1 Potential Grid Connections

1.1 Introduction

The Consenting Context

1.1.1 Although a grid connection is an integral, requisite part of any wind farm project, it is typically subject to a separate consenting process. Depending upon size (installed capacity), consent for a wind farm is sought either from the relevant local authority under the Town and Country Planning (Scotland) Act 1997 (the 1997 Act) or from the Scottish Ministers under Section 36 of the Electricity Act 1989. In contrast, in relation to overhead lines (OHL), the grid connection may require consent from the Scottish Ministers under Section 37 of the Electricity Act 1989; or, alternatively for underground sections (i.e. underground electricity cables), either planning permission may be required from the local authority; or permitted development rights may apply, subject to specific circumstances.

1.1.2 Normally the wind farm applicant will be the developer, whereas the grid connection consent will be sought by the relevant owner of the local distribution or transmission network, in this case Scottish and Southern Electricity Networks (SSEN).

1.1.3 In this case, the Applicant's interpretation of the application requirements is that the Environmental Impact Assessment process for the Proposed Development should additionally assess the secondary and indirect environmental effects associated with the grid connection, insofar as is possible.

1.1.4 The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 state that the EIA Report should provide an indication of any difficulties encountered by the applicant in compiling the required information. The main technical difficulty in relation to predicting the likely significant environmental effects of the grid connection is that the applicant for the Proposed Development has no absolute control over the nature and routeing of the eventual grid connection. Equally, given that the optimum interconnection point depends upon power flows and available capacity in the wider network, and given that these are constantly changing, then it is impossible to guarantee the final form of the grid connection until the time at which the connection is secured for construction.

1.1.5 As such, the Applicant has made an assessment of the predicted environmental effects of the grid connection based upon its best understanding of a potentially suitable route corridor. It should be noted that, when the consent application for the grid connection is brought forward, the grid connection will be the subject of a separate environmental assessment process.

1.2 Scope

1.2.1 Given the above qualifications and context, the purpose of this section is:

- to describe the existing local grid infrastructure;
- to describe a potential grid connection corridor and its environmental sensitivities; and
- based upon the identified grid corridor, demonstrate that a connection solution is possible that would be unlikely to have significant environmental impacts.

1.2.2 If the final objective can be achieved, then for the purpose of consenting the proposed development, there would be no reason to withhold consent on grounds of likely significant environmental impact of necessary related development.

1.2.3 This chapter contains the following:

- Figure: Indicative Grid Route.

1.3 Potential Grid Connection Corridor

1.3.1 RES has submitted an application for a grid connection for the Proposed Development to SSEN. The Applicant has successfully received a Gate 1 offer under the NESO Clean Power 30 (CP30) initiative, and a formal connection agreement is in place between the Applicant and SSEN.

1.3.2 The Applicant's initial assessment of the site was that it was physically capable of hosting a development of between 150 MW and 200 MW.

1.3.3 The grid network local to the site contains existing high-voltage infrastructure, including the transmission lines that follow the A9 corridor and the existing Tomatin substation.

1.3.4 The Proposed Development would most likely be connected to the Tomatin substation via sections of both underground cable and potentially overhead line (OHL). As shown Figure: Indicative Grid Route, the potential grid connection corridor would begin at the on-site substation search area located in the northern extent of the Proposed Development. From here, the corridor route exits the site and travels initially in a north-easterly direction, passing to the south and east of An Socach. The route then turns to travel in a generally north-westerly direction, descending to cross the River Findhorn, before connecting into the existing Tomatin substation

located adjacent to the A9 corridor. The only overhead section is anticipated to be where the corridor approaches the existing grid infrastructure or crosses major topographical features or infrastructure.

1.4 Construction

1.4.1 For an underground cable connection, the trench would be similar to those used for the Proposed Development(i.e. underground cabling as described in Chapter 3: Proposed Development Description), as shown in Figure 3.12. The trench could run in the road side verges adjoining the carriageway, or within footways adjoining the carriageway, although it is also possible that the cable would be laid within the carriageway itself. At 33 kV, underground cables are normally laid to a depth of 0.9 m. To lay this cable a trench is dug, bedding material, normally sand, is placed along the trench-base, the cable laid and then covered with more sand. The cables are then protected by a layer of protective plastic covers and then backfilled with subsoil and original topsoil and turfs.

1.4.2 For bridge crossings along the road, the cable could be laid within the bridge, if there is sufficient excavation depth, or otherwise via either trenching or directional drilling under the watercourse.

1.4.3 Generally, when OHL are constructed over open ground, single pole supports are used with a typical height of 13 m to 15 m, a typical spacing of 50 m and a minimum ground to cable clearance of 5.2 m (5.8 m over roads). Where the line changes direction, a stayed, double-pole arrangement is adopted. Double poles are also used at line terminations, for instance when the cable goes underground, or on rising ground, where the spacing between supports would generally decrease. It is anticipated that only a very short section of OHL will be required.

1.4.4 In terms of construction, single poles are buried to a depth of approximately 2 m, dependent on the pole height. The pole is stabilised by underground cross arms which run in the line direction. Excavations can generally be carried out by a mini crawler digger. Additional site plant will typically include a powered lifting and handling machine.

1.4.5 The construction activities would include the following:

- clearance of land (including vegetation strip as appropriate);
- digging of trenches;
- backfilling of trenches and remediation;
- micrositing of proposed locations for wooden poles;
- construction of contractor compounds for materials/plant/worker accommodation;
- establishment of the working width;
- excavations for wood pole foundations and removal of bedrock if necessary;
- erection of wooden poles; and
- stringing of conductors.

1.4.6 The land should be reinstated as near as reasonably practicable to its original condition.

1.4.7 It is anticipated that the works would be implemented by SSEN.

1.5 Potential Impact

1.5.1 A preliminary assessment of the precited environmental effects of the potential grid connection corridor has been undertaken to verify that there are unlikely to be any unacceptable environmental effects.

1.5.2 The main receptors considered to have the potential for likely significant effects are:

- Landscape and Visual;
- Non-Avian Ecology;
- Ornithology;
- Archaeology and Cultural Heritage;
- Hydrology
- Traffic and Transport; and
- Noise.

1.5.3 These are described in turn in the following sections.

Landscape and Visual

1.5.4 Currently there is no detailed route for the potential grid connection, therefore only a high-level assessment of landscape and visual impacts of likely significant effects has been carried out. However, for the purpose of this assessment it has been assumed that the majority of the potential grid connection would, as described above, be undergrounded and that construction locations would be restored to existing condition, and any landscape elements, such as drystone dykes or estate fencing, would be reinstated to their original specification.

Baseline Characteristics

Landscape Fabric/Topography and Landuse

1.5.5 The grid connection corridor is located within a landscape that comprises:

- an elevated, actively managed grouse moor that inclines from the highest point of the site (Carn Dubh'lc an Deoir at 750m) downwards in a north-easterly direction towards the lower-lying strath glens and the River Findhorn;
- a predominance of modified blanket bog, wet heath, and localised patches of upland acid grassland;
- commercial coniferous forestry plantations and occasional patches of native woodland / juniper scrub on the strath slopes;
- minor watercourses and natural/artificial drainage haggs;
- the local U2856 road (Slochd to Findhorn Bridge) and small estate tracks;
- farmsteads, lodges (e.g., Glenkyllachy Lodge, Strathnoon Cottage), and scattered residential properties in the Tomatin and Strathdearn areas; and
- existing wind farm access tracks and borrow pits.

Landscape Character

1.5.6 The potential grid connection corridor originates within the Rolling Uplands – Inverness Landscape Character Type (LCT), transitioning towards the Forested Upland Fringe LCT and Upland Strath LCT as it approaches Tomatin. This landscape is characterised by the expansive, rolling moorland hills of the Monadhliath Mountains which give way to the more settled, enclosed, and wooded slopes of Strathdearn. Given the transition from the elevated site to the strath, there is considerable local variety in the extent to which different characteristics are displayed, notably the scale of field patterns, the presence of commercial forestry, and the influence of existing infrastructure (such as the A9 and operational wind farms like Farr and Glen Kyllachy).

Visual Amenity

The potential grid connection corridor and adjoining area contain a number of key visual receptors, including:

- users of the A9 trunk road and local road network (e.g., U2856);
- residential receptors in scattered properties around Strathdearn, Garbole, and Tomatin; and
- local walkers, cyclists, and recreational users on Core Paths and in the nearby Cairngorms National Park (CNP).

1.5.7 The A9 acts as a key transport gateway in the immediate vicinity of the potential grid connection corridor, and the corridor sits in proximity to the highly sensitive recreational landscapes of the CNP fringes.

Construction Impacts

Effects on Landscape Receptors

1.5.8 Construction activities associated with the potential grid connection are likely to result in temporary impacts on the landcover, landscape elements, and disturbance to the condition of the landscape along the route. The principal impacts on landscape fabric would arise from site preparations (including stripping of peat/turf/existing vegetation), excavation of cable trenches and pole foundations, and subsequent backfilling and reinstatement of trenches/excavations. Impacts would, however, be of relatively short duration, of limited geographical extent and reversible, and are therefore not considered likely to be significant.

1.5.9 Construction operations would introduce disturbance, additional vehicle movements and temporary compounds to the transitioning landscape of the Rolling Uplands – Inverness LCT and the strath landscape around Tomatin. However, the landscape already contains a number of estate tracks, borrow pits, and established wind farm infrastructure, and so the proposals would not represent a wholly new element in the landscape. Construction activities would also be of short duration, of limited extent and reversible, and are therefore considered unlikely to constitute a significant effect on the character of the site and adjoining landscape.

1.5.10 Whilst there is potential for indirect effects on nearby landscape designations such as the Cairngorms National Park (CNP) and the Drynachan, Lochindorb and Dava Moors SLA, the temporary and reversible nature of construction impacts, coupled with the screening provided by woodland on the lower strath slopes, suggest that these highly valued landscapes would not be subject to significant construction effects.

Effects on Visual Receptors

1.5.11 While the elevated portions of the route are largely uninhabited, the potential grid connection would descend into a settled landscape where a number of residential properties are located (i.e., in and around Strathdearn and Tomatin) and where the A9, local U-class roads, and a network of footpaths/Core Paths are present. Thus, construction works would have potential effects on the amenity of visual receptors nearby, principally in respect of temporary visual disturbance. However, such

effects would be geographically localised, short term and reversible, and are therefore not considered significant.

Operational Impacts

Effects on Landscape and Visual Receptors

1.5.12 As much of the potential grid connection corridor would be undergrounded, and measures are to be adopted to reinstate any disturbed land and /or loss of characteristic elements, it is unlikely that there would be any long-term effects on landscape fabric, landscape character or visual amenity. The only place where this would not be the case is where the line is over grounded on wooden poles. As it approaches the Tomatin substation, it could be seen in conjunction with existing overhead lines, adding slightly to the existing wirescape converging on the substation. It is unlikely, however, that the modest scale and extent of this section of the grid connection would contribute to a significant cumulative or individual visual effect.

Mitigation

1.5.13 On the basis of the preceding assessment of potential construction and operational effects, the focus of mitigation would comprise:

- the careful selection of the detailed grid connection alignment and sites for compounds and material storage to avoid sensitive landscapes, deep peat deposits, and visual receptors;
- the adoption of a phased programme of construction that would minimise the extent of disturbance at any one time, and allow for rapid reinstatement of disturbed ground associated with trenching and foundations;
- undergrounding of the majority of the connection;
- selection of the grid connection alignment to utilise the screening effects of existing topography and forestry near Tomatin, minimising its length and avoiding key features and landscape and visual receptors; and
- early restoration of disturbed ground to a condition consistent with the current baseline; and reinstatement of any landscape elements that might be lost or damaged during construction works.

Residual Impacts

1.5.14 Taking account of the embedded and additional mitigation measures outlined previously, no significant effects are anticipated during either the construction or operational phase of the grid connection.

1.5.15 Effects on landscape fabric would be confined to the construction phase when undergrounding would take place and would entail disturbance or temporary and highly localised loss of ground cover. However, this would be reversed in the short term.

1.5.16 Similarly, whilst construction of the grid connection would introduce disturbance and additional vehicle and plant movements to the landscape, these would be highly localised, of a relatively small scale and temporary, with the underlying character of the local landscape returning to its baseline condition in the short term.

1.5.17 The visual amenity of the area would also only be subject to small scale and temporary impacts associated with construction activities. The undergrounding of the majority of the grid connection would ensure that views are generally not affected following the cessation of construction activities.

Ecology

Baseline Characteristics

1.5.18 Baseline surveys undertaken for the Proposed Development did not fully extend to cover the entirety of the potential grid connection corridor to Tomatin. However, a summary of the likely ecological sensitivities of the potential grid connection corridor, based on the findings of the baseline surveys for the Proposed Development and its immediate surroundings, is provided below:

1.5.19 Habitats/Botany: The corridor transitions from elevated, actively managed grouse moor dominated by modified blanket bog and wet heath, down towards the strath slopes which contain upland acid grassland, commercial forestry, native woodland, and patches of juniper scrub. Sphagnum mosses are occasional or absent across much of the elevated moorland, which is heavily drained and modified by muirburn and grazing.

1.5.20 Avifauna: The route lies in close proximity to the Kinveachy Forest Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), and Special Area of Conservation (SAC). These areas are highly sensitive and support nationally important breeding woodland bird assemblages, specifically including capercaillie. The broader ranges of the re-introduced white-tailed eagle also encompass the area of the potential grid connection.

1.5.21 Protected Mammalian Species: The ranges of otter, badger, water vole, bats, pine marten, and red squirrel encompass the potential grid connection corridor. The

presence of otters is of particular sensitivity given the corridor's interaction with tributaries feeding into the River Spey SAC and the River Findhorn.

1.5.22 Fish and Freshwater Invertebrates: Local watercourses within the corridor fall within or feed into the River Spey SAC catchment, which is designated for sensitive species including Atlantic salmon and the freshwater pearl mussel. Brown trout, European eel, and lamprey spp. may also be present depending on the availability of suitable habitat.

1.5.23 Protected Reptilian Species: The ranges of adder, common lizard, and slow worm also encompass the potential grid connection corridor, and consequently these species may be present depending on the availability of suitable habitat and resource.

Potential Effects

The potential effects during both construction and operation on ecological sensitivities are variable depending on the receptor and the proposed construction methods (i.e., underground cabling vs. overhead lines). Below is a summary of potential effects that the grid connection development may have on ecological receptors:

- Direct and indirect habitat loss (e.g., disturbance to modified blanket bog, wet heath, or woodland felling);
- Disturbance to / loss of breeding sites and resting places, particularly concerning woodland bird assemblages and capercaillie;
- Increased collision risk for avifauna (such as capercaillie or white-tailed eagle) if overhead line (OHL) infrastructure is utilised;
- Direct / indirect loss of foraging resource;
- Displacement / disruption to movement of animals;
- Environmental effects, specifically the pollution of watercourses via peat or non-peat sediment release, which could adversely affect Atlantic salmon, freshwater pearl mussel, and otters; and
- Changes to habitat composition through land-use change, drainage alterations, and increased human presence.

Approach to Mitigation

1.5.24 Proposed mitigation will vary depending on the detailed assessment of ecological constraints identified along the final route. The following points are provided as standard measures and site-specific embedded mitigations to address construction and operational impacts:

- Avoidance by Design: Route selection must be informed by appropriate buffers from ecological constraints. Notably, NatureScot stipulates that infrastructure, tree planting, or new fencing must avoid the 1km boundary of the Kinveachy Forest SPA/SAC to prevent increased collision risk and disturbance to capercaillie.
- Peat Avoidance: Micro-siting of grid poles or underground cable trenches to avoid areas of deep peat (greater than 1m) to minimise habitat disturbance and peat instability.
- Hydrological Buffers: Implementation of a strict 50m buffer from watercourses for infrastructure and stockpiled materials to protect the aquatic environment.
- Pollution Prevention: Standard pollution prevention mitigation will be employed throughout the construction phase. Runoff entering excavations will be directed through settlement lagoons, silt fences, and sediment traps before any indirect discharge to protect the River Spey SAC tributaries.
- Clerk of Works Oversight: An Ecological/Environmental Clerk of Works (ECoW) will be appointed to continuously monitor the site and ensure water quality and habitat protections are sustained.
- Avian Mitigation: If overhead lines are required, bird diverters should be installed on conductors located within high-risk flight paths for sensitive species.
- Timing of Works: Timing of construction to avoid peak activity periods/breeding seasons for protected species.

Residual Impacts

1.5.25 On the assumption that the final grid connection route and design are strictly informed by the ecological sensitivities identified (particularly regarding the River Spey SAC and Kinveachy Forest designations), and that the embedded mitigation measures and Construction Environmental Management Plan (CEMP) protocols are adopted, no significant residual impacts are anticipated to occur.

Ornithology

Existing Conditions

1.5.26 As detailed in Chapter 8 (Ornithology) and the Additional Information Report, the Kinveachy Forest Special Protection Area (SPA), Special Area of Conservation (SAC), and Site of Special Scientific Interest (SSSI) are in close proximity to the Proposed Development and the potential grid connection corridor. Consequently, as identified

in the updated bird surveys, there is potential for connectivity between the potential grid connection corridor and the Kinveachy Forest SPA and SSSI, whose qualifying features include capercaillie and a nationally important breeding woodland bird assemblage.

1.5.27 Baseline surveys undertaken for the Proposed Development did not fully extend to include the entirety of the potential grid connection corridor towards Tomatin. (As explained, bespoke baseline surveys would be carried out as part of a separate environmental assessment process once the consent application for the grid application is brought forward). A summary of the likely ornithological sensitivities of the potential grid connection corridor (based on the findings of the baseline surveys for the Proposed Development) is provided below.

1.5.28 Breeding Woodland Birds and Capercaillie: The Kinveachy Forest SSSI and SPA support nationally important breeding woodland bird assemblages, specifically including capercaillie. As the grid corridor transitions from the elevated moorland down towards the wooded strath near Tomatin, there is potential for these species to be present or moving through adjacent habitats.

1.5.29 Raptors (including White-tailed Eagle): White-tailed eagles have been identified as a key sensitive species in the area, and their flight paths and range expansion encompass the Proposed Development and the potential grid connection corridor. Other raptor species typical of upland moorland edges may also forage or breed in the vicinity.

1.5.30 Breeding Waders and Moorland Birds: The higher elevations of the corridor cross an actively managed grouse moor. Breeding waders and red grouse are likely to be present in these areas depending on the prevailing habitat and the extent of muirburn. Should any section of the grid connection (and associated construction areas) be within established buffer distances for Schedule 1 species, checks will be undertaken by a suitably licensed ornithologist and an appropriate buffer distance applied.

Species Scoped Out of Assessment

- On the basis of experience from other relevant projects and policy guidance or standards (e.g. NatureScot guidance), the following species are likely to be 'scoped out' since significant effects are unlikely:
- Common and/or low conservation species not recognised in statute as requiring special conservation measures, i.e. bird species not listed on Annex 1 of the EU Birds Directive or Schedule 1 to the Wildlife & Countryside Act 1981 (as amended);
- Common and/or species of low nature conservation importance not included in non-statutory lists that indicate birds whose populations are at some risk either generally or in parts of their range (e.g. the Birds of Conservation Concern (BoCC) Red list); and
- Passerine species (not generally considered to be at risk from wind farm developments), unless being particularly rare or vulnerable at a national level.

Potential Construction/Decommissioning Effects

1.5.31 Based on the available information to date from baseline surveys for the adjacent Proposed Development (Chapter 8) and the preliminary results from the desk-based study for the grid connection corridor, the following construction/decommissioning effects are likely to require consideration:

- Disturbance/displacement to target species (breeding raptors, owls and waders, and foraging geese and swans) associated with construction/decommissioning activities.

Potential Operational Effects

1.5.32 Based on the available information to date from baseline surveys for the adjacent Proposed Development and the preliminary results from the desk-based study for the potential grid connection corridor, the following operational effects are likely to require consideration:

- Displacement of target species (breeding raptors, owls and waders, and foraging geese and swans) around any sections of the grid connection that are overhead; and
- Potential collision risks associated with any sections of the grid connection that are overhead for target species (most likely to be wildfowl).

Approach to Mitigation

1.5.33 Significant effects upon birds will be avoided/minimised where possible within the design process. Good practice during construction and operation of the grid connection will also be implemented. Subject to detailed studies, there may be a need to minimise the risk of line strike by geese and swans moving between foraging areas e.g. through the use of bird deflectors are used on any sections of the grid connection that are overhead.

1.5.34 Where potential likely significant effects on Important Ornithological Features (IOFs) are identified, measures to prevent, reduce and where possible to offset these adverse effects will be proposed.

1.5.35 Standard good practice measures will be applied to minimise any potential effects on any wintering foraging/roosting wildfowl and breeding waders within up to 500 m and/or breeding Schedule 1/Annex 1 raptors and owls within up to 800 m of the grid connection.

1.5.36 If required, a Breeding Bird Protection Plan (BBPP), will be produced for construction and decommissioning to ensure that all reasonable precautions are taken to ensure the relevant wildlife legislation is adhered to.

Residual Impacts

1.5.37 On the assumption that the final grid connection route and design is strictly informed by any ornithological sensitivities identified (particularly regarding the Kinveachy Forest designations and white-tailed eagle flight paths), and that mitigation measures and good practice methods are adopted, no significant residual impacts are anticipated to occur.

Archaeology and Cultural Heritage

Baseline Characteristics

1.5.38 There are no heritage assets with statutory or non-statutory designations known to be directly impacted within the elevated portions of the potential grid connection corridor. The closest scheduled monuments and listed buildings are generally concentrated within the lower strath and around the settlement of Tomatin, located distantly from the upland moorland sections of the route. Historic Environment Scotland (HES) raised no objections to the main wind farm application, indicating a general lack of highly sensitive statutory assets in the immediate upland vicinity.

1.5.39 There are a number of non-designated heritage assets recorded in the Historic Environment Record (HER) within the broader study area of the potential grid connection corridor. As the corridor transitions from the Monadhliath mountains down to Strathdearn, these typically include assets of post-medieval and agricultural origin.

1.5.40 While the presence of prehistoric assets (such as burnt mounds or cists) cannot be ruled out, the recorded assets in this landscape are predominantly later historical features.

1.5.41 The post-medieval assets likely to be present in this transitional landscape include: former farmsteads, shieling huts, enclosures, sheepfolds, small stone borrow pits, and rig and furrow agriculture associated with the historical settlement of Strathdearn.

1.5.42 The majority of these identified non-designated agricultural assets are assessed as being of no more than low sensitivity, while any undiscovered prehistoric remains would hold a higher sensitivity.

Construction Impacts

1.5.43 Installation of underground sections of the grid connection would have potential to directly affect any identified heritage asset that lies along its route. Installation of poles to support an overhead line can usually easily be microsited to avoid identified assets along the route.

1.5.44 In addition to potential impacts from construction activities, the establishment of compounds for materials and plant storage, offices and workers' welfare accommodation can also have direct impacts on identified heritage assets.

1.5.45 It is also possible that buried archaeological remains that have not been identified by the desk-based baseline study could be directly affected either as a result of construction activities or the establishment of working compounds.

1.5.46 Where works are proposed within existing road carriageways (such as the U2856 or existing estate tracks), the potential for direct impact on archaeology and cultural heritage assets is normally low or negligible as road construction work is likely to have had a detrimental impact on any buried remains that may have been present. Where cable trenches or pole erection is proposed in roadside verges or undisturbed moorland, the potential for direct impacts on archaeology and cultural heritage is likely to be low; although the possibility of buried archaeological remains surviving in undisturbed ground cannot be ruled out.

1.5.47 Depending on the final alignment, a small number of non-designated assets along the potential grid connection corridor could be directly affected, such as remnants of post-medieval agricultural boundaries or tracks. Excavation of the trench for the installation of an underground cable could reveal buried, unrecorded archaeological remains that may survive either along the verge or below the undisturbed moorland surface.

Operational Impacts

1.5.48 If the proposal to install underground cables is adopted, there would be a negligible potential for adverse impact on the settings of cultural heritage assets along the route.

1.5.49 If a section of overhead line on wooden poles were to be installed (for instance, as the line approaches the Tomatin Substation), there is a low potential for any adverse impact on the setting of cultural heritage assets. The proposed overhead line would, if installed, be viewed within the context of the existing A9 corridor and existing grid infrastructure, and would have an impact on the setting of nearby heritage assets of only negligible magnitude; an effect that would be minor and not significant.

Mitigation

1.5.50 Most of the identified heritage assets within the potential grid connection corridor can be avoided by design of the route alignment and the selection of the sites of construction compounds; thereby ensuring their preservation in situ.

1.5.51 Where the potential grid connection corridor passes in close proximity to any known HER assets, a watching brief would be carried out to ensure that any buried remains are identified and recorded to an appropriate standard..

1.5.52 If required under the terms of a planning condition, the scope of any other required archaeological watching brief(s) would be agreed through consultation with The Highland Council's Historic Environment Team (HET) in advance of development works commencing and would be set out in a Written Scheme of Investigation (WSI).

1.5.53 If significant discoveries are made during any archaeological monitoring works that are carried out, and it is not possible to preserve the discovered remains in situ, provision would be made for the excavation, where necessary, of any archaeological deposits encountered. The provision would include the consequent production of written reports on the findings, with post-excavation analysis and publication of the results of the works, where appropriate.

1.5.54 Written guidelines would be issued for use by all construction contractors, outlining the need to avoid causing unnecessary damage to known heritage assets. The guidelines would set out arrangements for calling upon retained professional support in the event that buried archaeological remains of potential archaeological interest (such as building remains, human remains, artefacts, etc.) should be discovered in areas not subject to archaeological monitoring. The guidelines would make clear the legal responsibilities placed upon those who disturb artefacts or human remains.

Geology, Hydrology and Hydrogeology

Baseline Characteristics

1.5.55 As noted previously, the grid connection corridor would begin at the on-site Clune Wind Farm substation. It would then travel generally north-eastwards across elevated moorland and descend into the strath, following a route towards the Tomatin substation. The corridor would likely involve a combination of underground cabling and potential overhead line sections on wooden poles as it approaches existing grid infrastructure near Tomatin.

1.5.56 Where the grid connection comprises an overhead line, the potential for direct hydrological and peat effects is significantly reduced. Whilst a small area of ground disturbance would be required for the pole foundations, this is not considered to be significant, assuming an access track is not required alongside the overhead line.

1.5.57 The corridor falls within the catchments of the River Findhorn and the River Spey Special Area of Conservation (SAC). Where underground cabling is required, it would need to cross various minor watercourses and drainage haggs associated with these catchments. For crossings along existing roads (such as the U2856) or estate tracks, the cable could be laid within the bridge structure if there is sufficient excavation depth. Otherwise, it would be buried under the watercourse by either trenching or directional drilling.

1.5.58 The upland portion of the route contains modified and drained blanket bog. Site-specific surveys confirm the baseline environment is heavily modified by muirburn and grazing, with Sphagnum mosses occasional or absent, and frequent patches of bare peat.

1.5.59 Baseline conditions with regards to wider localised hydrological sensitivities including Groundwater Dependent Terrestrial Ecosystems (GWDTE) and public or private water supplies (PWS) are not currently mapped in detail for the entire corridor and can only be established following a specific baseline survey. The following section outlines the wider hydrological sensitivities that would be considered when the grid connection application is brought forward.

Potential Hydrological Effects

1.5.60 The grid connection route would be assessed for the following potential effects:

- construction runoff, non-peat and peat sediment release, and potential pollution events (of particular sensitivity given the proximity to the River Spey SAC catchment);

- potential effects on peat stability and carbon-rich soils;
- potential effects on GWDTE; and
- potential effects on public or private water supplies

1.5.61 The potential effects from construction runoff and potential pollution events would be controlled through adherence to best practice guidance as detailed in a Construction Environmental Management Plan (CEMP).

1.5.62 If the final length of the underground cable route is greater than 5 km it would require a Simple Licence under the Controlled Activities (Scotland) Regulations (CAR) 2011, authorised by SEPA. This would include details of the drainage plans proposed to manage surface runoff from the cable route

1.5.63 The potential effects of the cable route on GWDTE and any public and private water supplies would be assessed once baseline data has been obtained and any associated constraints identified.

Approach to Mitigation

1.5.64 The following section identifies potential mitigation measures that would need to be considered to reduce the likely significant effects.

1.5.65 Peat and Sediment Control: To protect the tributaries of the River Spey SAC, micro-siting of grid poles or cable trenches will be required to avoid areas of deep peat (greater than 1m). A strict 50m buffer from watercourses will be maintained for infrastructure and stockpiled materials where technically feasible. Runoff entering excavations will be directed through settlement lagoons, silt fences, and sediment traps before any indirect discharge.

1.5.66 If high or moderate GWDTE are identified within the survey corridor a 100 m buffer would need to be applied to the habitat in accordance with SEPA Land Use Planning System Guidance Note 31, in order to ensure no significant effect on GWDTE.

1.5.67 If the cable route does cross through habitat comprising high or moderate GWDTE further assessment would be needed, to ascertain whether the route passed through the preferential flow path and would consequently have a significant effect on the habitat.

1.5.68 The design of the cable route would aim to result in minimal disturbance to the ground. Any disturbance would be temporary. Backfilling of material around the cable without significant compaction should allow shallow movement of water to reoccur once construction has been completed. This would be reviewed against the survey data once complete.

1.5.69 A 100m buffer would also be required around groundwater abstractions for private water supplies (or 250m for excavations deeper than 1.5m). Where the supply may be influenced by surface water interactions, the wider hydrological connectivity of the working area to the supply source would need to be considered. Should the assessment identify a potential effect, mitigation measures would need to be submitted to SEPA and THC. Mitigation measures would be dependent on the assessed risk, for instance whether the effect would be a temporary reduction in water quality, or effect on water quantity, and the magnitude of this effect.

Residual Impacts

1.5.70 On the assumption that the final grid connection route is strictly informed by identified hydrological and peat sensitivities (particularly regarding the River Spey SAC catchment), and that robust mitigation measures including CEMP protocols and Ecological Clerk of Works (ECoW) oversight are adopted, no significant residual impacts are anticipated to occur.

Traffic and Transport

Baseline Characteristics

1.5.71 Baseline surveys undertaken for the Proposed Development's Transport and Access chapter (Chapter 10) focused extensively on the access routes surrounding the wind farm, including the U2856 and the A9. The review of the potential grid connection corridor to Tomatin in terms of traffic and transport has been informed by these comprehensive baseline traffic surveys, desk study, and professional judgement.

1.5.72 The local road network outwith the site boundary, specifically the U2856, is predominantly made up of narrow, single-track rural roads with passing places. In contrast, the A9 is a major, high-capacity trunk road that acts as the primary transport gateway for the region

1.5.73 Traffic counts undertaken for the EIA confirm that the local road network, particularly the U2856, is currently very lightly trafficked, especially regarding existing baseline Heavy Goods Vehicle (HGV) movements.

Construction Impacts

1.5.74 It is anticipated that construction vehicles for the potential grid connection will travel to the site utilising the A9 trunk road and access the local corridor via the

U2856. As such, there would be a localised, temporary increase in traffic on these roads during the grid installation phase.

1.5.75 Construction traffic associated with the potential grid connection corridor would likely involve a small number of construction vehicles each day to deliver equipment, cable drums, and carry excavated material. Staff are anticipated to travel to the site via the A9 and would be of a limited number each day. Whilst no specific quantitative traffic appraisal has been undertaken exclusively for the grid connection works, the EIA demonstrates that the road network has massive spare capacity. Specifically, a theoretical road capacity review confirmed that even during the peak construction of the main wind farm, the U2856 retains 98.36% of its spare capacity. Therefore, there is ample capacity to comfortably accommodate the comparatively negligible level of construction traffic required for the grid connection.

1.5.76 It is possible that some temporary traffic management or short road closures may be required; for example when construction vehicles require occupation of the road and there is insufficient spare width for vehicles to pass. If required, diversionary routes or traffic light controls would be implemented. Road closures or single-lane working to facilitate the laying of underground cables are likely to be required for short periods at a time.

Operational Impacts

1.5.77 Operational impacts in terms of traffic and transport would be limited to occasional trips associated with maintenance and repair. This would generally be restricted to occasional Light Goods Vehicle (LGV) trips. As such, the operational impact in terms of Traffic and Transport can be classed as negligible.

Mitigation

1.5.78 A Construction Traffic Management Plan (CTMP) will likely be required as part of any future planning application for the grid connection, aligning with the robust commitments already made for the main wind farm. This would include mitigation measures such as plans for temporary traffic management during construction periods, restricted hours of work/deliveries (e.g., 0700 to 1900, Monday to Saturday) to avoid peak times, and good practice measures such as wheel cleaning stations and routine road sweeping when leaving the site to join the local road network.

Residual Impacts

1.5.79 It is considered that with the adoption of the proposed mitigation (principally the CTMP), no significant residual impacts are anticipated to occur.

Noise

Baseline Characteristics

1.5.80 The noise character of the area transitions from an exposed, remote upland moorland environment at the wind farm site (where the acoustic environment is dominated by wind and natural sounds) to a more settled rural environment as the corridor descends towards Tomatin and Strathdearn. In these lower-lying areas, the acoustic baseline is heavily influenced by traffic noise from the A9 trunk road, local vehicle movements on the U2856, and general agricultural activities.

Construction Impacts

1.5.81 Noise would arise during the construction of the grid connection due to the operation of plant machinery (e.g., excavators for trenching or pole foundations) and any associated construction traffic utilising the local road network. Construction noise levels at residential properties, particularly scattered dwellings in the strath such as Strathnoon Cottage or those near the Tomatin substation, would depend on their exact distance from the final grid connection route. However, these impacts would be highly localised, temporary in nature, and could be effectively mitigated.

Operational Impacts

1.5.82 Corona noise can be emitted from overhead lines in certain conditions and has two components: a low frequency hum and broadband noise. The type of sound emitted can be characterised as a ‘crackling’ or ‘buzzing’ that is at its maximum in wet weather conditions such as fog or rain. Corona noise is generally more associated with much higher voltage transmission lines and would only be expected to be audible infrequently at very short distances from any overhead line sections of the grid connection (such as the final approach into the Tomatin substation). No significant impacts due to operational noise are therefore expected due to the potential grid connection corridor.

Mitigation

1.5.83 Any noise emitted during the construction period would be temporary. 'Best practicable means' would be used to reduce noise levels with due regard to practicality and cost in line with the Control of Pollution Act (CoPA) 1974)[1].

1.5.84 To protect the amenity of nearby residents, construction working hours for the grid connection would likely be restricted to align with those of the main development (e.g., 0700 to 1900, Monday to Saturday).

1.5.85 The guidance provided by BS 5228-1: 2009+A1:2014 would also be utilised to identify appropriate mitigation, such as switching off plant when not in use and maintaining well-fitted acoustic enclosures on equipment. The final mitigation measures to be adopted would be agreed as part of the Construction Environmental Management Plan (CEMP).

1.5.86 The levels of corona noise due to the operation of any overhead line sections of the grid connection are not predicted to be great enough to require mitigation due to the voltages involved, the separation from nearby properties, and the acoustic masking provided by existing background noise (such as the A9 corridor). The use of underground cabling along the majority of the route inherently mitigates any operational corona noise from those sections

Residual Impacts

1.5.87 With the implementation of restricted working hours and standard best-practice acoustic mitigations, no significant residual impacts are anticipated due to either the construction or operation of the grid connection.

1 Control of Pollution Act, published by Her Majesty's Stationary Office, 1974.

1.6 Summary

Table 1.1 Likely Secondary and Indirect Impacts of the Proposed Developmentresulting from the Potential Grid Connection

	Construction Impacts	Operational Impacts	Mitigation	Residual Effects	Means by which Mitigation would be delivered
Landscape and Visual	Indirect impacts on Landscape Character (transitioning from Rolling Uplands to Upland Strath) arising from site clearance, excavation activities, and removal of vegetation/peat. Impacts on views and visual amenity for receptors along the U2856, A9 corridor, and fringes of the Cairngorms National Park.	Potential for indirect operational impacts would only exist where the grid connection comprises an overhead line (OHL) as it approaches the Tomatin substation. Indirect impacts on views and visual amenity arising from the proposed underground cable route would only arise should maintenance activities be required	Embedded mitigation, including undergrounding the majority of the route, sensitive route selection to utilise woodland screening, and rapid reinstatement/restoration of the affected moorland and verges	Minor / Not Significant	Design, construction management, and monitoring.
Archaeology and Cultural Heritage	Potential direct impact on undiscovered buried prehistoric archaeological remains or unrecorded non-designated post-medieval agricultural assets.	Potential impact on the setting of heritage assets near Tomatin and Strathdearn if overhead line infrastructure is utilised.	Most identified heritage assets can be avoided by design of the route alignment. Where required, an archaeological watching brief will be carried out to ensure any buried remains are identified and recorded.	Negligible.	Planning condition; Written Scheme of Investigation (WSI); CEMP.
Ecology	Disturbance/displacement of protected species (otter, water vole, badger, bats, pine marten, red squirrel). Direct and indirect habitat loss of any sensitive habitats identified (e.g., modified blanket bog, wet heath, woodland).	Disturbance/displacement of protected species. Indirect habitat loss or alteration of sensitive habitats.	Appropriate good practice guidance will be applied, including micro-siting to avoid deep peat (>1m) and 50m buffers around watercourses feeding the River Spey/Findhorn catchments. Should any likely significant effects be identified, measures to prevent or reduce effects would be proposed.	With avoidance and appropriate mitigation, there would be no significant effects.	Design, CEMP, Species Protection Plans, and ECoW monitoring.
Ornithology	Disturbance/displacement of target species, including capercaillie, white-tailed eagle, breeding woodland birds, waders, and raptors.	Potential for operational effects would only exist where the grid connection comprises overhead line and are likely to consist of: • Disturbance/displacement of target species. • Collision risk for capercaillie and white-tailed eagle moving between habitats.	Strict avoidance of the 1km buffer around the Kinveachy Forest SPA/SAC for infrastructure or new fencing. If required, bird deflectors attached to any overhead section of the route. Implementation of a Breeding Bird Protection Plan (BBPP).	With avoidance and appropriate mitigation, there would be no significant effects.	Design, BBPP, and construction management/monitoring.
Geology, Peat & Hydrology	Surface water runoff, peat instability, and potential peat/non-peat sediment pollution events affecting the River Findhorn and River Spey SAC catchments. Effects on GWDTE and Private Water Supplies (PWS).	No further effects.	Surface water runoff and pollution prevention would be managed through adherence to the CEMP and a Peat Management Plan (PMP). Avoidance of deep peat, GWDTE, and water supplies would be applied as the first principle of the detailed alignment selection.	With avoidance and mitigation, there would be no significant effect.	CEMP, PMP, and (if required) CAR Licensing.).

	Construction Impacts	Operational Impacts	Mitigation	Residual Effects	Means by which Mitigation would be delivered
Traffic and Transport	Impact confined to the A9 trunk road and the local U2856 road network. Levels of construction traffic are likely to be extremely low and well within the substantial spare capacity of the local network.	Operational trips to the site would include maintenance and repairs only. The impact of these is considered to be negligible.	A Construction Traffic Management Plan (CTMP) would be put in place. This would include plans for Temporary Traffic Management, restricted working hours, and any diversionary routes required.	Negligible assuming mitigation is carried out.	Construction Traffic Management Plan (CTMP)..
Noise	Some temporary construction noise impact at properties close to the connection route (e.g., scattered dwellings near Strathdearn and Tomatin).	No significant operational noise (corona) impact due to low voltages, separation distances, undergrounding, and masking from A9 background noise.	Construction noise mitigation measures in accordance with the CoPA 1974 and BS 5228-1..	Negligible / Not significant.	CEMP and Environmental Health Officer (EHO) agreed working hours.