North East 400 kV Reinforcement Works
EIA Report - Volume 1 Non-Technical Summary

February 2019
CONTENTS

1. INTRODUCTION  2
2. THE NEED FOR THE PROJECT  4
3. CONSIDERATION OF ALTERNATIVES  5
  3.1 “Do-Nothing” Scenario  5
  3.2 Alternative Corridors, Routes or Alignments  5
  3.3 Alternative Technical Options  5
4. DESCRIPTION OF THE PROPOSED DEVELOPMENT  6
  4.1 Phase 1 – Enabling Works  6
  4.2 Phase 2 – Construction Works  6
  4.3 Phase 3 – Commissioning  7
  4.4 Phase 4 – Reinstatement  7
  4.5 Construction Environmental Management  7
  4.6 Construction Employment and Hours of Work  7
  4.7 Construction Traffic  7
  4.8 Operation and Management of the Transmission Connection  8
5. EIA APPROACH, SCOPE AND CONSULTATION  9
6. ENVIRONMENTAL EFFECTS OF THE PROPOSALS  10
  6.1 Visual  10
  6.2 Ecology  10
  6.3 Ornithology  11
  6.4 Cultural Heritage  11
  6.5 Hydrology, Hydrogeology, Geology and Soils  11
  6.6 Electric and Magnetic Field Effects  12
  6.7 Electromagnetic Interference Effects  13
  6.8 Noise and Vibration  13
7. CUMULATIVE EFFECTS  14
8. CONCLUSION  15

FIGURES

Figure 1: Location Plan and Overview
Figure 2: The Proposed Development
1. INTRODUCTION

This Non-Technical Summary (NTS) forms part of the Environmental Impact Assessment (EIA) Report prepared under the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 on behalf of Scottish Hydro Electric Transmission plc (SHE Transmission).

SHE Transmission, referred to as ‘the Applicant’ from this point forwards and throughout the EIA Report, currently owns and operates the electricity transmission network connecting the substations at Blackhillock, near Keith; Rothienorman; Kintore; and Peterhead. The existing steel lattice overhead line between these substations (see Figure 1) currently operates at a capacity of 275 kilovolts and serves as part of the main transmission network for the north-east area of Scotland.

A number of new electricity generating developments are planned around the north-east area of Scotland, including onshore and offshore wind farms, a new undersea cable connecting Scotland and Norway, and an increase to Peterhead Power Station’s electricity output. The current operating capacity of the existing overhead line is not sufficient to transmit the increased electricity that will be generated by these new developments, and so the Applicant is proposing to increase the operating capacity of the overhead line to 400 kilovolts.

The existing steel lattice towers are built to accommodate the higher operating capacity of 400 kilovolts and do not need to be replaced or altered. Some towers may require minor works to reinforce their structure or strengthen their foundations; however, their final appearance would remain the same. The insulators (glass or composite discs) attached to each tower would need to be replaced with slightly longer insulators to support the increased operational voltage; however, the new insulators would look similar to the existing ones once installed. The conductors (the wires suspended between the steel lattice towers) would also be replaced at the same time, as recent tests have shown that they will need to be replaced within the next five to ten years due to their age and condition. As part of the replacement of the conductors, the fixtures and fittings which connect them to the steel pylons would also be replaced. Again, their appearance would be similar to the existing situation. Replacement of the conductors and the fixtures and fittings is collectively termed re-conductoring.

The existing overhead line connects into Keith substation, on the outskirts of Keith, and a separate overhead line connects Keith substation to Blackhillock substation, further south. As part of the proposed works, a short section of the overhead line would be diverted to bypass Keith substation and connect directly into Blackhillock substation. This would involve taking down seven existing towers and their conductors, and building four new ones to the south-east.

All of these works together are referred to through the rest of this NTS, and throughout the EIA Report, as ‘the Proposed Development’. An overview of the Proposed Development is shown on Figure 1, whilst more detailed plans are presented in Figure 2.

The full results of the EIA (baseline information, survey findings and technical assessments) that have been completed for the Proposed Development are presented in the EIA Report. The aim of this NTS is to summarise the content and the main findings of the EIA Report in a clear and consistent manner to assist the public in understanding what the environmental effects of the Proposed Development are likely to be. The full EIA Report (Volume 2: Main Report; Volume 3: Figures; Volume 4: Technical Appendices) provides a more detailed description of the Proposed Development, and the findings of the EIA.
The full EIA Report and supporting Figures and Technical Appendices can be viewed at the following locations:

<table>
<thead>
<tr>
<th>Location</th>
<th>Address</th>
<th>Opening Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Scottish Government Library</td>
<td>Victoria Quay, Edinburgh, EH6 6QQ</td>
<td>9am to 4pm Monday to Friday, 24 hours' notice required prior to visit via <a href="mailto:SGLibrary@gov.scot">SGLibrary@gov.scot</a></td>
</tr>
<tr>
<td>Aberdeenshire Council</td>
<td>Gordon House, Inverurie, AB51 3WB</td>
<td>8.45am to 5pm Monday to Friday</td>
</tr>
<tr>
<td>Aberdeenshire Council</td>
<td>Buchan House, St Peter Street, Peterhead, AB42 1QF</td>
<td>8.45am to 5pm Monday to Friday</td>
</tr>
<tr>
<td>Keith Access Point</td>
<td>The Resource Centre, 26 Mid Street, Keith, AB55 5AH</td>
<td>8.45am to 5pm Monday to Friday</td>
</tr>
</tbody>
</table>

The EIA Report can also be viewed at [www.energyconsents.scot](http://www.energyconsents.scot).

Notice of the application, together with a copy of the Non-Technical Summary, is also provided on the Applicant's website at: [https://www.ssen-transmission.co.uk/projects/north-east-400kv/](https://www.ssen-transmission.co.uk/projects/north-east-400kv/).

The EIA Report will be available in other formats, if required. For details, including costs, contact:

Gary Donlin, Community Liaison Manager
gary.donlin@sse.com

OR

For the Attention of Gary Donlin
SHE Transmission
1 Waterloo Street
Glasgow
G2 6AY
2. THE NEED FOR THE PROJECT

As set out in Section 1: Introduction, the Proposed Development is required due to the planned development of several projects which will increase the demand on the electricity transmission network in the north-east of Scotland. Specifically, the following developments are planned:

- the Moray East Offshore Windfarm, with a maximum output of 900 megawatts;
- the West Offshore Windfarm, with a maximum output of 750 megawatts;
- the North Connect High Voltage Direct Current Interconnector, with a maximum output of 1,400 megawatts; and
- an increase in maximum output of the Peterhead Power Station from 400 megawatts to 1,180 megawatts.

These projects are currently anticipated to be complete and operational by 2024, with the first connection due in 2021. In order to allow these projects to proceed on schedule, the electricity transmission network must be capable of carrying the increased electrical load before they begin operating.

Additionally, demand on the transmission network has been recently increasing due to the development of smaller generation projects, such as onshore wind farms.

The Applicant has obligations under the Electricity Act 1989 to develop and maintain an efficient, co-ordinated and economical system of electricity transmission. As the owner and operator of the existing overhead line, the Applicant is required to meet this increased demand, and proposes to do so by increasing the operational voltage of the existing overhead line to 400 kilovolts, as set out in Section 1: Introduction, and in further detail in Section 4: Description of the Proposed Development.
3. CONSIDERATION OF ALTERNATIVES

The Proposed Development is primarily located in the north-east of Aberdeenshire, with a short section crossing into the Moray Council area, where the substations at Keith and Blackhillock are located. The existing overhead line is approximately 106 kilometres in length.

As part of early work in designing the project, the Applicant considered alternative options for the connection route, connection type, and technology to be implemented. This consideration of options also took into consideration the requirements of the Electricity Act 1989, which notes that the Applicant must:

- “have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest”; and
- “do what [it] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects”.

In effect, the design for the Proposed Development must seek to limit its effects on the environment as far as reasonably possible while delivering the required capacity upgrade.

To that end, three main alternative approaches were considered by the Applicant: the “Do Nothing” Scenario, alternative corridors, routes or alignments, and alternative technical options.

3.1 “Do-Nothing” Scenario

This scenario assumes that no other options are considered and that the transmission network remains at 275 kilovolt capacity. This would result in the current capacity limitations remaining in place, and fail to deliver on the Applicant’s obligations as network operator.

As such, this was considered to be an unsustainable development option and discarded at an early stage.

3.2 Alternative Corridors, Routes or Alignments

As noted in Section 1: Introduction, the Proposed Development requires replacement of the existing insulators, as they have a current capacity of 275 kilovolts. The steel towers, however, were constructed to allow for a future increase to 400 kilovolts.

Given that the towers are already designed for this higher capacity and are structurally sound (subject to some steel and foundation reinforcement in places), the most efficient and cost-effective approach for the Proposed Development is to replace the insulators on these towers. In comparison, replacing the towers, or constructing new towers elsewhere to establish a new route, would be inefficient, costly and have much greater impacts upon the environment.

Consequently, alternative routes and alignments were not considered further.

3.3 Alternative Technical Options

Whilst the existing steel lattice towers can be utilised for future reinforcement, a technical and asset review was required to understand the ability for the existing conductors, insulators and earthwire to be used at a nominal voltage of 400 kV.

Following an engineering assessment of the current condition of the existing conductors, it was decided to replace all components simultaneously. This would minimise mobilisation costs and disruption to the general public.

Consideration was also given to the specific types of conductors, insulators and other components to be used. The types selected reflect the best available technological options at present, however as technology options are continuously advanced, the specific product types may be further optimised as part of detailed design.
4. DESCRIPTION OF THE PROPOSED DEVELOPMENT

The Proposed Development consists of replacement of the existing insulators and conductors, along with their fixtures and fittings, to allow for an increased transmission capacity from 275 to 400 kilovolts, between substations at Blackhillock, Rothienorman, Kintore and Peterhead. Additionally, an alteration of the overhead line route on the outskirts of Keith would be carried out to directly connect the substations at Rothienorman and Blackhillock.

The specific works to be carried out for this capacity increase would involve:

- replacement of the insulators and fittings on the steel towers;
- replacement of the conductors spanning between the towers, as well as the earthwire which runs between the tops of the towers;
- removal of seven towers and their conductors on the outskirts of Keith, and replacement with four new towers so as to bypass Keith substation; and
- connect the overhead line into Blackhillock substation, which includes the removal of two towers at Blackhillock.

There would also be a requirement for certain works associated with the construction and operation of the Proposed Development including vegetation clearance, tower access route upgrades, temporary site compounds, and temporary measures to protect road, rail and water crossings. Existing tracks would be utilised where possible for construction access. Metal or plastic roadway panels may be used where there are no tracks. For the construction of new towers on the outskirts of Keith, temporary stone tracks would be required.

The works are anticipated to be carried out between April 2021 and October 2023, subject to the necessary approvals being granted. Works would generally be undertaken during the months of April to October, and would be co-ordinated as part of planned outages on the transmission network to minimise disruption to consumers.

Development would be carried out in four phases, set out as follows.

4.1 Phase 1 – Enabling Works

Enabling works would involve the establishment of site compounds for storage of equipment and materials required for the works, and either the upgrade of existing access routes or laying of temporary tracks to allow vehicles and machinery to access the towers.

4.2 Phase 2 – Construction Works

The construction works would be broken into three main stages: replacement of the insulators and conductors; reconfiguration of the overhead line at the outskirts of Keith; and connections into substations.

In addition to replacement of the insulators and conductors, these works would also involve steel and foundation reinforcements where engineering inspection of towers determines this to be necessary. Where the existing overhead line crosses roads, railways or watercourses, temporary mechanical protection, such as scaffolding, would be put in place prior to and during re-conductoring works to ensure no damage or injury in the unlikely event of equipment failure.

Construction of the new towers at the outskirts of Keith would require excavation for new foundations, laying of temporary stone tracks (to be removed upon completion), erection of the towers themselves, and finally installation of the conductors.

Following the completion of the new towers, seven existing towers would be removed; three from the Blackhillock to Keith overhead line, and four from the Keith to Rothienorman overhead line, leaving a direct link between Blackhillock and Rothienorman substations. Existing foundations would be broken up to around one metre below ground level, and all materials removed from site.
Connection into Blackhillock substation would comprise the installation of new connecting conductors between existing towers and electrical components within the substation, known as downleads.

4.3 Phase 3 – Commissioning

This stage would involve an inspection of the completed works to ensure everything has been built and installed to specification and the new insulators and conductors are fit to carry the required voltage. Once inspections are complete and satisfied, the circuits would be energised from the substations.

4.4 Phase 4 – Reinstatement

Upon completion of the works, all vehicles and machinery would be removed from all sites, the construction compounds would be cleared up and removed, and temporary tracks would be taken away and the ground restored to its previous condition.

4.5 Construction Environmental Management

4.5.1 All works would be carried out in accordance with the Applicant’s General Environmental Management Plans (GEMPs) and Species Protection Plans (SPPs), which have been developed by the Applicant to ensure best practice working methods are adapted to minimise potential environmental effects.

4.5.2 A contractual management requirement of the successful Principal Contractor would be the development and implementation of a Construction Environmental Management Plan (CEMP). This document would detail how the successful Principal Contractor would manage the site in accordance with all commitments and mitigation detailed in the EIA Report, statutory consents and authorisations, and industry best practise and guidance.

4.6 Construction Employment and Hours of Work

4.6.1 The Applicant considers it important to act as a responsible developer with regards to the communities which host the construction works. The delivery of a major programme of capital investment provides the opportunity to maximise support of local communities. Employment of construction staff would be the responsibility of the successful Principal Contractor; however, the Applicant would encourage the successful Principal Contractor to make use of suitable labour and resources from areas local to the Proposed Development where possible.

4.6.2 Construction activities would in general be undertaken during daytime periods only. For weekdays, this would involve work between approximately 07:00 to 19:00 in the summer and 07:30 to 17:00 (or as daylight allows) in the winter. At weekends, the working hours would be approximately 07:00 to 17:00 in the summer and 07:30 to 17:00 (or as daylight allows) in the winter. Any variation in these working hours would be agreed in advance with the appropriate local authorities.

4.7 Construction Traffic

4.7.1 Construction of the Proposed Development would give rise to regular numbers of staff transport movements, with small work crews travelling to work site areas. It is anticipated that the successful Principal Contractor would identify a single main compound area, with a safe area for parking away from the public highway. Additional temporary compound areas would be identified as necessary.

4.7.2 Vehicle movements would be required to construct temporary or upgraded access roads; deliver the foundation and tower components and conductor materials to site; and deliver and collect materials and construction plant from the main site compound and to individual tower locations.

4.7.3 The successful Principal Contractor would determine where access is required, and for which items of plant, and prepare Traffic Management Plans in consultation with the Applicant and the local authorities. Traffic Management Plans would describe all mitigation and signage measures that are proposed on public roads based on access maps and subsequent site assessments.
4.7.4 Temporary traffic lights may be required at some locations (e.g. for delivery of scaffold materials). For minor tracks and other crossings, the installation of appropriate warning signs and provision of staff with stop / go boards to control any passing traffic may be adequate.

4.8 Operation and Management of the Transmission Connection

4.8.1 In general, an OHL requires very little maintenance. Regular inspections are undertaken to identify any unacceptable deterioration of components, so that they can be replaced.

4.8.2 From time to time, inclement weather, storms or lightning can cause damage to either the insulators or the conductors. If conductors are damaged, short sections may have to be replaced. Insulators and conductors are normally replaced after about 40 years, and towers painted every 15 to 20 years.
5. **EIA APPROACH, SCOPE AND CONSULTATION**

Environmental Impact Assessment (EIA) is a process that considers how a proposed development will change existing environmental conditions and what the consequences of such changes will be. It therefore informs both the project design and planning decision making processes.

An important part of the EIA process involves consulting with a variety of organisations and individuals. This process is important both for allowing interested parties to express their views or concerns about a proposal, but also to highlight any specific issues to be assessed or reviewed through the EIA. This stakeholder consultation takes place throughout the design and assessment process.

In August of 2018, the Applicant produced a Scoping Briefing Note; a brief report outlining what the Proposed Development was and setting out the proposed scope of environmental assessment. This report was issued to the following statutory consultees, who were invited to comment:

- Energy Consents Unit;
- Aberdeenshire Council;
- Moray Council;
- Scottish Environmental Protection Agency;
- Scottish Natural Heritage; and
- Historic Environment Scotland.

These statutory consultees were invited to a meeting to discuss with the Applicant the proposed approach to assessment, and to give any particular comments they felt would assist at that stage.

Following this, an EIA Scoping Report was issued to the Energy Consents Unit in September of 2018. This report took into account the previous comments from statutory consultees and set out in further detail the anticipated works, the environmental assessment methods to be undertaken, and information on each of the environmental topics to be addressed. The report concluded with a summary of the particular elements of each topic proposed to be included or excluded from the EIA based on the potential for significant effects to arise as a result of the Proposed Development.

In November 2018 the Energy Consents Unit issued their Scoping Opinion in response to the EIA Scoping Report. This set out formal comments and feedback from the statutory consultees listed above, as well as a number of non-statutory consultees consulted as part of the process. The Scoping responses noted a number of items to be addressed as part of the EIA. These comments and topics are addressed throughout the EIA Report.

Several public consultation events were held to allow members of local communities to express their views on the Proposed Development. These were held in late November 2018 at locations in Keith, Rothienorman, Kintore and Peterhead, and attended by a total of 78 people. The comments and discussions from these events were summarised in a Report on Consultation, included with the EIA Report.

In January 2019, a Gate Check Report was issued to the Energy Consents Unit. The purpose of this report was to set out the comments and issues raised by consultees in response to the EIA Scoping Report, and set out how these have been addressed within the EIA Report.

Throughout the above process, specific consultation was undertaken with a few consultees to further discuss key issues raised through the consultation process.
6. ENVIRONMENTAL EFFECTS OF THE PROPOSALS

The EIA considers the potential for significant effects as a result of the Proposed Development on the following environmental features:

- visual;
- ecology;
- ornithology;
- cultural heritage;
- hydrology, hydrogeology, geology and soils;
- electric and magnetic field effects;
- electromagnetic interference effects; and
- noise and vibration.

6.1 Visual

There would be no material change to the appearance of the existing 275 kV overhead line between Blackhillock, Peterhead and Kintore substations, as the conductors, insulators and associated fittings will be visually similar to those present already. The exception to this would be the reconfiguration of the overhead line on the outskirts of Keith. As such, the Visual Impact Assessment for the Proposed Development concentrated on this element of the Proposed Development only. An assessment on landscape character was also scoped out of the assessment as no significant effects are anticipated.

The Visual Impact Assessment considers how the overall reduction of three towers and the change in the layout of the overhead line would affect sensitive visual receptors, such as local residents or those using nearby paths and roads.

The assessment concludes that there would likely be some significant adverse visual effects during the construction phase, although these would be short term and limited to the immediate area. Once construction is complete, there would likely be a small number of significant beneficial visual effects in the immediate area due to the overall reduction of towers and their movement further from Keith.

6.2 Ecology

The ecological assessment considers how the Proposed Development may affect sensitive habitats or protected species. Field surveys identified a variety of different habitats along the route of the overhead line, the majority of which were considered to be of low sensitivity given that the route crosses large areas of intensively farmed agricultural land utilised for arable crops and pasture. Other open ground habitats are characterised by semi-improved / unimproved grasslands and marshes. Woodland areas are typically small and fragmented, being utilised as shelterbelt or commercial plantation and dominated by coniferous woodland.

Potential effects on ecology would be limited to the construction phase; once the Proposed Development is operational, there would be no anticipated effects.

Some impacts may occur upon local habitats, for example due to loss of habitat areas associated with the new towers proposed on the outskirts of Keith, or changes in habitat type due to soil disturbance or alterations to local hydrology.

The only statutory designated site within 1 km of the Proposed Development is Mill Wood Site of Scientific Interest (SSSI). The SSSI is located 280 m south of the nearest towers (Towers 6 and 7), on the opposite side of the Burn of Drum. No works are planned to be undertaken within the SSSI boundary. As the site is not hydrologically connected to the Proposed Development it is not anticipated that there will be any impacts on this SSSI.

Protected species with potential to be affected by the Proposed Development are badger, otter, pine marten, red squirrel and bat species, either through disturbance during construction or as a result of injury.
Mitigation measures have been set out in order to minimise potential effects on ecology during construction. The Applicant has a set of good practice and working control measures which are applied as required to developments, and these, in tandem with a site-specific Construction Environmental Management Plan, would serve to reduce or prevent effects on ecology. Consequently, all effects on ecology would be reduced to non-significant levels.

6.3 Ornithology

The ornithology assessment considers how the Proposed Development may affect bird species, either protected or of conservation concern. Baseline data on bird species within the vicinity of the Proposed Development, including information on sites designated for nature conservation and species records, were gathered from a number of sources. Breeding bird surveys were also carried out in areas where new infrastructure is proposed; i.e. the re-configuration of the existing overhead line on the outskirts of Keith.

No effects upon designated sites are anticipated due to their large distance from the overhead line and lack of ‘connectivity’; the indirect link between a development and a designated site resulting from its species foraging or moving through the development site.

Potential exists for effects on bird species principally during the construction phase; from damage to nests or disturbance to nests or young resulting from construction works. The magnitude of these effects is likely to be low and, subject to the mitigation measures proposed, no significant effects are likely.

6.4 Cultural Heritage

The cultural heritage assessment considers how the Proposed Development may affect archaeology and built heritage. Due to the nature of the works, it was not considered that any significant impacts on the setting of cultural heritage assets were likely, as the historic setting of heritage assets in the area would not experience any noticeable change between the appearance of the existing and proposed insulators and conductors.

A desk-based assessment of known cultural heritage sites within the vicinity of the potential effects was carried out to inform a Cultural Heritage Management Plan.

The Cultural Heritage Management Plan, and the appendix to the cultural heritage chapter, contain a table listing every known heritage feature within 200 metres of the overhead line and tower access routes, a note of the potential impacts, and the mitigation measures to be set in place to protect them, where considered necessary.

Overall, no significant effects are anticipated on cultural heritage as a result of the Proposed Development.

6.5 Hydrology, Hydrogeology, Geology and Soils

This assessment considers how the Proposed Development is likely to affect the soil and water environments. As effects on these environments can be complex and have wide-ranging effects, the Proposed Development has been assessed against an array of different legislation, planning policies and guidance documents. Information for the assessment was drawn from numerous sources, including specific data requests to the Scottish Environmental Protection Agency and both local authorities.

Assessment of potential effects was carried out in relation to the following aspects of the soil and water environments:

Soils and Geology

No significant earthworks are required, limited to excavations for foundations and stripping of topsoil for temporary stone access tracks. However, best practice measures would be put in place to safeguard soils, such as avoiding working during heavy rain and ensuring all temporary tracks are removed once works are complete. While the soils with potential to be affected are not considered to be sensitive, these measures would serve to protect them in line with best practice.
Surface Water and Groundwater Quality

Surface water and groundwater quality can be affected by pollutants from development. The Applicant’s previously mentioned good practice and working control measures are considered sufficient to limit pollution, and no additional mitigation measures are proposed. Any water required on site, inclusive of site welfare facilities for personnel, would be provided by a water tanker, and waste water taken away in a similar fashion.

Surface and Groundwater Flow

Similarly, the good practice and working control measures would serve to ensure surface and groundwater flows are not impeded, with no difference caused to watercourses or ground conditions. Excavations would be small in area and depth, with pre-construction ground surveys carried out to identify any further safeguards required.

Flood Risk

Areas of flood risk are highly sensitive, and increases in flood risk can have wide-ranging effects. No new permanent development would take place within the 1000-year floodplain (i.e. the flood plain of a storm so large that it has only a 0.1 % chance of occurring in any given year).

No new watercourse crossings or upgrades to existing watercourse crossings are currently anticipated to be required to facilitate access for construction of the Proposed Development. In the event that any new or upgraded watercourse crossings are required, the design of any new watercourse crossings would be agreed with the Scottish Environmental Protection Agency.

Private Water Supplies

A number of private water supplies were identified within 250 metres of the existing overhead line and construction access routes. The majority of these water supplies would not be affected by the Proposed Development as most towers would be accessed by existing tracks or via temporary panels, and the Applicant’s good practice and working control measures would serve to prevent any effects. Private water supplies near the reconfiguration works on the outskirts of Keith would have the potential to be affected due to excavation works for tower foundations and temporary stone tracks, and so these have been subject to a specific risk assessment. Only one private water supply was identified near the reconfiguration works, and was determined to be sufficiently distant from the Proposed Development that there is unlikely to be any effect on it.

The need for tower foundation upgrades will be determined by the successful Principal Contractor as part of the detailed design stage of the Proposed Development. Where it is identified that upgrades are required, a private water supply risk assessment will be undertaken prior to any construction works and, if a private water supply source is identified within 250 m of the Proposed Development, suitable mitigation measures will be confirmed.

Designated Sites

No designated sites dependent on water were identified within five kilometres of the Proposed Development. Good practice and working control measures are thus considered sufficient to prevent any effects upon such sites.

Summary

With the implementation of best practice mitigation measures, no significant effects are considered likely to arise on the soil or water environments local to the site.

6.6 Electric and Magnetic Field Effects

The existing overhead line produces electric and magnetic fields due to carrying an electric current. As the voltage capacity would be increased, the electric and magnetic fields would increase proportionately. While there are no statutory regulations to limit exposure to these fields, guidelines endorsed by the UK Government set out exposure levels to be adhered to.
The assessment of electric and magnetic fields sets out the electric and magnetic field strengths which would exist at and near the overhead line following increase of its operational voltage to 400 kilovolts. It concludes that exposure levels to both field types are below the levels set in the above guidelines, and thus no significant effects would occur. No mitigation measures are considered necessary.

6.7 Electromagnetic Interference Effects

Conductors can produce interference for devices which use radio waves, principally radio and television. These effects can increase during wet conditions, or when conductors are corroded or damaged. The assessment of these effects considers the increase in interference levels likely to arise from the Proposed Development compared with the existing conductors.

It is predicted that several properties in close proximity to the overhead line may detect interference to medium and long wave (AM) radio signals; however, FM radio, digital radios and televisions would not be affected. Given the predicted decline in radio stations transmitting on AM frequencies and increasing use of alternative broadcasting media, together with the widespread use of mobile phone use and extensive mobile network coverage across the UK, the overall impact is not considered to be significant.

6.8 Noise and Vibration

Similar to generation of electric and magnetic fields, live conductors can produce noise. This normally occurs due to debris or damage to the surface of the conductors, or during wet conditions. As the noise level relates to the electric field, the increase from 275 to 400 kilovolts would tend to increase noise from the conductors.

During dry weather conditions, noise from the conductors would be very low and not readily noticeable. During wet weather conditions, the line would produce more noise; however, various factors, such as the increase in background noise produced by rainfall and the lower noise levels inside a building compared with outside areas, would either mask or reduce the noise from the overhead line to acceptable levels.
7. CUMULATIVE EFFECTS

Assessment of cumulative effects requires consideration of how a development is likely to interact with other similar nearby developments. While each development on its own may not result in any significant effects, multiple developments affecting the same elements of the environment, such as sensitive habitats or local residents, may result in significant effects when considered together.

Cumulative effects can also arise through the interaction between different types of effects arising from the same development on a particular aspect of the environment. For example, the effects of dust, noise, vibration, light, human presence and visual effects on a nearby protected species may individually be non-significant, but when considered together may give rise to a significant level of effect.

There are a number of developments associated with the reinforcement of the transmission network within the north-east of Scotland, some of which are directly relevant to the Proposed Development. These developments include:

- Blackhillock substation, including Beatrice Offshore Windfarm Ltd. substation (BOWL) (completion due 2019);
- Keith to Blackhillock 132 kV underground cable (construction 2019 / 2020);
- Keith to Blackhillock 132 kV sealing end platform (including removal of two towers);
- Keith substation ongoing maintenance;
- Rothienorman substation and associated infrastructure (construction 2019-2021);
- New Deer substation and associated infrastructure (construction 2018-2020);
- Peterhead substation and associated infrastructure (construction 2020-2022); and
- Kintore substation 400 kV extension (construction 2021-2023).

7.1.1 Where relevant, the individual technical chapters within this EIA Report consider the potential cumulative effects of the Proposed Development with other developments. No significant cumulative effects were identified.
8. CONCLUSION

SHE Transmission is proposing to reinforce the existing transmission network in the north-east area of Scotland by increasing the transmission capacity of an existing overhead line from 275 to 400 kilovolts. This would involve replacement of the insulators and conductors across approximately 106 kilometres, currently connecting the substations at Blackhilllock, Rothienorman, Kintore and Peterhead. Additionally, a reconfiguration of the towers on the outskirts of Keith would be carried out to bypass Keith substation, resulting in an overall reduction of three towers. These works altogether comprise 'the Proposed Development'.

The need for the project is driven by planned increases in generation capacity in the north-east area of Scotland. SHE Transmission, as the owner and operator of the transmission network, is obligated to carry out this reinforcement in the most efficient, cost effective and co-ordinated manner while minimising potential environmental impacts.

Consultation with statutory and non-statutory consultees was carried out throughout the EIA and Scoping process, in addition to several public exhibitions, in order to invite comment on the Proposed Development itself and specific areas of environmental assessment to incorporate into the EIA.

The EIA incorporates assessment of the Proposed Development's likely significant effects on the following environmental aspects:

- visual;
- ecology;
- ornithology;
- cultural heritage;
- hydrology, hydrogeology, geology and soils;
- electric and magnetic field effects;
- electromagnetic interference effects; and
- noise and vibration.

Subject to implementation of SHE Transmission's good practice and working control measures, as well as the identified site-specific mitigation measures outlined in each technical chapter of the EIA Report, the Proposed Development is not considered likely to give rise to any significant effects.