that may possibly be disturbed, then tree trimming activities will be suspended until such time that the otter breeding site is vacated and breeding activity is finished, as confirmed by ECoW. As stated above, tree trimming will be conducted in a manner which does not damage the breeding site / river bank through careful pollarding of tree limbs and retention of tree root structures and lower vegetation under which this species typically breeds.

Protection of Water Quality and Qualifying Aquatic Fauna (section 6.2.2 of the NIS)

In order to mitigate potential impacts from water pollutants during the construction phase, all works associated with the construction of the proposed development will be undertaken with due regard to water quality protection.

All site works and activities, including use of temporary access routes, excavation of tower foundations, construction of towers and stringing will be conducted in an environmentally responsible manner, so as to minimise or, insofar as is practicable, eliminate any adverse impacts on water quality that may potentially occur as a result of works associated with the construction phase. The detailed CEMP which will be produced by the contractor engaged to construct the proposed development (which will, itself, contain all mitigation measures set out in the outline CEMP and the Schedule of Mitigation Measures set out in the EIS) will be employed to ensure that all mitigation measures detailed in the EIS and NIS are implemented and that there is adequate protection and monitoring of the water environment. Thus, general construction practices will adhere to the requirements for the protection of fisheries habitat during construction and development works in the vicinity of river sites published by Inland Fisheries Ireland (IFI) (*Requirements for the Protection of Fisheries Habitat during Construction and Development*

Works at River Sites[2]. Sediment and pollution control measures will be also undertaken in all work areas located near drains and / or watercourses within catchments of European sites.

Accordingly, for the avoidance of doubt, the following mitigation measures will be implemented in respect of specific works locations, including the towers in the vicinity of the two crossings of the River Boyne and River Blackwater cSAC and SPA and will include a requirement to implement the following measures:

- Silt barrier / silt curtains will be used where towers are to be located and / or works are to be undertaken near watercourses, such as in the vicinity of the two crossings of the River Boyne and River Blackwater cSAC and SPA. Correct installation of silt fences is vital and will be supervised by the construction manager and ECoW. The silt barrier / silt curtain will be shaped and installed so that it will catch runoff, without the water flowing underneath or around the edge. The silt barrier will be located down-gradient of the works and inspected on a regular basis including during and after rainfall events. For steep slopes, such as in the vicinity of Tower 355, more than one silt curtain will be used. The edges of the silt curtain will be turned upslope to prevent water going around the edges. Grips, sumps, straw bales and sediment traps will be installed to capture silt where applicable. Each of these should be maintained daily by the contractor to ensure that they remain effective and do not increase the likelihood of an incident occurring.[3]

- It is not anticipated that any localised groundwater dewatering will be required at tower construction locations in the vicinity of the two crossings of the River Boyne and River Blackwater cSAC and SPA. However, in the unlikely event that localised groundwater dewatering is required (at tower construction locations) significant impacts on the groundwater level will be realised only in close proximity to the point of abstraction. Any impacts will be restricted to the short period of pumping. The resultant water will be filtered before discharge. In such circumstances, groundwater can be filtered using bunds / tanks filled with filter material. Single sized aggregates 5–10 mm, geotextiles or straw bales can be used as a filter. Monitoring will be undertaken on the discharge water quality. Treated water discharged is likely to be at a very small scale and can be discharged onto the adjacent field. No discharge will take place directly to water courses linked to European sites.

- Precautionary measures will be taken to avoid spillages of contaminants including oils / fuels and concrete or cement (at tower construction sites). These include:

[2] http://www.fishingireland.net/environment/constructionanddevelopment.htm
[3] CIRIA Document 650

- use of secondary containment, e.g. bunds around oil storage tanks;
- use of drip trays around mobile plant;
- supervising all deliveries and refuelling activities; and
- designating and using specific impermeable refuelling areas isolated from surface water drains.

- With regard to on site storage facilities and activities, any raw materials and fuels, will be stored within bunded areas, to guard against potential accidental spills or leakages entering local watercourses linked to the European sites. All equipment and machinery will have regular checking for leakages and quality of performance. No raw materials or fuels will be stored within, or in the vicinity of, the European sites.

- All site personnel will be trained and aware of the appropriate action in the event of an emergency, such as the spillage of potentially polluting substances. Spill kits are retained to ensure that all spillages or leakages are dealt with immediately and staff are trained in their proper use. Any servicing of vehicles will be confined to designated and suitably protected areas, and there will be no servicing or refuelling of vehicles within, or in the vicinity of, the European sites. Any pollution incident or spill will be reported to the site supervisor and appropriate action taken.

- Temporary access roads used will be temporary rubber or aluminium road panels at a number of specific locations. Tracks will be up to 4m wide and routed away from drains in those locations. In addition, silt barriers will be used at those sensitive locations to prevent direct runoff to local watercourses. All temporary access tracks will be removed at the end of the construction phase and the land will be restored to its original condition.

- Wash down and washout of concrete transporting vehicles will not be permitted at the location of construction. Such wash down and washout activities will take place at an appropriate facility offsite or at the location where concrete was sourced.

- Water quality monitoring will be undertaken prior to the commencement of construction to confirm baseline data and ensure that, during the construction phase of the proposed development, there is no deterioration in water quality. In particular, such confirmatory monitoring will be targeted at watercourses considered to have a higher potential for pollution (e.g. towers where there are watercourses within 20m of the construction works). At these locations, water quality monitoring will include daily inspection of adjacent watercourses. Regular sampling for pH and conductivity will be undertaken in order to ensure the implementation and effectiveness of the recommended mitigation measures with sampling for

suspended solids and hydrocarbons if any change in the appearance is identified. Daily observations of watercourses close to construction works will be logged and details of observations including photographs will be recorded. In the unlikely event that any pollution event is suspected to have occurred, samples will be collected upstream and downstream of this point, and sent to an appropriately accredited laboratory for analysis. All works will halt until the source has been identified, controlled and any remediation undertaken.

6.2 MITIGATION MEASURES – ENVIRONMENTAL IMPACT STATEMENT (EIS)

The mitigation measures from the EIS are included in Table 6.1 herein. Note that this is a direct replication of Volume 3B, **Table 11.1**.

Table 6-1 Table of Schedule of Commitments (Summary of Mitigation Measures from Chapters of the EIS)

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
***CONSTRUCTION (CHAPTER 7, VOLUME* 3B) – NOTE ALL OTHER MITIGATION MEASURES ARE ALSO RELEVANT TO CONSTRUCTION MITIGATION**					
1.1	General construction	Construction Management	In the event of approval being granted for the proposed development and prior to commencement of works, the contractor(s) which will be appointed by the Electricity Supply Board (ESB) will prepare a detailed *Construction Environmental Management Plan* (CEMP). An outline CEMP is included as, **Appendix 7.1, Volume 3B Appendices** in the EIS. The scope of the final CEMP will detail *inter alia* the implementation and management of environmental controls and mitigation measures (detailed in the EIS and summarised below). Monitoring of the construction phase shall be carried out by an Environmental Officer, in association with an ecologist (Ecologist Clerk of Work (ECoW)) and archaeologist to ensure that all mitigation measures contained in the EIS and CEMP are implemented.	Pre-construction Phase	Yes. Detailed CEMP produced by contractor and agreed by ESB and subsequently with local and relevant prescribed authorities.
1.2	General construction	Construction Management – Client Engineer	A Client Engineer will be appointed and shall monitor and inspect the detailed designs, plant, material, and works including scheduling to ensure that these meet the requirements of the functional specification, designs and transmission standards.	Pre-construction Phase	Yes
1.3	General construction	Construction Management	Prior to construction, Notices and Schedules, as well as maps confirming the position of towers as approved by the Board, will be issued to landowners.	Pre-construction Phase	None

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			EirGrid representatives will meet with landowners to deal with any queries the landowner may have following the issuing of the Notice.		
1.4	General construction	Construction Management – working hours	Access to the site will be during daylight for all construction stages. It is not anticipated that construction works will be carried out on Sunday, or Bank Holidays or that any construction works will be carried out in hours of darkness.	Construction Phase	None
1.5	General construction	Landowner Liaison	Prior to commencing the works, discussions will take place between the appointed landowner agents and landowners to ensure awareness of the specific works that will take place pursuant to the proposed development. All landowners will be contacted prior to access being required on their lands and a date of commencement for the works will be provided to the landowner before any work begins. The detailed design of access routes and construction methodology to be used, chosen from the methodologies identified in the EIS, will be based on the condition of land at the time of construction will be discussed with the landowner prior to the commencement of works.	Pre-construction Phase	None
1.6	General construction	Construction Management	Prior to commencement of construction a full traffic management plan will be produced and implemented.	Pre-construction Phase	Monitoring required during construction
1.7	General construction	Construction Management	A Construction and Waste Management Plan (forming part of the CEMP) will be implemented to minimise waste and ensure correct handling and disposal of construction waste streams.	Pre-construction Phase	None

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
1.8	General construction	Reinstatement	Once all the works are complete, the land used for temporary access routes and construction areas around the overhead structures will be reinstated as close as possible to their original condition.	Post Construction Phase	None
HUMAN BEINGS – POPULATION & ECONOMIC (CHAPTERS 2 VOLUMES 3C and 3D) - No specific mitigation measures. Refer to other topics.					
HUMAN BEINGS – LAND USE (CHAPTERS 3 VOLUMES 3C and 3D)					
2.1	General construction	Construction Management	A method statement and work programme that shows the detailed phasing of work will be prepared prior to commencement of work.	Pre-construction Phase	None
2.2	General construction and operational maintenance works	Landowner Liaison	A wayleave agent will be appointed by the contractor to liaise with the landowners along the line route and ensure that their requirements for entry are met, so far as is possible. Land owners will be notified in advance of the commencement of any construction or maintenance works.	Construction Phase and Operation Phase	None
2.3	General construction	Comply with ESB / IFA agreement	All employees and contractors involved in the construction phase will receive adequate training – in particular in relation to issues relating to livestock safety and bio security on farms.	Construction Phase	None

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
2.4	General construction	Maintain access to agricultural land	The contractor will ensure that land owners have reasonable access to all parts of their farm during the construction phase.	Construction Phase	None
2.5	General construction	Minimise the risk of spreading animal and crop diseases	Disease protocols will be adhered to. The contractor will comply with any Department of Agriculture, Food & the Marine regulation pertaining to crops and livestock diseases.	Construction Phase	Yes
2.6	N/A – general construction	Fencing of construction areas to prevent disturbance	Where required, appropriate fencing will be erected to exclude livestock from sites of construction.	Construction Phase	None
2.7	General construction	Minimise impact of rock breaking or piling, if required	In the unlikely event that rock breaking or pilling are required, owners of livestock in adjoining fields will be notified in advance.	Construction Phase	None
2.8	General construction	Minimise impacts to soil	Where top soil is stripped back it will be replaced. All disturbed field surfaces will be re-instated. It will be the construction policy to minimise non-tracked vehicular access to sites in wet weather. Temporary access tracks (aluminium road panels or rubber mats) will be laid in certain sites to avoid damage to soil.	Construction Phase	None

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			Vehicles which leak oil or fuel will not be allowed on construction or access sites. Any soil contaminated by fuel or concrete spillage will be removed from the site and dealt with appropriately as per legislative requirements.		
2.9	General construction	Minimise impacts to land drains	Affected land drains will be directed in a manner that maintains existing land drainage.	Construction Phase	None
2.10	General construction and operation phase	Ensure health and safety	ESB will provide safety information directly to all affected land owners e.g. *Guidelines for Safe Working near Overhead Electricity Lines in Agriculture* and *Code of Practice for Avoiding Danger from Overhead Electricity Lines*. These publications will enable farmers to fulfil their statutory requirements under Health and Safety Regulations.	Construction Phase and Operation Phase	None
2.11	General construction and operation phase	Minimise impact on livestock	Helicopter inspections will be announced in local newspapers and the Farmer's Journal.	Operation Phase	None
HUMAN BEINGS – TOURISM (CHAPTERS 4 VOLUMES 3C and 3D) – No specific mitigation measures. Refer to other topics.					

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
HUMAN BEINGS – EMF (CHAPTERS 5 VOLUMES 3C and 3D)					
3.1	MSA	Minimise EMF levels	The configuration of the phases (that is the spatial arrangement of the two sets of three vertically aligned electricity wires) on the existing double circuit towers will be optimised to ensure EMF levels are minimised.	Pre-construction	None
FLORA AND FAUNA (CHAPTERS 6 VOLUMES 3C and 3D)					
4.1	General	Minimising risks such as disturbance to wildlife and protection of water quality	The key approach for minimising risks such as disturbance to wildlife and protection of water quality is the appointment of an appropriately experienced Ecological Clerk of Works (ECoW) on site during construction, to monitor the effectiveness of proposed mitigation measures in relation to known environmental effects and mitigation measures proposed in the EIS: The role of the ECoW will include: • Supervision of construction works and ensure compliance with legislation; • Monitoring habitats and species during the course of construction works and effectiveness of mitigation; • Provision of advice regarding the avoidance and minimisation of potential disturbance to wildlife;	Construction Phase and initial Operation Phase (5 years plus)	Yes. Monitored by ECoW.

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			• Provide recommendations on appropriate responses / actions to site specific issues (e.g. identification of previously unrecorded breeding sites during construction works); and • Liaison with NPWS, IFI and other prescribed authorities, when required. In addition to the construction phase, it is recommended that a site ecologist (ECoW) also be appointed during the pre-construction (landowner liaison stage) and post construction phases (up to 5 years) in particular to monitor mitigation measures regarding wintering birds.		
4.2	General	Construction Management	A CEMP will be implemented for the construction phase of the project with respect to all mitigation.	Construction Phase	Yes. Monitored by Environmental Officer.
4.3	General	Construction Management	Work method statements, which will incorporate all the mitigation measures identified in the EIS, will be developed by construction and site contractors, agreed with statutory authorities and ECoW (where appropriate), and implemented by construction crews for all construction activities.	Construction Phase	Yes. Monitored by Environmental Officer.
4.4	General	Protection aquatic ecology	As required, temporary silt screens will be installed in drains /small streams deemed to be at possible risk of water pollutant discharge. Where possible, towers (access routes, stringing areas and indicative works areas) have been	Construction Phase	Yes. Monitored by ECoW.

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			located away from sites of ecological importance. Furthermore, where possible, access to tower locations will be via existing tracks that are regularly used by farm machinery. Existing field access points (e.g. gaps / farm gates) to local roads will be used to avoid creating additional hedgerow gaps.		
4.5	General	Minimise impacts to habitats	Semi natural habitats such as wetlands and hedgerows will be avoided.	Construction Phase	Yes. Monitored by ECoW.
4.6	General	Avoid the spread and introduction of invasive species and noxious weeds	Any invasive plant material noted on site will be removed off site and disposed of at appropriate licensed waste disposal facility. Any invasive species found to occur within 15m of working areas will require its eradication to avoid the spread of invasive species, to ensure compliance with the *European Communities (Birds and Natural Habitats) Regulations 2011* (S.I. No. 477 of 2011).	Construction Phase	Yes. Monitored by ECoW.
4.7	General	Maintenance of habitat connectivity	All landscaping / reconnection works must ensure that only native species are utilised. Non-native species will be avoided.	Construction Phase	Yes. Monitored by ECoW.
4.8	General	To minimise impacts to habitats	Hedgerow, tree and scrub vegetation that are to be retained which are located in close proximity to working areas will be clearly marked and fenced off to avoid accidental damage during excavations and site preparation. No materials will be stored within 5 metres of hedgerows / trees / scrub.	Construction Phase	Yes. Monitored by Environmental Officer.
4.9	Towers located at field	To minimise impacts to habitats i.e. field	The vegetation will be removed to ground level. Works will be implemented in a manner to minimise soil disturbance and compaction outside of the tower	Construction Phase	Yes. Monitored by ECoW.

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
	boundaries	boundaries comprised of hedgerows	foundations. Post construction a wooden fence will be installed around the tower base to prevent livestock access and replanting carried out with low growing woody species of local provenance including Blackthorn, Hawthorn and Hazel. This will allow re-establishment of the hedgerow in the gap where the tower is located. It is expected that the hedgerows would be sufficiently robust within 5 years following construction that fencing could be removed. Where required, disturbed areas of grassland will be appropriately prepared and reseeded with a locally sourced grass mix, similar to that already occurring within the surrounding fields. Reseeding works will be undertaken within 3 weeks of construction works to avoid flushing of exposed soil downstream.		
4.10	General	To minimise impacts to habitat i.e. trees	Tree cutting and lopping in proximity to conductors will be undertaken in a manner which minimises the requirement for extensive tree lopping. Large mature trees will be pollarded by qualified foresters / tree surgeons so as to retain as much of the treeline / linear habitat structure and in a manner which retains ground flora species and which does not kill the tree. The trimming regime will involve a scalloping or profiling effect which will minimise the effect on vegetation. Overall, it will not change the structure and ecological function of these linear woodland features, and will not measurably affect associated fauna post construction.	Construction Phase	Yes. Monitored by ECoW / Environmental Officer.
4.11	General	To minimise impacts to habitats i.e. trees	Where construction work is required close to mature trees, the National Joint Utilities Group *Guidelines for the Planning Installation and Maintenance of Utility Services in Proximity to Trees* (NJUG 10) will be followed so as to minimise damage.	Construction Phase	Yes. Monitored by ECoW / Environmental Officer.

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
4.12	General	To minimise impacts to breeding birds	Scrub, hedgerow or tree removal / trimming will be undertaken outside of the bird nesting period, which begins on March 1st and continues until August 31st, in order to protect nesting birds. All birds and their nesting places are protected under the *Irish Wildlife Act 1976* (as amended 2000).	Construction Phase	Yes. Monitored by ECoW / Environmental Officer.
4.13	General	Protection aquatic ecology	A drainage and sediment control plan will be implemented by contractors during site works. The plan will detail specific mitigation measures (taken from mitigation measures, outlined in Chapter 6 and 8 of this EIS) to address site specific issues.	Construction Phase	Yes. Monitored by Environmental Officer.
4.14	General	Protection aquatic ecology	Potential impacts caused by spillages, drip and or spills during the construction phase will be reduced by the maintenance of an adequate supply of spill kits and hydrocarbon adsorbent packs at labelled stations at all working areas, with all vehicles on-site carrying spill kits. All personnel will be fully trained in the use of the equipment. Any used spill kits will be disposed of appropriately off-site.	Construction Phase	Yes. Monitored by Environmental Officer.
4.15	General	Protection aquatic ecology	A 24 hour, 7 day per week Emergency Response protocol for leaks / spill of hydrocarbons and / or chemicals will be drawn up and implemented. This must be implemented in the unlikely event of an accidental spillage of chemicals, hydrocarbons or release of protection aquatic ecology sediment to the surface or ground water system.	Construction Phase	Yes. Monitored by Environmental Officer.
4.16	General	Protection aquatic ecology and sensitive	Excavated materials from construction works will be deposited within the works area where there is no significant risk of runoff into local watercourses.	Construction Phase	Yes. Monitored by ECoW / Environmental

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
		habitats			Officer.
4.17	General	Protection aquatic ecology water	As part of their environmental and works requirements, the contractor will establish a maintenance schedule and operational procedure / method statement for silt and pollution control measures during the construction period. This will be monitored for effectiveness by the contractor and ECoW.	Construction Phase	Yes. Monitored by Environmental Officer.
4.18	General	Protection aquatic ecology Compliance with best practice	Oil, petrol and other fuel containers will be double-skinned and bunded to be able to contain 110% volume. Bund specification will conform to the current best practice for oil storage such as Enterprise Ireland's *Best Practice Guide BPGCS005 Oil Storage* Guidelines.	Construction Phase	Yes. Monitored by Environmental Officer.
4.19	General	Protection aquatic ecology Compliance with best practice	Pouring of concrete will only take place in designated locations and concrete washings will be treated off site following current best practice guidelines including *Pollution Prevention Guidelines for Northern Ireland and Scotland*. Concrete washings will not be discharged to surface water and poured concrete will be allowed to cure for a minimum of 48 hours in the dry.	Construction Phase	Yes. Monitored by Environmental Officer.
4.20	General	Protection aquatic ecology	Raw or uncured waste concrete or similar will be disposed of by removal to approved / licensed disposal site. It is noted that there will be a concrete truck wash out at the batching plant area. This washout will be directed to the three bay water recycler provided at this location.	Construction Phase	Yes. Monitored by Environmental Officer.

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
4.21	General	Protection aquatic ecology	Water courses which have been identified as potentially at risk of pollution from construction activities (e.g. drains and smaller streams linked to the River Boyne and Blackwater) will have appropriately designed silt traps (based on drain and potential runoff characteristics identified) installed in consultation with IFI (where necessary). Refer to **Chapter 8** in Volumes 3C and 3D for details.	Construction Phase	Yes. Monitored by Environmental Officer.
4.22	General	Protection aquatic ecology	Refuelling of machinery, will be carried out on level, hard surfaced designated areas where possible, at least 20m from watercourses and drainage ditches. In the event that refuelling is required outside of this area, fuel will be transported in a mobile double skinned tank and a spill tray will be employed during refuelling operations.	Construction Phase	Yes. Monitored by Environmental Officer.
4.23	General	Protection habitats and aquatic ecology	All machinery will be regularly maintained and checked for leaks. Services will not be undertaken within 50m of aquatic features, including dry drainage ditches. Servicing must be undertaken on level, hard surfaced designated areas where possible.	Construction Phase	Yes. Monitored by Environmental Officer.
4.24	General – Construction	Protection aquatic ecology	Construction materials such as hydrocarbon, cement and grout will be stored in bunded areas or silos which will be regularly inspected by the site manager.	Construction Phase	Yes. Monitored by Environmental Officer.

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
4.25	General – construction	Protection aquatic ecology	Weather conditions will be taken into account when planning construction activities to minimise risk of extreme run off from works areas.	Construction Phase	Yes. Monitored by Environmental Officer.
4.26	General – construction	To minimise impacts to bats	Given the likely timescale (likely to be greater than 2 years) between any decision to grant planning approval and actual site clearance and construction, confirmatory bat surveys / monitoring of specific mature trees identified for felling will be undertaken by a bat specialist prior to tree cutting. In order to proceed with the felling of trees that may be identified as bat roosts, it will be necessary to acquire a derogation licence from NPWS. NRA, (2006) *Guidance in relation to tree felling and hedgerow removal* will be followed throughout the site clearance phase of the proposed development.	Pre-construction Phase and Construction Phase	Yes. Monitored by ECoW.
4.27	General – construction	To minimise impacts to Otters	Pre-construction surveys to confirm presence / absence of Otter breeding sites in relation to the conditions which have been evaluated in this EIS will be undertaken at watercourses and adjacent habitats that occur in close proximity to tower locations and tree felling areas. Details of the pre-construction verification / monitoring methodology and the approach to be taken will be outlined in the CEMP that is to be drawn up for the construction phase of the development with reference to relevant guidance documents. No direct impacts are expected to arise as works will require an agreed method statement and be monitored by the ECoW.	Pre-construction Phase and Construction Phase	Yes. Monitored by ECoW.

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
4.28	General – construction.	To minimise impacts to Kingfishers	Given the likely timescale between any decision to grant planning approval and the commencement of actual site clearance and construction, pre-construction surveys to confirm the conditions which have been evaluated will be undertaken at watercourses and adjacent habitats (linked to the River Boyne and Blackwater) that occur in close proximity to tower locations and tree felling areas to confirm presence / absence of Kingfisher breeding sites.	Pre-construction Phase and Construction Phase	Yes. Monitored by ECoW.
4.29	General – construction	To minimise impacts to Badgers	Surveys for Badger setts will be conducted at woody vegetation required for cutting. This is required to confirm that site clearance activities are in line with the receiving environment considered in this EIS. A buffer zone will be established around any known Badger setts through the erection of temporary posts and wires with “no entry” signs erected. Any works within 50m of a sett will require a licence from NPWS. No direct impacts are expected to arise as works will require an agreed method statement and be monitored by the ECoW.	Pre-construction Phase and Construction Phase	Yes. Monitored by ECoW.
4.30	General – Operational Phase	To minimise impacts on Whooper Swans	The key operational impacts identified are potential collision risks to Whooper swans. Mitigation by avoidance of feeding and roosting sites has been implemented as far as possible in the route selection for the alignment. Flight Diverters (Swan Flight Diverter markers constructed from high-impact grey PVC (UV stabilised) fitted at approximately 5m apart along each earthwire, are proposed at specific locations identified in the EIS. This line marking is proposed for the earth wire to	Operational	Yes. Annually for 10 years.

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			increase visibility of the earth wire to flying birds.		
4.31	General	Hedgerow re-growth and fence maintenance	Where poor or no hedgerow re-growth has occurred, replanting with similar native hedgerow species will be carried out so as to ensure linear habitats are retained / re-established. If new fencing is required or maintenance then this will be agreed and implemented with the landowner.	Post Construction	Yes. 2 years post construction.
4.32	General		Monitoring will be undertaken to determine the effectiveness of proposed flight diverter mitigation.	Post construction	Yes. Annually for 10 years.
4.33	General – During maintenance works	During maintenance works, consideration will be given to ensure ongoing protection of water quality.	Depending on the nature of the proposed maintenance works; there may be a requirement for risk assessments of potential impacts to surface waters and appropriate mitigation will be implemented where a risk is identified.	Post construction	Yes. Ongoing (depending works requirements)
SOILS, GEOLOGY AND HYDROGEOLOGY (CHAPTERS 7 OF VOLUMES 3C AND 3D)					
5.1	Lemgare CGS, Altmush CGS, Galtrim CGS and the Boyne CGS	To mitigate potential impacts	The mitigation measures agreed with the GSI for site investigation works / construction of the towers include the following; • Continued consultation with the GSI; • Limiting excavation by only excavating the required footprint;	Construction Phase	None

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			• Maintaining an adequate distance from Lemgare pNHA, and Altmush Stream; and • The GSI will be notified about any significant new section / feature that is exposed within the tower footprint.		
5.2	General	Effective treatment of spoil material	Excavated soil and subsoil will be stored adjacent to the excavation area. Excavated material will be reused in situ where possible. In the event no material is suitable / wanted for reuse by landowners, subsoil will be disposed of in accordance with all applicable legislative requirements.	Construction Phase	None
5.3	General	Dealing with unexpected contaminated land	All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should it be determined that any of the soil excavated is contaminated, this will be dealt with appropriately as per all applicable legislative requirements.	Construction Phase	Monitoring required during construction
5.4	General	To minimise impact from material spillages	All oils and fuels used during construction will be stored on temporary proprietary bunded surface (i.e. contained bunded plastic surface). These will be moved to each tower location as construction progresses. Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place away from surface water gullies or drains. No refuelling will be allowed within 50m of a stream / river. Spill kits and hydrocarbon absorbent packs will be stored in this area and operators will be fully trained in the use of this equipment.	Construction Phase	Monitoring required during construction

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
5.5	General	Minimise impacts to soils	Controlling working practices by, for example, minimising land take, avoiding repetitive handling of soils, minimising vehicle movements off road and limiting the size of stockpiles will reduce the compaction and erosion of material. Soils will be reinstated at the towers and along the temporary access route where necessary.	Construction Phase	None
5.6	Tower Locations	Minimise impacts to existing wells and boreholes	Where it is necessary to dewater to construct the tower foundations in close proximity of wells, monitoring will be carried out of wells within 100m of the tower locations.	Construction Phase	Monitoring required during construction
5.7	General – construction	Minimise impacts to existing wells and boreholes. Protection of the quality of the receiving water system.	Water pumped from the excavations may contain suspended solids. Settlement may be required to reduce the suspended solids concentrations to protect the quality of the receiving water system. Settlement will be undertaken by a standard water filtration system to control the amount of sediment in surface water runoff. Direct discharge to streams or rivers will not be permitted.	Construction Phase	Monitoring required during construction
5.8		Tara Mines	Liaison will be undertaken with Tara Mines during construction / operation phase to ensure no conflicts arise.		
WATER (CHAPTERS 8 OF VOLUMES 3C AND 3D)					
6.1	General	To prevent water	All works will be undertaken with due regard to the guidance contained within	Construction	None

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
	Construction Phase	pollution	CIRIA Document C741 2015 *Environmental Good Practice on Site*.	Phase	
6.2	Where tree felling may be required	To prevent water pollution during felling of forestry	Consultation will be undertaken with Inland Fisheries Ireland (IFI) and NPWS before commencing felling operations in areas of importance to fisheries and wildlife. Sediment traps will be installed prior to felling and maintained on a daily basis throughout felling operations. Trees will be felled away from the aquatic zone. Machine extraction will not occur in the riparian zone. On sites where risk of erosion is high (steep slopes and / or adjacent to rivers), brash mats will be used to avoid soil damage, erosion and sedimentation. Brash mat renewal will take place when they become heavily used and worn. Provision will be made for brash mats along all off-road routes, to protect the soil from compaction and rutting. Felling will not occur during periods of high rainfall to prevent runoff. No refuelling or machinery maintenance will occur within 50m of an aquatic zone. Timber will be stored on dry areas away from the riparian zones. The forest felling effects of the overhead transmission line will be short term during construction phase.	Construction Phase	Monitoring required during Construction Phase.
6.3	Near watercourses (including the	Protection of Watercourses	Silt barrier / silt curtains will be used where towers or works are undertaken near watercourses.	Construction Phase	Monitoring required during construction

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
	River Boyne and Blackwater)		In relation to the River Boyne and Blackwater the towers are located a minimum of 60m and 100m respectively from these rivers. However, notwithstanding this distance, it is proposed to use silt barriers / curtains for tower construction near those rivers.		
6.4	General Construction	Minimise impacts on soils	Stockpiles will be graded to a <1:4 profile. Topsoil and subsoils will be stored separately. Stockpiles of mineral soils and peat will be <2m and <1m respectively. Geotechnical supervision in combination with monitoring will ensure that any peat encountered is stored in suitable areas.	Construction Phase	Monitoring required during construction
6.5	Near watercourses	Protection of Watercourses	Where it would be necessary to dewater to construct the tower foundations precautions will be taken to ensure there is no adverse effects on nearby watercourses including the resultant water being filtered before discharge.	Construction Phase	Yes on the discharge water quality.
6.6	Near watercourses	Protection of Watercourses	Precautions will be taken to avoid spillages. These include: • Use of secondary containment, e.g. bunds around oil storage tanks; • Use of drip trays around mobile plant; • Supervising all deliveries and refuelling activities; and • Designating and using specific impermeable refuelling areas isolated from surface water drains.	Construction Phase	Yes during construction

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
6.7	Near watercourses	Protection of Watercourses	With regard to on site storage facilities and activities, any raw materials and fuels, will be stored within bunded areas, if appropriate to guard against potential accidental spills or leakages. All equipment and machinery will have regular checking for leakages and quality of performance.	Construction Phase	Yes - equipment
6.8	Near watercourses	Protection of Watercourses	All site personnel will be trained and aware of the appropriate action in the event of an emergency, such as the spillage of potentially polluting substances. Spill kits are retained to ensure that all spillages or leakages are dealt with immediately and staff are trained in their proper use. Any servicing of vehicles will be confined to designated and suitably protected areas. Any pollution incident or spill will be reported to the regulator and remediated to their original condition.	Construction Phase	Ongoing monitoring required during construction
6.9	Near watercourses	Protection of Watercourses	Wash down and washout of concrete transporting vehicles will not be permitted at the location of construction. Such wash down and washout activities will take place at an appropriate facility offsite.	Construction Phase	Ongoing monitoring required during construction
6.10	Temporary Access Routes and Tower Foundations	Protection of watercourses	At certain locations where very poor soft ground is encountered, Type 2 temporary access track may have to be laid. Generally temporary access tracks use rubber mats or aluminium road panels. Temporary access routes will be up to 4m wide and routed away from drains	Construction Phase	None

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			where possible. In sensitive locations silt barriers will be used to prevent direct runoff to local watercourses.		
6.11	Temporary Access Routes and Tower Foundations	Protection of water quality	Preventative measures will ensure that input suspended solids concentrations will be minimised at source. This will be achieved by ensuring that all silt / clay and topsoil is properly stored during the construction phase of the development.	Construction Phase	Ongoing Monitoring required during construction.
6.12	Construction-Temporary Access Routes and Tower Foundations	Protection of Water Quality	Water quality monitoring will be undertaken prior to the commencement of construction to confirm baseline data and ensure there is no deterioration in water quality. This will be targeted on watercourses considered to be at a higher risk of pollution (i.e. towers where there are watercourses within 20m of the construction works). Water quality monitoring will include daily inspection of adjacent watercourses.	Prior to and during the Construction Phase	Ongoing Monitoring, observing and sampling required during construction.
6.13	Construction-Material Storage Yard	Protection of Water Quality	The surface water drainage system at the construction material storage yard will take into account the recommendations of the CIRIA C468 and utilises SuDs (sustainable urban drainage) devices where appropriate. Runoff from site will be limited to greenfield runoff rates. Runoff will pass through a silt trap, oil interceptor and settlement lagoon before being discharge to the surface water.	Prior to and during the Construction Phase	Ongoing observing and sampling required during construction

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
6.14	Woodland Substation	Protection of Water Quality	Implementing the design standards of the GDSDS, the surface water drainage system at Woodland takes into account the recommendations of the GDSDS and utilises SuDs (sustainable urban drainage) devices where appropriate. Runoff from hardstand areas at Woodland Substation will be limited to greenfield runoff rates.	Prior to and during the Construction Phase	Ongoing observation required
AIR – NOISE & VIBRATION (CHAPTER 9 OF VOLUMES 3C AND 3D)					
7.1	Construction Phase	To ensure compliance with appropriate European Standards	The contractor appointed will have to ensure that all plant items used during the construction phase will comply with standards outlined in European Communities (*Construction Plant and Equipment) (Permissible Noise Levels) Regulations* (1990). The contractor will make reference to BS5228: *Noise Control on Construction and Open Sites* (2009), which offers detailed guidance on the control of noise from construction activities.	Construction Phase	Ongoing monitoring required during construction.
7.2	Construction Phase	To ensure the adoption of appropriate practices during construction	It is proposed that various practices be adopted including: • Night time working will typically not occur; however, there may be a necessity to continue to operate generator, pumps or other equivalent machinery at a number of locations, where the digging of foundations and erection of towers may cause activity to remain in one location for a longer period of time; • On these infrequent occasions screening and enclosures can be	Construction Phase	Ongoing monitoring required during construction.

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			utilised. For maximum effectiveness, a screen should be positioned as close as possible to either the noise source or receiver. The screen should be constructed of material with a mass of > 7kg/m2 and should have no gaps or joints in the barrier material. This can be used to limit noise impact to 45dB (A) Leq (BS 5228 acceptable night time level) at any noise sensitive receptors, if required by agreement with the local authority; • Appoint a site representative responsible for matters relating to noise; and • Establishing channels of communication between the contractor / developer, local authority and resident i.e. for notification of requirement of night works, should this be required.		
7.3	Construction Phase	Use of appropriate noise control measures during construction	Furthermore, it is envisaged that a variety of practicable noise control measures will be employed, these may include: • Selection of plant with low inherent potential for generation of noise and / or vibration; • Erection of temporary barriers around items such as generators or high duty compressors. For maximum effectiveness, a barrier should be positioned as close as possible to either the noise source or receiver. The barrier should	Construction Phase	Ongoing monitoring required during construction

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			be constructed of material with a mass of > 7kg/m2 and should have no gaps or joints in the barrier material, • As a rough guide, the length of a barrier should be 5 times greater than its height. A shorter barrier should be bent around the noise source, to ensure no part of the noise source is visible from the receiving location; and • Positioning of noisy plant as far away from sensitive receptors, as permitted by site constraints.		
7.4	Construction Phase	Use of appropriate construction phase vibration mitigation	Any construction works that have the potential to cause vibration at sensitive receptors will be carried out in accordance with the limit values as set out in the EIS.	Construction Phase	Ongoing monitoring required during construction
7.5	Operational Phase	Use of appropriate operational phase noise mitigation measures	It is not expected that noise arising from the proposed development will cause significant noise impact. Corona noise may be audible under certain weather conditions and in close proximity to the line. Corona noise is caused predominantly by items of transmission line hardware, other than conductors, e.g. clamps, and can be mitigated by replacement of individual items of hardware. Aeolian noise very rarely occurs on 400 kV lines and is not expected to arise on	Operational Phase	Ongoing monitoring required during construction

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			the proposed development. Recommended mitigation measures for Aeolian noise include the fitting of air flow spoilers on conductors and the fitting of composite insulators.		
7.6	Unknown at time of writing	To minimise noise impact to sensitive receptors	Use of temporary noise barriers around rock breaking activity if noise impact to sensitive receptors is deemed likely.	For duration of localised rock breaking	Noise monitoring of closest sensitive receptor or representative location.
AIR - QUALITY AND CLIMATE (CHAPTER 10 OF VOLUME 3C AND 3D)					
8.1	General Development wide – construction phase	Protection of properties from significant dust nuisance	Mitigation measures will be employed on a site-specific basis based on a review of the construction activities involved and their proximity to nearby receptors in each location. The site specific mitigation measures will be employed to ensure that properties within 50m of the construction locations will not be subject to significant dust nuisance. The types of mitigation measures include the following: • A water bowser will be available to spray work areas, especially during periods of excavations works coinciding with dry periods of weather, in order to suppress dust migration; • All loads which could cause a dust nuisance will be covered to minimise	Construction Phase	Ongoing monitoring required during construction (in the context the CEMP).

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			the potential for fugitive emissions; and • Stockpiled material during the construction phase will be sprayed during periods of dry weather in order to suppress dust migration from the site.		
LANDSCAPE CHAPTER 11 OF VOLUMES 3C AND 3D)					
9.1	Development wide – construction phase	Minimise physical landscape effects on vegetation	The key mitigation measures described in the Flora and Fauna section (section 4 of this table) will serve to minimise physical landscape effects arising from disturbance to vegetation and soils. The key mitigation measures as described in the Flora and Fauna section in relation to landscape effects are; using existing access routes and gaps in hedgerows, reinstatement of hedgerows and ground vegetation (with similar or better quality planting), protection of retained vegetation, sensitive vegetation pruning methods including pollarding of mature trees to retain hedgerow lines, monitoring of vegetation establishment over 24 months, and replanting in the event of any reinstatement failures. Hedgerows will be maintained to ensure no vegetation is tall enough to potentially interfere with the conductors.	Construction and Operational Phase	Ongoing monitoring required by a qualified Landscape Architect during construction and inspection of reinstated planting over a 24 month period
9.2	Development wide – construction phase	Minimise physical landscape effects on soil	The mitigation measures in section 5 – Soils, Geology and Hydrogeology will serve to minimise physical landscape effects on soil and subsequent vegetation establishment. The key mitigation measures as described in this section in relation to landscape effects are; correct removal, storage and reinstatement of subsoil and topsoil, avoidance of soil compaction and removal and disposal of soil	Construction and Operational Phase	Ongoing monitoring required by a qualified Landscape Architect during construction and

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			where not required for reinstatement.		inspection of earthworks over a 24 month period
9.3	Blackwater Valley	To mitigate landscape character and visual impact in a valley landscape	Micro mitigation is possible through the retention or enhancement of trees and hedgerows in key locations	Construction phase	Ongoing monitoring required by a qualified Landscape Architect during construction and inspection of reinstated planting over a 24 month period
9.4	Brittas Estate	To reduce the potential impact on a historic designed landscape	The clearance of existing vegetation will be minimised in this area and in consultation with the landowner appropriate screening could be planted on either side of the entrance road and other locations within the estate to limit the views towards the proposed development.	Construction phase	Ongoing monitoring required by a qualified Landscape Architect during construction and inspection of reinstated planting over a 24 month

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
					period
9.5	Boyne Valley	To mitigate landscape character and visual impact in a valley landscape, on a protected viewpoint and on a view from Bective Abbey	Micro mitigation is possible through the retention or enhancement of trees and hedgerows in key locations.	Construction phase	Ongoing monitoring required by a qualified Landscape Architect during construction and inspection of reinstated planting over a 24 month period.=
MATERIAL ASSETS – GENERAL (CHAPTER 12 OF VOLUMES 3C AND 3D)					
10.1	Development wide - General	To minimise impacts on electricity, telecoms & gas	A pre-construction survey for utilities such as gas, electricity, telecoms etc. will be undertaken during the construction phase, including ground investigations, to confirm the conditions which have been encountered in the EIS.	Prior to construction	None
10.2	At the crossing of OHL and	To minimise disruption to existing electricity &	Certain obstacles along a straight have to be guarded such as road / railway crossings and other transmission or distribution lines by way of temporary guard	Construction phase	None

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
	telecoms services is necessary	telecoms services during construction	poles.		
10.3	Development Wide General – Construction Phase	To comply with Best Practice Guidelines on the *Preparation of Waste Management Plans for Construction & Demolition Projects* (2006)	Waste management will be carried out in accordance with *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects* (2006) produced by the Department of Environment, Community and Local Government. A Construction Waste Management Plan (which will form part of the CEMP) will be implemented to minimise waste and ensure correct handling and disposal of construction waste streams. The key principles underlying the plan will be to minimise waste generation and to segregate waste at source.	Construction Phase	None
10.4	Development wide General – Operational Phase	To ensure the appropriate recovery / disposal of operational waste (such as packaging etc.) arising from occasional maintenance activities	A negligible amount of light waste generated in the operational phase of the proposed development arising in maintenance and cleaning operations, replacement of lighting units as required, oils arising from occasional maintenance activities and packaging materials will be removed off site by licensed contractors for appropriate recovery / disposal at licensed facilities.	Operational Phase	Monitoring required during Operational Phase (during maintenance)

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
10.5	Development wide General - Operational Phase	To ensure safe aviation activity at Trim Airfield	Landing aircraft using Runway 28 would need to be visually aware of where the towers are located and a formal approach procedure of *'visual contact of towers / cables required before starting field approach'* should be introduced. The OHLs will be below the obstacle limitation surfaces for Trim Airfield, but making them more conspicuous through the fitting of marker spheres should be considered between Towers 355 and 357. The landscape consultants propose fitting 60cm diameter spheres at 30 metre intervals alternating orange and white	Operational Phase	None
10.6	Development wide General - Operational Phase	To ensure safe Ballooning activity in the vicinity of the proposed development	The potential presence of the proposed development will have to be considered by the balloon pilots as part of their flight planning. The power line will have to be considered by the balloon pilots for launching and landing, but as stated by the IAA balloon pilots are allowed fly over power lines.	Operational Phase	None
MATERIAL ASSETS – TRAFFIC (CHAPTER 13 OF VOLUMES 3C AND 3D)					
11.1	Development Wide General – Construction Phase	The preparation and implementation of a Construction Traffic Management Plan. The objective of this plan will be to minimise the	It shall be a requirement of the contractor appointed to construct the project to prepare a detailed Construction Traffic Management Plan prior to the commencement of construction operations. As a minimum, the mitigation measures should include the following: • Development of a detailed construction programme aimed at minimising	Prior to the commencement of the construction phase.	Monitoring of roads used during construction stage required.

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
		impact caused by the construction stage of the project.	peaks in traffic volumes on specific roads; • Continuous monitoring of the roads used for construction; • Identification of traffic management measures with respect to road closures; • Measures for continuous liaison with local authorities and other relevant stakeholders; • Identification of traffic management measures at site entrances; and • Measures for accommodating emergency response vehicles along the haul routes.	Continuous updating throughout the construction stage.	
CULTURAL HERITAGE (CHAPTER 14 OF VOLUMES 3C AND 3D)					
12.1	General – Construction	To mitigate against potential impacts during the construction phase	In areas where it has been identified that there is the potential that archaeological, architectural or cultural heritage site, structures, monuments or features could be impacted on during the construction phase, one or more of the following mitigations measures have been recommended in the EIS: • Archaeological monitoring – in areas of moderate archaeological potential, excavations associated with construction works and / or	Prior to the construction phase and throughout construction	Ongoing implementation of archaeological monitoring, archaeological testing and other recommended

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			facilitating access to the construction site and / or stringing areas will be monitored by a suitably qualified archaeologist. In the event that archaeological deposits are discovered, work in the area will cease immediately and the archaeologist will liaise with the National Monuments Service of the DAHG and the National Museum of Ireland. • Archaeological testing – best practice in areas of high archaeological potential demands caution, to ensure that archaeological deposits are identified as early as possible, thereby ensuring that any loss from the archaeological record is minimised. Under a monitoring remit, an archaeologist will observe normal construction works, usually undertaken with a toothed excavator bucket. During archaeological testing a licensed eligible archaeologist supervises excavations undertaken with a toothless grading bucket, under licence to the National Monuments Service of the DAHG, thereby ensuring the early identification of archaeological deposits and minimal loss to the archaeological record. Undertaking this confirmatory surveying will ensure that sufficient time can be allowed within the construction schedule for the excavation of any archaeological deposits discovered. • Demarcation – where it has been identified that there is the potential that an archaeological, architectural or cultural heritage site, structure or monument or could be impacted upon in gaining access to construct the proposed development then demarcation has been recommended to		mitigation strategies.

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			prevent any inadvertent damage. A suitably qualified archaeologist will access the site prior to the commencement of construction works in the area and demarcate a buffer around the site, structure or monument that will remain in place throughout any construction works in the vicinity. • Confirmation of temporary access routes – at a number of locations confirmation of the proposed construction temporary access routes will take place, in consultation with the construction team and prior to commencement of construction works, to ensure that the surviving historic fabric of buildings is not impacted on in gaining access for construction activities. To this end the temporary access routes may be revised, sensitive features highlighted and demarcated or different construction machinery or methods (as identified in the EIS) may be used that can access the site without impacting on the historic fabric. • Monitoring of tree surgery – in a couple of instances there is dense vegetation that will have be to be trimmed in the vicinity of upstanding remains of buildings that are indicated on historic mapping. This work will be monitored by a suitably qualified archaeologist to ensure that the historic fabric of the buildings is not impacted upon by the works.		
12.2	Development Wide General – Construction	To ensure the implementation of the mitigation measures	It is recommended that a suitably qualified cultural heritage consultancy / consultant be appointed to oversee the effective implementation of the mitigation measures recommended in this EIS for the construction phase of the proposed	Construction phase	None

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
	Phase	during the construction phase	development. The consultancy / consultant should maintain continuing liaison with the National Monuments Service of the DAHG throughout the construction phase of the development.		
12.3	Development wide general	To comply with the Code of Practice Between the National Monuments Service of the DoEHLG (now DAHG) and ESB Networks (2009)	In line with the Code of Practice Between the National Monuments Service of the DoEHLG (now DAHG) and ESB Networks (2009), a project archaeologist will be appointed to oversee the effective implementation of the recommended archaeological mitigation during the proposed works.	Construction phase	None
12.4	Teltown Zone of Archaeological Amenity (ZAA)	To mitigate impact on Teltown ZAA	The following mitigation strategies have been formulated for the Teltown ZAA: • Test pits for other environmental and engineering disciplines will be subject to archaeological monitoring by a suitably qualified archaeologist; • Archaeological testing – best practice in areas of high archaeological potential demands caution, to ensure that archaeological deposits are identified as early as possible, thereby ensuring that any loss from the archaeological record is minimised. During archaeological testing a licenced eligible archaeologist supervises excavations undertaken with a toothless grading bucket, under licence to the National Monuments Service of the DAHG, thereby ensuring the early identification of	Construction phase	None

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
			archaeological deposits and minimal loss to the archaeological record. Undertaking this work preconstruction will ensure that sufficient time can be allowed within the construction schedule for the excavation of any archaeological deposits discovered. All tower guarding locations within the Teltown ZAA will be subject to a regime of pre-construction archaeological testing under licence to the National Monuments Service of the DAHG. The National Monuments Service of the DAHG and the National Museum of Ireland will be consulted immediately should archaeology be discovered and allowance will be made for full archaeological resolution; • During the construction phase a suitably qualified archaeologist will monitor site access and construction works. Ensure that where appropriate low ground pressure vehicles or panel tracks are used to minimise ground disturbance. Type 3 temporary access tracks will not be used within the Teltown ZAA. Low ground pressure vehicles and Type 2 temporary access tracks will be used to minimise ground disturbance. The Derrick Pole Methodology (see Volume 3B Section 7.3.4.3.2 of the EIS) will be used for tower construction; mobile cranes will not be used; and • A suitably qualified archaeologist will monitor access and construction of any guarding areas required within the ZAA.		

Item	Location (along the proposed route)	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring to Ensure Effectiveness of Mitigation
12.5	Various Locations	To mitigate against potential impacts during the construction phase of tower locations, guarding areas and 110 kV crossings, and associated temporary access routes.	Refer to summary of mitigation measures as listed in Chapter 14, **Volumes 3C** and **Volume 3D**.	Construction phase	Monitoring required during construction
12.6	Brittas House (RPS No. MH005-105)	To reduce the potential impact on the setting of entrance avenue to Brittas House (RPS No. MH005-105), Co Meath	The clearance of existing vegetation will be minimised in this area and in consultation with the landowner appropriate screening will be planted on either side of the lane to limit the views towards the proposed development.	Construction phase	Monitoring required during construction
12.7	Development wide – operational	To mitigate against potential impacts during the operational phase	Potential impacts on archaeological, architectural or cultural heritage sites, monuments, structures or features during maintenance works that may be required during the operational phase of the proposed development are best mitigated through ongoing liaison with the National Monuments Service and the Architectural Heritage Advisory Unit at the DAHG and local heritage and conservation officers within the County Councils.	During maintenance or upgrade works that may be required during the operational phase	Ongoing monitoring required during the operational phase (during upgrading / maintenance works).

Annex 1

Table of Contents from Two Previous Similar Type CEMP's

Construction Environmental Management Plan (CEMP)

Salthill – Screeb 110 kV Transmission Line

Table of Contents

CEMP – P 08 Litter Control & Site Clearing

CEMP – P 09 Spill Control

CEMP – P 10 Accident Prevention

CEMP – P 11 Bund Management

CEMP – P 12 Oil Interceptors Maintenance

CEMP – P 13 Fuelling of Vehicles & Equipment On-site

CEMP – P 14 Concrete Usage and Washing Out

CEMP – P 15 Noise

CEMP – P 16 110 kV ESBN Recommended Code of Practice

CEMP – P 17 Recommended Best Practice Guidelines

CEMP – P 18 Working within an NHA

CEMP – P 19 Soil and Geology

CEMP – P 20 Working in a Peat Environment

CEMP – P 21 Access Over Normal Ground Conditions

CEMP – P 22 Access Over Peat or Wet Conditions

CEMP – P 23 Vegetation Clearance

CEMP – P 24 Forestry Clearance

CEMP – P 25 Working in Bird Sensitive Environments

CEMP – P 26 Other Sensitive Species

CEMP – P 27 Protection of Water Quality / Sedimentation Prevention

CEMP – P 28 River and Stream Crossings

CEMP – P 29 Spread of Invasive Species

CEMP – P 30 Archaeological Protection

CEMP – P 31 Operation and Maintenance

CEMP – P 32 Environmental Incident Response

CEMP – P 33 Receipt of Public Complaints

CEMP – P 34 Receipt and Investigation of Public Complaints

CEMP – P 35 Internal Audit

CEMP – P 36 Control of Environmental Records

Construction Environmental Management Plan (CEMP)

Cloghboola – Trien 110 kV Line

Table of Contents

Annex 2

Construction Equipment for Each Activity Type

Annex 2

Construction Equipment and Duration

North-South 400 kV Interconnection Development

Table of Contents

1. Foundation Installation Stage

The equipment required for the foundation installation stage of construction includes the following:

- 4 x 4 vehicle;
- Concrete vibrator;
- Water pump;
- Wheeled dumper or track dumper (6 to 8 tonnes);
- Timber or other shuttering boxes;
- 360˚ tracked excavator (13 tonnes normally, 22 tonnes for rock breaker);
- Transit van;
- Road sweeper;
- Chains and other small tools; and
- Concrete delivered by supplier to closest convenient point (38 tonnes gross).

Duration of Foundation Works

The average duration (continuous days) of foundation works is as follows:

- Angle / intermediate tower 3 - 6 days
- Piled / rock anchor foundation 5 - 10 days
- Crew size 4 to 6 workers

2. Tower Erection Works by Derrick Pole

The equipment required for the tower erection stage by derrick pole of construction includes the following:

- 4 x 4 vehicle;
- Winch tractor and trailer;
- Derrick pole;
- Teleporter;
- Transit van; and
- Chains and other small tools.

Duration of Tower Erection Works

The average duration (continuous days) of tower building works is as follows:

- Angle tower 3 - 4 days
- Intermediate / transposition tower 3 – 4 days
- Crew size 7 workers

3. Tower Erection Works by Mobile Crane

The equipment required for the tower erection stage by construction using a mobile crane includes the following:

- 4 x 4 vehicle;
- All terrain mobile crane;
- Tractor and trailer;
- Teleporter;
- Transit van; and
- Chains and other small tools.

Duration of Tower Erection Works

The average duration (continuous days) of tower building works is as follows:

- Angle tower 3 - 4 days
- Intermediate / transposition tower 3 – 4 days
- Crew size 7 workers

4. Stringing Stage

The equipment required for the stringing stage of construction includes the following:

- 4 x 4 vehicles;
- Puller - tensioner X 2;
- Teleporter X 2;
- Drum stands X 2;
- Drum carriers X 2;
- Stringing wheels;
- Conductor drums;
- Compressor & head;
- Transit vans;
- Road sweeper;
- Chains and other small tools; and
- Conflict guardings.

Duration of Stringing Works

The average duration of stringing works is typically one week per straight. This figure is similar for all straights regardless of length as the most time consuming aspect is the movement and setup of stringing equipment. Stringing crews are typically quite large and could have as many as 15 workers.

5. Substation Works

The proposed works associated with extending / modifying the existing Woodland Substation will consist of, but not limited to, the following elements:

- Site preparation works, including the removal of part of the existing fence, site clearance and earthworks;
- Installation of the new 2.6m high palisade fence;
- Excavation of trenches and laying of ducts for electrical cables, communication cables, lighting, etc.;
- Excavation of trenches and laying of pipework for connection to the existing surface water drainage network;
- Foundations works for the installation of equipment, structures and monopole;
- Installation of miscellaneous outdoor electrical equipment including support structures, gantries and bases and associated cabling and wiring;
- Stringing of overhead line (OHL) conductors;
- Installation of lightning conductor equipment; and
- Completion of external finishes.

The following machinery will be necessary to carry out all the construction works above:

- Concrete truck;
- Mobile crane;
- Pulling and tension devices for overhead conductors;
- Excavator;
- Dumper truck; and
- Bulldozer.

Annex 3

Sample Construction Detail Map

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Registered Office: as above Registered in Ireland No. 155249

Client: EIRGRID

Project: North-South 400 kV Interconnection Development

Drawing title: Annex 3 Sample Construction Detail Map

Production unit: Overhead Line HV

Drawn	Produced	Verified	Approved	Approved date
DOS	DOS	MH	CM	Jan-15

Client ref.	No. of sheets	Size	Scale
	1	A3	1 : 2,500

Drawing number: PE687-D141-153-001-000 Sheet Rev