WHITELAW BRAE WIND FARM
33kV GRID CONNECTION

CHAPTER 4:
DEVELOPMENT DESCRIPTION

CHAPTER CONTENTS

4. DEVELOPMENT DESCRIPTION

INTRODUCTION

4.1. This chapter provides details of the components that comprise the Proposed Development. This includes the overhead line (OHL) and sections of underground cable, as well as ancillary works, including accesses and temporary compounds. It also provides information on the construction and of the Proposed Development.

4.2. Within this and subsequent chapters, the term 'Proposed Development' includes the OHL and sections of undergrounding, together with all ancillary works to be undertaken within the section 37 application boundary, as detailed within the following paragraphs, unless indicated otherwise.

THE PROPOSED DEVELOPMENT

4.3. The Proposed Development comprises two new 33kV electrical circuits between Whitelaw Brae Wind Farm substation and Clyde South Wind Farm substation (as shown in **Figure 6.1: Location Plan**), which lie a distance of some 11.4km apart. The development will comprise two sections of 33kV underground cable at each substation end, and one central section of OHL comprising two parallel 33kV OHLs supported on a total of 120 No wood poles (L34 and L36 specification). A summary of the co-ordinates for each circuit are provided in paragraph 4.7. Further detail is provided in the following sections.

4.4. The northern part of the Proposed Development will commence as two underground cable routes at the consented Whitelaw Brae Wind Farm substation. Circuit A (the southern-most circuit) originates at National Grid Reference: **NT0704020766** and Circuit B (the northern-most circuit) at **NT0703320774**. After exiting the western side of Whitelaw Brae Wind Farm substation, the underground cable routes will head south, running parallel to an existing wind farm access track. West of Peat Hill, the route alignment will turn to the west across rough upland grassland, crossing Fingland Burn and Cleuch Head watercourses, before heading downhill and reaching the River Tweed in the lower valley. The underground cables will pass underneath the River Tweed (via HDD crossing beneath the river) just to the south of Badlieu, before continuing west towards the A701 through a small section of commercial forestry. To carry out the HDD works, drilling fluid is pumped through the drill pipe to the drill bit where high-pressure jets and the drill bit will grind the soils ahead of the drill stem. The drilling fluid will also carry the cuttings back to the entrance pit at the drill rig. Drilling fluid is a mixture of water (either locally pumped from nearby water source into the mixing tanks, or brought to site in water tanks, cubes or bowsers) and additives such as bentonite, which is mixed to obtain the required consistency for the soil conditions the HDD bore will encounter. The route of the underground cables will then head south, parallel with the A701, for approximately 2.5km.

4.5. On the A701 near Smid Hope Burn, the two circuits will transfer from underground cables onto twin OHLs, i.e., onto two 2-pole terminal structures (Circuit A onto pole number 61 and Circuit B onto pole number 1). Co-ordinates are given below in paragraph 4.7. The OHL route will then continue west/south-west towards Upper Howecleuch for approximately 5.4km, with each circuit supported on wood H-poles. To the south of Upper Howecleuch the route transfers from two 2-pole terminal structures (numbers 60 and 120) back onto two 33kV underground cable circuits.

4.6. The alignment of the cables continues south-west, passing underneath the A74(M) and B7076 via HDD crossing, then running roughly parallel to the northern side of the existing access tracks at Clyde South Wind Farm. The underground cables terminate in the south-western corner of the Clyde South Wind Farm substation, with Circuit A (southern-most) terminating at **NS982091342** and Circuit B (northern-most) at **NS9821913428**.

4.7. A summary of the co-ordinates is provided below:

- Circuits originate at Whitelaw Brae Wind Farm Substation

  Circuit A: NT0704020766

  Circuit B: NT0703320774

- Transition from u/g cable to OHL (A701 near Smid Hope Burn)

  Circuit A: NT0476716517 (Pole No 61)

  Circuit B: NT0476716537 (Pole No 1)

- Transition from OHL to u/g cable [Upper Howecleuch near the A74(M)]

  Circuit A: NT0019414711 (Pole No 120)

  Circuit B: NT0017614722 (Pole No 60)

- Circuits terminate at Clyde South Wind Farm Substation

  Circuit A: NS9820913428

  Circuit B: NS9821913428

4.8. The overall length of the Proposed Development is 13.6km, comprising of two circuits each of 5.4km of OHL and 8.2km of underground cable.

DESCRIPTION OF OVERHEAD LINES

4.9. The two proposed parallel OHLs will be supported on twin wood pole supports (H-poles). There will be 120 wood H-pole structures within the wayleave corridor, with 60 poles in each circuit.

4.10. Wood poles can be utilised in wet or boggy conditions, whereby a wooden 'bog shoe' arrangement can be used to stabilise poles. The wood poles will be seasoned and treated with a suitable preservative, resulting in a dark brown appearance, which will weather to a silver/ grey colour over a period of approximately five years following installation. Typical wood H-pole structures are illustrated in **Photos 4.1, 4.2, 4.3** and **4.4** below. These double or 'H-Poles' are used at elevations greater than 200m above ordnance datum (AOD). The entire Proposed Development is located at elevations greater than 200m, hence H-poles are used along the whole route.

Photo 4.1: Typical 33kV Wood Pole – double or 'H-pole'

4.11. Structure types to be used include Terminal Structures, Intermediate H-poles and Angle H-poles. Terminal Structures are utilised where the circuits change from underground cable to overhead line, and vice-versa. Angle H-poles are utilised where there is a change in direction of the route alignment. Intermediate H-poles are utilised along straight sections of the route alignment.

Photo 4.2: Typical twin 33kV Wood Pole Overhead Line

Photo 4.3: Typical Terminal Structure for a Wood Pole Overhead Line

Photo 4.4: Typical Angle Pole

Wood Pole Sizes, Heights and Span Length

4.12. The height of the wood poles (including steel work and insulators) will vary between 8.5 – 13.3m for this project. The height of the line is dependent on a number of criteria, including geographical location, topography, height above sea level, wind and ice loading, span length and conductor type. Pole heights may also be increased locally where required to safely cross features such as watercourses or transport corridors. The majority of poles utilised in this grid connection are likely to be approximately 10.35m in height above the ground. Depending on the structure, an additional 1.8m to 2m of a wood pole is buried.

4.13. The wood poles which support the overhead line are generally between 300mm and 470mm in diameter, depending on the height of the pole. L36 wood poles are slightly larger in diameter than L34 wood poles.

4.14. The selection of individual pole sizes has followed detailed site walkover surveys.

4.15. Span length or the spacing between the poles is dependent on the same criteria as line height. On average, the span length for L34/L36 wood pole lines is 80m, with the actual length dependent on the detailed site survey. The spans range from 60m to 130m max to accommodate technical and environmental considerations.

Stays

4.16. Galvanised steel stays (guy lines) will be provided for additional stability for poles on changes in direction and at terminal positions. Stay wires are attached near to the top of the structures and anchored in the ground by a below-ground timber foundation block.

Insulators and Conductors

4.17. Each pole is topped by galvanised steelwork cross-arm and insulators (likely to be grey plastic). The steel cross arm and insulators will carry a single three-phase circuit (three metal alloy conductors) in a flat formation (i.e. all at the same height on each individual pole).

4.18. Insulators are made of a suitable electrical insulating material, typically glass or plastic composite, and are used to support the conductor and provide the necessary electrical clearance between the conductor and the supporting galvanized steel cross-arm.

Foundation Design

4.19. The design of the foundations for the 33kV overhead line will be guided by the ground conditions at each pole location. In good ground conditions, the poles will be directly embedded into the ground and the hole backfilled with excavated topsoil. The hole would be backfilled with soil replaced in reverse order to the order it was excavated to ensure environmental continuity. Backfilling would be progressed in layers of approximately 300 – 400 mm deep, with stone hard core added as required around foundation blocks to ensure adequate compaction and suitable geotechnical conditions are maintained between each layer. When replacing any topsoil/turf around the pole it would be left slightly proud of ground level (approximately 150/ 300 mm) to allow for the excavation to naturally compact further through time

4.20. Where required, additional support can be provided by a below-ground timber foundation block, which is fitted at a minimum of 500mm below ground level. In some locations a more complex timber structure known as a 'bog shoe' may be required, for example, where peat is present.

4.21. Under normal ground conditions, a typical single pole excavation is $3m^2$ by 2m deep, with a maximum excavation of 3m depth.

DESCRIPTION OF UNDERGROUND CABLE

4.22. The proposed underground cable sections will comprise three 33kV cables per circuit installed in a trench in a trefoil duct formation, as illustrated in **Diagram 4.2: Typical Underground Cable Trench** in this chapter.

4.23. A duct for fibre optic cabling will be included as part of the proposed cable arrangement. The fibre optic communication cable is for electrical protection and communication systems, is for internal operational use by SPT and is related to the running of its network. The cable system will start at the substation with special weatherproof terminations, known as cable sealing ends, which are connected into the substation equipment.

4.24. The trench will be excavated at a width of 1.2m to the contour of the original ground so that the duct is laid to a minimum depth of 1.1m (max depth, 1.5 m) below ground level accommodating any bedding materials.

4.25. Joint bays would be required to join cable lengths, with approximately 500m between joint bays. A typical layout of a joint bay is shown in **Diagram 4.1** below.

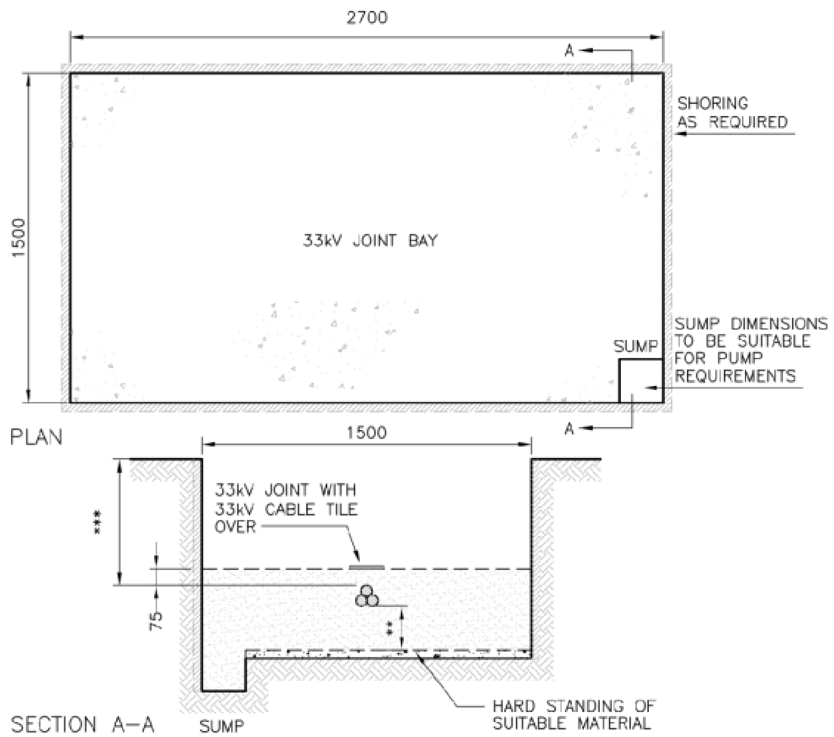

Diagram 4.1 Typical Joint Bay

4.26. The underground cables are connected to the overhead line at the terminal structure by way of cable sealing ends. Where the cables become exposed and connect to the OHL terminal structures, they will be suitably protected (i.e. with a cable guard) and anti-climbing device(s) fixed to the OHL Structure.

4.27. The cables will be in ducts and terminated directly into the 33kV switchgear at the substations at either end of the circuit.

INFRASTRUCTURE LOCATION ALLOWANCE (ILA)

4.28. The environmental appraisal process has been used in combination with technical design work to develop the detailed development footprint upon which the appraisals are based. However, it is anticipated that, post consent, it may be necessary and desirable to refine the final vertical and horizontal profile of conductors and pole positions and heights, as well as the lines of access tracks, to reflect the following:

- Pre-construction confirmation of dynamic environmental conditions, e.g. the location of protected species;
- More detailed technical survey information, particularly for unconfirmed ground conditions such as the heavily forested areas;
- To provide further scope for the effective mitigation of any likely environmental effects; and
- Minor alterations requested by landowners.

4.29. To ensure that the final positions of the OHLs and associated works are not varied to such a degree as to cause an increase likely environmental effects outlined in this Environmental

Appraisal Report, an ILA is proposed. This would permit the siting of a pole to be adjusted within a 20m radius of the indicative pole locations and a 20m tolerance either side of the indicative access track locations. The cable alignment would be subject to the same 20m ILA. The maximum vertical ILA is 18 m, whereby the typical pole height is likely to be between 9.5 m and 15 m above the ground level (including steel work and insulators), but poles may vary in height in order to respond to local topographical variations, engineering and safety considerations.

4.30. Implementation of the ILA would be controlled through the proposed detailed Construction Environmental Management Plan (CEMP). Should a request to vary a pole location or height or access track position within the ILA be raised, the relevant environmental baseline surveys undertaken to inform the EAR would be reviewed in the first instance as these surveys extend beyond the proposed ILA tolerance. Should this review 'flag up' any potential issues, further environmental advice would then be sought from retained specialists as appropriate. A procedure for notifying relevant statutory consultees of proposed ILA movements would also be agreed with these bodies prior to construction commencing.

Higher and Lower Voltage Overhead Line and Underground Cable Crossings and Diversions

4.31. Where the proposed overhead line route crosses existing higher or lower voltage overhead line routes, the lower voltage lines will be undergrounded to avoid conflicts with the OHL.

CONSTRUCTION METHODS

4.32. An outline of the construction methods and proposed environmental management measures is given below. A Construction Environmental Management Plan (CEMP) will be developed by SPEN, in conjunction with its appointed contractors. The CEMP will identify those responsible for the management and reporting on the environmental aspects during the construction works. The CEMP will be used to ensure a commitment to meeting all relevant conditions attached to the section 37 consents and deemed planning permissions and delivering the environmental mitigation measures identified in this Environmental Appraisal Report (EAR) during construction of the Proposed Development. Adherence to the CEMP will be a contractual requirement of each contractor that SPEN engages on the Project.

4.33. The purpose of the CEMP will be to:

- Provide a mechanism for ensuring that construction methods avoid, minimise and control potentially adverse environmental effects, as identified in the EAR Report;
- Ensure that good construction practices are adopted and maintained throughout the construction of the Whitelaw Brae project (the Proposed Development);
- Provide a framework for mitigating unexpected effects during construction and decommissioning;
- Provide a framework for monitoring and assessing any changes required through the Infrastructure Location Allowance (ILA) process;
- Provide assurance to third parties that agreed environmental performance criteria are met;
- Establish procedures for ensuring compliance with environmental legislation and statutory consents; and
- Detail the process for monitoring and auditing environmental performance.

Site Establishment and Temporary Construction Compounds

4.34. Five temporary laydown/welfare areas will be required, with the preferred sites located at the proposed Whitelaw Brae Wind Farm substation, next to the A701 south of Badlieu and near Smid Hope Burn, at Upper Howecleuch near the A74(M) and at the existing Clyde South Wind Farm substation. Dimensions vary from 100m to 30m in length and width, dependent on requirements, e.g., for cabins and/or parking, storage of materials such as ducting, cable drums and other accessories (sand, tiles, etc), and handling areas. It is anticipated that the contractor will also identify a 'satellite' yard for storage in order to reduce the amount of traffic movements, and that construction of the compound will be MOT type one aggregate on top of terram. The contractor will obtain all the necessary consents and permits once the precise location of the temporary construction compounds is decided upon.

4.35. Clearly defined areas for the storage of oil will be identified as part of the site establishment process. Spill kits will be located and maintained at all oil storage and refuelling locations and on all site vehicles. An emergency response procedure will be provided as part of the proposed CEMP.

4.36. Pole storage will be in a defined area away from any watercourses and taking into consideration the control of any creosote from the poles causing any potential contamination. Typically, this will be by storage on a hard standing, with a non-permeable membrane to prevent leaching. This will be agreed with site management and environmental advisors.

4.37. All waste will be stored securely and disposed of through a licensed waste carrier, in accordance with waste regulations and the Site Waste Management Plan. The waste hierarchy will be followed to keep waste to a minimum.

4.38. Any temporary construction compounds shall be restored following completion of the overhead line.

OHL Construction

4.39. Construction vehicles will move from the public highway to laydown areas and to the working locations via a combination of existing commercial forestry and wind farm tracks, and temporary trackway and temporary stone road construction accesses. These are typically 3–5m wide and slightly wider where there is a swept path requirement. Construction accesses are designed to access every pole site on the route and the alignments of the underground cables. Any such temporary access improvements are removed following the construction and re-laid temporarily the next time they might be needed for operational maintenance.

4.40. Access is typically required for a tracked excavator and low ground-pressure vehicles (e.g., tractor, Argo cat, quad bikes). During the stringing phase of the works, there could also a need for access for one tractor, one tensioner and one mobile elevated working platform (MEWP) and cable trailers to gain access to several locations along the line. These works are sequential, and the plant moves from one location to the next until the stringing is completed.

4.41. Areas of boggy ground and peat are avoided as far as practical. Where it is required to cross such ground, low pressure ground bearing plant and bog mats will be used. All-terrain vehicles will be utilised to access the point of work in these areas.

4.42. During construction the wood poles are transported to the temporary laydown areas or pole locations on general purpose four-wheel drive cross-country vehicles which have incorporated lifting devices.

4.43. Drums of conductors are delivered as close as possible to the angle or tension pole sites from which the conductors are pulled. If necessary, tractors adapted to carry such loads are used to transport drums to the pole sites.

4.44. Turf and Topsoil would be removed together to retain the turf root system and placed to one side for later reinstatement.

4.45. A hole would be excavated to allow the pole brace block and/ or steel foundation braces to be positioned in place. A typical pole excavation is 3m2 x 2m deep with a maximum excavation of 3m depth.

4.46. Excavated material is sorted into appropriate layers and used for backfilling. It is anticipated that all excavated material would be used for backfilling.

4.47. Poles are erected using normal agricultural equipment such as a digger with a lifting arm. The excavator then hoists the assembled structure into position, and once the structure has been braced in position, the trench is backfilled.

4.48. The hole will be backfilled with soil replaced in reverse order to the order of excavation. Backfilling would be progressed in layers of approximately 300-400mm deep, with stone hardcore added as required around foundations to ensure adequate compaction and suitable geotechnical conditions are maintained between each layer.

4.49. When replacing turf/top soil, it will be left slightly proud of ground level (approximately 150/300mm) to allow for natural compaction over time.

4.50. Once all poles within the section of line under construction are erected, the poles are fitted with insulator supports. Running blocks are fitted to the top of the insulator support and the conductors fitted. Drums of conductor and a tensioner with a hydraulic brake are located at one end of the line section, with the pulling winch at the other. The conductor is joined to a single, heavy-duty pilot wire and drawn through the section, one conductor at a time, under constant tension and radio communication during stringing is maintained between the operators of the pulling winch, the tensioner, hydraulic brake and intermediate observation points so the pulling can be stopped if problems arise.

4.51. By using the 'continuous tension stringing' method the conductors are held aloft at all times and do not touch the ground or any other structures. Overhead line conductors are usually erected from one end of the line, in short sections (dependent upon the terrain and complexity of the design). Temporary stays are required along the line to balance the conductors as the build progresses to the other end. These stays are installed and removed along the length of the line as the individual sections are completed

Underground Cable Construction

4.52. A typical working corridor of up to 15m is required for installation of the underground cable circuits (A and B) where it passes through commercial forestry and grassed upland areas. The working corridor is required to accommodate the trench width together with the excavated material, all underground cable construction activities and safety clearances.

4.53. Access is via existing commercial forestry and wind farm tracks, in addition to temporary trackway access, with low ground-pressure vehicles and bog mats used in wet areas and areas where peat is present. Access between Peat Hill and the HDD entry pit will be demarcated with fencing. The equipment used will include (up to) 13t excavators, (up to) 9t dumpers, vibration roller, hand compaction machines, trackway installation vehicle (HI-AB) and hand tools.

4.54. Site preparation works include vegetation clearance within the working area and topsoil/turf excavation and segregation in grassed areas. Turf and Topsoil would be removed together to retain the turf root system and placed to one side for later reinstatement. Excavated material is sorted into appropriate layers.

4.55. As shown in **Diagram 4.2**, the trench is excavated to the required width and depth using a JCB type tracked excavator. The trench bottom must be uniform, with adequate clearance on each side of the ducts, and be free from roots, organic debris, clods, rocks, stones, and other materials likely to cause damage to the cable duct.

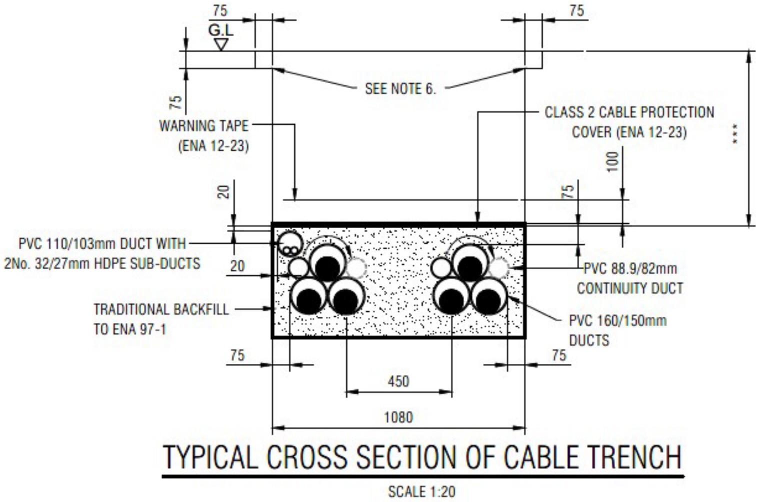

Diagram 4.2: Typical Underground Cable Trench

4.56. Trench walls will be supported appropriately where necessary to ensure trench stability. Excavations will be kept free from water by use of mobile pumps, with water pumped to a suitable settlement pond, prior to either infiltration (to ground) or discharge (via piping).

4.57. Drainage design measures to ensure the discharge will not result in pollution to surface water will be set out in the CEMP.

4.58. All excavated material will be carefully stored a minimum of 10m away from any adjacent watercourse with particular care taken to prevent any risk of runoff or wind borne dry sediment into the watercourses.

4.59. The cable is laid on a bed of thermally selected sand and backfilled with the previously extracted material or suitable imported backfill if required.

4.60. Backfill will be completed by returning the remaining excavated material to the trench in layers, in reverse order with the existing vegetation placed on the trench where possible.

4.61. The cable route is indicated by above ground markers located at the centre of the cable trench and placed at field boundaries to indicate the cable route. Such markers are located so as not to interfere with normal farming activities.

4.62. The underground cables are connected to the overhead line at the 2-pole terminal structure by way of cable sealing ends. The cables will be in ducts and terminated directly into the 33kV switchgear at the substations at either end of the circuit.

4.63. Where the underground cable circuits are routed alongside the A701, works will be covered by a Traffic Management Plan (TMP) prepared in collaboration with the construction contactor and in approval with Scottish Borders Council's Roads Department. A draft version of this TMP can be referenced in **Appendix 4.1: Draft Traffic Management Plan.**

4.64. SPEN will be requesting that one lane is closed as a worse scenario, and the SPEN cable route will follow the 'path of least resistance' to ensure that works are carried out as efficiently as possible. Traffic Management will comply with NRSWA and to ensure the safety of the working parties and road users alike.

Horizontal Directional Drilling (HDD)

4.65. Where an underground cable is required to cross the River Tweed and the A74(M) transport corridor, a trenchless technique (horizontal directional drilling) will be used as illustrated in **Diagram 4.3**. Water will be required as part of the HDD process for the high-pressure jets at the drilling end and as part of the drilling fluid to carry back cuttings to the entrance pit. This will be abstracted at source from a local watercourse.

4.66. Details of agreed construction methods and robust environmental mitigation measures will be set out in the CEMP to prevent contamination of water resources, including the River Tweed SSSI/SAC.

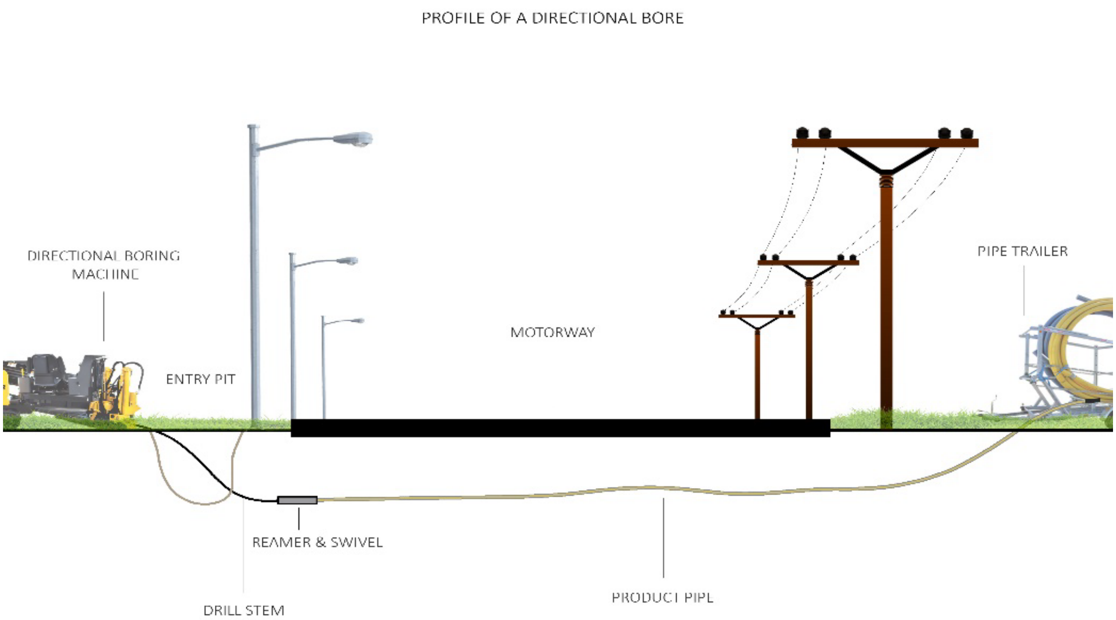

Diagram 4.3: Indicative Sketch showing Horizontal Directional Drilling

A74(M) and Railway

4.67. The proposed HDD route is approximately 375m long. The proposed eastern point of the route and the HDD entry is located at National Grid reference (NGR) NT0011214543. The proposed HDD route returns to ground level on the southwestern side of the B7076 at NGR NS9981914326.

River Tweed

4.68. Environmental surveys, landowner engagement and SI works indicate that the proposed crossing point will be located in proximity to NS9981914326. This is subject to the appointed HDD Contractor addressing a number of data gaps and geotechnical hazards by carrying out further SI works on the western side that were not feasible during the development phase due to landowner access issues and forestry ground conditions. Therefore, it is envisaged that the HDD length could be approximately 250-300m long.

4.69. In proximity to the River Tweed, the access route for installation of the underground cable HDD Entry Pit will act as a work area for the HDD pipework to be fabricated and welded together in readiness to be pulled through the bored hole. It will be demarcated by installing stock proof fencing (both sides of the agreed wayleave area of 15m) from top of Peat Hill to the HDD entry pit. Top soil/turf will be removed and reinstated as described above. Track mats will be installed to facilitate safe access/egress with bog mats utilised in wet areas.

Watercourse Crossings

4.70. The overhead line construction will not require the construction of any new watercourse crossings. In the event that minor watercourses have to be crossed, avoidance of damage to the banks will be specified in the CEMP. Bog mats would be used to cross minor watercourses without damage to bank integrity.

4.71. Where pole installation is required within 30m of a watercourse, silt traps or other mitigation will be put in place (which will be outlined in the CEMP), with nearby watercourses checked during periods of high rainfall during construction activities. Ground excavation work will temporarily stop work during periods of high rainfall, where a risk to surface water quality is identified.

4.72. All excavated material will be carefully stored a minimum of 10m away from any adjacent watercourse with particular care taken to prevent any risk of runoff or wind-borne dry sediment into the watercourses.

Crossing Footpaths and other Services

4.73. Where the Proposed Development crosses footpaths or other infrastructure (pipelines, existing 11kV OHLs, Telecom cables) certain precautionary works have to be completed prior to the commencement of conductor stringing. These temporary works are completely removed upon completion of the construction of the section of line where the oversail is situated. Where public footpaths or rights of way need to be closed, these will be temporarily diverted in consultation and agreement with relevant stakeholders, including landowners.

OHL Works in Proximity to the Scheduled Monument

4.74. Hard barriers will be erected along the edge of the Scheduled Monument Area with a full-time archaeological watching brief appointed. Pole Stays are to be a minimum of 1m away from the edge of the Scheduled Monument Area meaning poles will be roughly 5-10m away dependant on terrain. Details will be presented in the CEMP and referenced in **Chapter 7: Cultural Heritage and Archaeology.**

Forestry

4.75. Where an overhead line is routed through forestry, a 'wayleave corridor' is required to ensure that trees do not fall onto the line. SPT has statutory powers to control tree clearance within the wayleave corridor. For this project, a corridor of 80m i.e., 40m either side of the centre line between the two overhead lines is required. This represents a falling distance of 25m to the lowest conductor. In addition, a wayleave of 15m is required for each of the underground cable sections. Further details of the felling requirements are provided in **Chapter 11: Forestry.**

4.76. Some felling of commercial plantation forestry will be necessary to accommodate the Proposed Development. The Whitelaw Brae Forestry Impact Appraisal (FIA) presented in Chapter 11 has identified that the total area of felling. SP Energy Networks will liaise with the landowners to agree a suitable felling strategy for the commercial forestry. It is anticipated that all timber extracted from the site will be transported to an end user (saw mill, board/pulp mill, etc.).

4.77. Tree felling and timber extraction will be undertaken using conventional machinery for the felling of mature and semi mature accessible timber, including mechanical harvesters, manual chainsaw operators.

4.78. The timber harvesting operations will be carried out in accordance with the UK Forestry Standard[1] and the UK Forest and Water Guidelines, 2011[2].

MITIGATION PLANTING

4.79. The wayleave extends to 54.87 hectares of land in total including all land use.

4.80. 31.5 hectares of commercial forest and 5.14 hectares of broadleaves/mixed species requires clearing in order to deliver the overhead and underground route, including associated wayleaves of 80 metres and 15 metres respectively. This is a total of 36.64 hectares which will require to be replaced offsite.

4.81. SPEN is committed to securing compensatory planting to offset the loss in line with the Scottish Government's Control of Woodland Removal Policy. Should section 37 consent be granted for the proposed development, it is expected that a woodland planting strategy will be conditioned to this consent.

4.82. In addition, 50.63 hectares of trees external to the wayleave will be impacted by the route passing through the windfirm edges of mature conifer forest; 8.09 hectares of this will be rendered at high risk of wind damage following wayleave clearance and should also be cleared. The remaining 42.54 hectares of forest is considered lower risk and should be monitored for future wind damage.

4.83. SPEN has no mechanism to control felling and replanting/restocking within the areas vulnerable to windthrow. However, SPEN is committed to liaising with landowners to agree that these areas will be felled to mitigate the risk of forest damage through windthrow. The felling of these areas would require the agreement of the relevant landowners and would be delivered in line with a felling permission to be applied for by the landowner to Scottish Forestry (SF) on behalf of the Scottish Ministers. It is anticipated that each felling permission would be granted subject to a condition, to ensure that the felled woodland is replanted. In terms of the Forestry and Land Management (Scotland) Act 2018 ("2018 Act") and associated regulations[3], in making a decision on any felling application, the Scottish Ministers acting through SF must have regard to their duty under section 2 to promote sustainable forest management. In addition, SF are entitled to impose conditions in relation to the retention of, or increase in, woodland cover. SF normally expect an area which has been clear felled to be restocked and will normally attach what is referred to as a continuing condition to felling permissions to secure the restocking.

4.84. Should the landowner not agree to pre-emptively fell the woodland required to create a more windfirm edge (to mitigate the windthrow effects) and the trees subsequently suffer from windthrow, it is within the control of SF, on behalf of Scottish Ministers, using powers contained in the 2018 Act and associated Felling (Scotland) Regulations 2019 to issue felling and restocking directions. In terms of section 34 of the 2018 Act, if it appears to SF that felling of trees is required to prevent deterioration or further deterioration in the quality of timber comprised in the trees or to improve the growth of other trees or to prevent or reduce harm caused by the presence of the trees, it may serve a felling direction on the

[1] Forestry Commission (2017) The UK Forestry Standard – the Government's Approach to Sustainable Forestry
[2] Forestry Commission (2011) Forests and Water – UK Forestry Standard Guidelines
[3] The Felling (Scotland) Regulations 2019

owner of the land requiring the felling of the trees. These powers could be exercised to address the effects of windthrow. Felling directions may also be issued subject to conditions addressing the retention of or increase in woodland cover. SF can therefore secure the replanting or restocking of woodland which has been felled.

4.85. In addition, and separately, in terms of section 36 of the 2018 Act, SF may serve a restocking direction where felling is not carried out in accordance with a felling permission, a felling direction, a restocking direction, or a continuing condition on felling permission in relation to land has not been complied with.

4.86. Having regard to the duty imposed upon Scottish Ministers to promote sustainable forest management, the powers available to issue felling directions and the practice of imposing conditions on felling licenses granted under the 2018 Act, the appraisal has been undertaken on the basis that any windthrow resulting from the introduction of the overhead line (OHL) wayleave would require the relevant landowner to replant the same area of forest. This is separate from any commercial imperative the landowner may have. Should the landowner agree to fell these same areas prior to windthrow occurring as part of the Whitelaw Brae Project then this would require the appropriate felling permission to be in place. As noted above, these permissions would normally include a similar restocking condition which would result in no net loss of forestry outside of the wayleave corridor. As such, there is deemed to be no loss of forestry from the effect of windthrow.

4.87. A full Forestry Impact Report for the Whitelaw Brae Grid Connection can be found at **Appendix 11.1** of this report.

REINSTATEMENT

4.88. All construction equipment will be removed from site and suitable reinstatement undertaken. Areas of ground disturbed by the construction works will be reinstated to their original condition, in agreement with affected landowners. Subject to programme requirements, some sections of the construction may be reinstated earlier than the final construction completion.

COMMISSIONING

4.89. On completion of the Proposed Development, a period of equipment testing will be undertaken prior to the new equipment becoming operationally live.

OPERATION, INSPECTION AND MAINTENANCE

4.90. Whilst most wood pole OHL components are maintenance free, exposed elements which suffer from corrosion, wear, deterioration and fatigue need to be inspected on a regular basis. OHLs supported on wood poles require refurbishment or replacement after approximately 30 to 40 years.

4.91. Annual maintenance checks on foot are commonly required during operation. The cable section will also be kept clear of all but low growing vegetation. In the unlikely event that there is a fault along the cable, the area around the fault is excavated and the fault repaired, or a new section of cable inserted as a replacement. If lines are decommissioned, cables can either be left in situ or carefully excavated and removed.

CONSTRUCTION PROGRAMME

4.92. Subject to receiving planning permission and the fulfilment of any associated conditions, construction is programmed to commence in month 1 of the DRAFT construction programme shown in **Table 4.1: DRAFT Construction Programme** below. The full details of the programme will be confirmed once a contractor has been appointed. The key activities that will take place during construction are summarised in the programme below, although it is noted that this dependent on obtaining the relevant section 37 consent from the Scottish Ministers.

Table 4.1: Draft Construction Programme

Whitelaw Brae Wind Farm Connection Programme Status	2023												2024											
	Qtr1			Qtr2			Qtr3			Qtr4			Qtr1			Qtr2			Qtr3			Qtr4		
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Substation Works (within Clyde South)																								
Mobilisation										■														
Installation & Civils											■	■	■	■	■									
Pre-Commissioning Testing																■								
Overhead Line (OHL) Works																								
Tree Cutting																								
Mobilsation				■																				
Tree Cutting Works					■	■	■																	
Access Works																								
Temp. Access Road Installation								■	■	■	■													
Temp. Access Road Removal															■	■	■							
OHL Installation																								
Wood Pole Installation									■	■	■	■	■											
String Route Works												■	■	■										
Cable Works																								
Ducting Works																								
Mobilsation					■																			
Windfarm to A701 Duct Installation						■	■	■	■															
A701 Duct Installation						■	■	■	■	■	■	■												
Clyde South to A74(M) Duct Installation													■	■	■									
Cable Installation Works																								
Mobilsation								■																
Windfarm to A701 OHL Start Point Cable Install									■	■	■	■	■	■	■	■								
Clyde South to A74(M) Cable Install													■	■	■	■								
HDD Works																								
Mobilsation				■																				
HDD Works - River Tweed					■	■	■																	
HDD Works - A74(M) & Railtrack crossing								■	■	■	■													
Commissioning Works																								
Substation Commissioning																	■	■						
OHL Commissioning																	■	■						
Cable Commissioning																	■	■						
Demobilisation																			■					