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Chapter 17

The Proposed Converter Station

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Glossary & Abbreviations

Glossary of Terms	
Term	**Meaning**
Alternating Current (AC)	Electric power transmission in which the voltage varies in a sinusoidal fashion. This is the most common form of electricity transmission and distribution.
base scheme design	The design of the UK Onshore Scheme for the purposes of the planning application.
connection point	The existing Bicker Fen 400 kV Substation; the point on the National Electricity Transmission System (NETS) where Viking Link connects.
the Contractor	Party or parties responsible for the detailed design and construction UK Onshore Scheme.
converter station	Facility containing specialist equipment (some indoors and some potentially outdoors) for the purposes of converting electricity from AC to DC or DC to AC.
converter station site	The proposed site occupying approx. 30 ha containing the converter station and associated landscaping, drainage as well as land required for construction.
converter station zone	The proposed zone occupying approx. 8 ha containing the converter station buildings, outdoor electrical equipment and hardstandings within a security fence.
detailed scheme design	The design of the Scheme developed by the Contractor within the Limits of Deviation (AC and DC cables) and Rochdale Envelope (converter station).
Direct Current (DC)	Electric power transmission in which the voltage is continuous. This is most commonly used for long distance point to point transmission.
Limits of Deviation	These define the maximum extents of the corridor for which planning permission is sought and within which proposed DC and AC cable routes may be installed.
Open cut methods	Cable installation methods which require the excavation of a trench into which ducts or cables can be directly laid.
the Project	Viking Link, from the connection point at Revsing Substation in Denmark to the connection Bicker Fen Substation in Great Britain).
Rochdale Envelope	This defines the parameters of the proposed converter station for which planning permission is sought including its location, layout and dimensions.
the Scheme	UK Onshore Scheme from MLWS to the connection point comprising underground AC and DC cables, converter station and access road.
Temporary Construction Compound	Compound used by the Contractor for siting of offices, welfare facilities, storage and laydown.
Temporary Construction Facilities	All areas used for temporary construction requirements including compounds, working areas.

Glossary of Terms	
Term	**Meaning**
Temporary Works Area	Larger working area located on or adjacent to the working width used where construction activities requires a larger area for example at trenchless crossings.
Transition Joint Pit	Buried concrete pit where onshore and submarine cables are physically jointed together.
trenchless methods	Cable installation methods used to cross obstacles such as roads or watercourses and ensure less disturbance at the ground surface.
working width	The 50 m wide working corridor required for the installation of underground AC cables.

List of Abbreviations	
Abbreviation	**Meaning**
AC	Alternating Current
AIL	Abnormal Indivisible Load
AIS	Air Insulated Switchgear
AOD	Above Ordnance Datum
BBC	Boston Borough Council
CCTV	Closed Circuit Television
CEMP	Construction Environmental Management Plan
CSC	Line-commutated current source conversion
DC	Direct Current
DNO	Distribution Network Operator
ECoW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
ES	Environmental Statement
GB	Great Britain
GIS	Gas Insulated Switchgear
ha	hectare
HGV	Heavy Goods Vehicle
HVDC	High Voltage Direct Current
IDB	Internal Drainage Board
km	kilometre
km^2	square kilometre
kV	kilovolt

List of Abbreviations	
Abbreviation	**Meaning**
LoD	Limits of Deviation
LPA	Local Planning Authority
LV	Light vehicles
m	metre
mAOD	metres Above Ordnance Datum
mm	millimetre
NETS	National Electricity Transmission System
NGVL	National Grid Viking Link Limited
NOx	Nitrogen Oxides
PM	Particulate Matter
SOx	Sulphur Oxides
SHDC	South Holland District Council
TCPA	Town and Country Planning Act
UK	United Kingdom
VSC	Self-commutated voltage source conversion
XLPE	Cross-linked polyethylene

1 Introduction

1.1 Introduction

1.1.1 This chapter describes the proposed converter station including the permanent access road from the A52 to the converter station and the proposed Alternating Current (AC) cable route from the converter station to the existing Bicker Fen 400 kilovolt (kV) Substation (the 'connection point'). This chapter provides details of:

- Evolution of design: Following identification of the proposed site consideration was given to the location and layout of the proposed converter station. Details are provided of the alternatives considered and how the base scheme design was arrived at.
- Construction: Provides details of the construction of the proposed converter station including an indicative construction programme, description of the main construction works and indicative details of the site office, storage and laydown areas.
- Operation: Describes the main components of the proposed converter station including information about its design and appearance, operation and maintenance as well as details of the permanent site access arrangements.
- Decommissioning: Provides details of the likely activities which would be undertaken in the event that the proposed converter station requires to be decommissioned should Viking Link ('the Project') cease operation.

1.2 Level of Design Detail

Overview

1.2.1 National Grid Viking Link Limited (NGVL) is seeking full planning permission for the proposed converter station including permanent access road and the proposed AC cable route to the connection point. This section sets out the level of design detail which forms the base scheme design for which planning permission is being sought and which has been used to inform the Environmental Impact Assessment (EIA).

Proposed Converter Station

1.2.2 As described in chapter 3 converter stations are highly complex systems for which NGVL does not undertake significant detailed design work. The detailed design of the proposed converter station is Contractor-dependent and subject to a competitive tender process. For the purposes of the application for planning permission NGVL has developed a 'Rochdale Envelope' (Ref 17.1). This establishes the base design of the proposed converter station with which the Contractor's detailed design will comply. The base design establishes parameters including details of the maximum size, layout and appearance of the proposed converter station. This approach strikes

a balance, ensuring sufficient information to inform the EIA based on a realistic worst case whilst also providing some flexibility to the Contractor in finalising the detailed design of the proposed converter station. The detailed design including matters such as layout and appearance will be finalised and discharged by way of planning conditions within the parameters set by the base design.

1.2.3 The level of detail provided by the base design of the proposed converter station is summarised below in Table 17.1.

Table 17.1 Proposed Converter Station – Base Scheme Design Details

Consideration	Design Detail
Access	As part of the base scheme design full details of the proposed permanent access road from the existing highway at the A52 to the proposed converter station site have been identified (see section below).
Appearance	As part of the base scheme design a Design Code has been developed which establishes the requirements to be met by the Contractor including selection of colour(s) and material(s). Full details of the final appearance would be confirmed as part of the detailed design by planning condition.
Landscaping	As part of the base scheme design full details of the proposed landscaping scheme as well as proposed offsite planting have been identified. A landscape masterplan has been prepared as part of the planning application.
Layout	As part of the base scheme design development zones have been identified based on the location and size of building units and outdoor electrical equipment as well as other requirements such as landscape planting and drainage. Full details of the final layout would be confirmed as part of the detailed design by planning condition.
Scale	As part of the base scheme design maximum dimensions including building heights and floor space, heights of any outdoor electrical equipment and finished ground levels have been identified.
Drainage	As part of the base scheme design an outline drainage design has been developed. These are based on the maximum parameters of the proposed converter station. Full details of the final drainage scheme would be confirmed as part of the detailed design by planning condition.
Security	As part of the base scheme design details of security measures which will be required such as fencing and Close Circuit Television (CCTV) have been included. Full details of the final security scheme would be confirmed as part of the detailed design by planning condition.
Lighting	As part of the base scheme design details of lighting which will be required have been included. Full details of the final lighting scheme would be confirmed as part of the detailed design by planning condition.

Proposed AC Cable Route

1.2.4 The proposed AC cable route connects Viking Link to the National Electricity Transmission System (NETS) at the existing Bicker Fen 400 kV Substation and, dependent on the direction of operation, facilitates the export or import of electricity from or to Great Britain. For the purposes of the application for full planning permission NGVL has developed Limits of Deviation (LoD) within which the AC cable will be installed.

1.2.5 The LoD set a 150 m wide corridor within which the working width required for AC cable installation (up to 50 m) will be established. The base scheme design provides details of the AC cable route and associated temporary working corridor including access to and within the working corridor, temporary and permanent drainage and soil storage.

Proposed Permanent Access Road

1.2.6 As part of the base scheme design full details of the proposed permanent access road from the existing highway at the A52 to the proposed converter station site have been identified. This includes the details of the proposed junctions formed at the A52 and North Ing Drove, proposed bridge crossing of the Hammond Beck as well as details of the running width of the road.

1.3 Consents Required

1.3.1 Planning permission is being sought under the Town and Country Planning Act 1990 (TCPA) as follows:

- Planning permission from Boston Borough Council (BBC) for the installation of approximately 1.13 km of proposed AC underground cable and associated temporary works.
- Planning permission from South Holland District Council (SHDC) for the proposed converter station, 2.8 km long permanent access road and approximately 1.21 km of proposed AC underground cable and all associated temporary works.

1.4 Site Description

1.4.1 The planning application boundary comprising all of the UK Onshore Scheme is approximately 1,480 hectares (ha) or 14.8 square kilometres (km^2). The proposed converter station (including permanent access road, AC underground cable route and land required during construction) occupies approximately 164 ha (1.64 km^2) of the planning application boundary. Figure 17.1 illustrates the planning application boundary and highlights the area which relates to the proposed converter station including land required during its construction. A plan of the proposed converter station site is contained in Figure 17.2.

1.4.2 The proposed converter station site including the permanent access road is located entirely within the area of SHDC. Approximately 1.21 km of the AC underground cable route is located

within SHDC and approximately 1.13 km located within BBC where it connects to Bicker Fen 400 kV Substation. Local Planning Authority (LPA) boundaries are illustrated in Figure 17.2.

1.4.3 The surrounding area is predominantly rural with the majority of the land within the planning application boundary currently used for agriculture. The proposed converter station site is located on North Ing Drove on agricultural land (centred on Grid Reference TF187 373). It is within close proximity to similar infrastructure including Bicker Wind Farm and electricity transmission and distribution substations including the connection point. These are located approximately 0.5 km and 1 km respectively to the north of the proposed converter station site. The proposed permanent access road is routed entirely through agricultural land from the A52 to North Ing Drove and follows field boundaries for the majority of its length. Similarly the proposed AC cable route is routed entirely through agricultural land to the north of the proposed converter station site and east of Bicker Fen 400 kV Substation.

1.4.4 The nearest settlements are the villages of Northorpe, Bicker and Donington located to the east and south east of the proposed converter station site. Donington is located close to the planning application boundary where the permanent access road forms a new junction with the A52. There are a number of scattered individual and small clusters of residential properties within the wider area. The closest of these are two properties located on North Ing Drove which lie within 0.2 km of the east and 0.6km of the west of the proposed converter station site application boundary.

1.4.5 Currently access to the proposed converter station site is provided by North Ing Drove only. From the A52 to the east/south east, a network of local roads provides access to surrounding villages and properties. To the north there is an existing access track connected to Middle Fen Drove, however, this does not provide access to the proposed site. There are a small number of farm tracks which are utilised by local farmers to provide access to agricultural land including two which are located within and cross the planning application boundary.

1.4.6 The proposed converter station site is bounded to the north, south and west by drains which are maintained by the Black Sluice Internal Drainage Board (IDB). A number of drains and watercourses are also present in the wider area both close to and within the planning application boundary. This includes a number of drains and watercourses which are crossed by the permanent access road and the proposed AC cable route such as Hammond Beck which has to be crossed by the permanent access road.

1.4.7 Topography within the vicinity of the planning application boundary is illustrated in Figure 17.3. Some of the more elevated areas relate to embankments such as those on South Forty Foot Drain to the west of the proposed site. Within the proposed converter station site topography is variable ranging from just under 2 to just over 3 metres Above Ordnance Datum (mAOD).

1.4.8 There is generally limited vegetation present within or adjacent to the planning application boundary. This comprises hedgerows which form part or all of the field boundaries, individual trees, irregular small shelterbelts or pockets of woodland as well as screen planting around the existing Bicker Fen 400 kV Substation.

2 Evolution of the Converter Station Design

2.1 Overview

2.1.1 This section describes the evolution of the proposed converter station design from the identification of the proposed site to the base scheme design that forms the basis of the planning application. Following identification of the proposed site the base scheme design has evolved through an iterative process which considered a range of environmental and engineering factors as well as feedback received from consultation with statutory and non-statutory consultees and the local community. This section describes the design process and how the design of the proposed converter station has been identified. Reference should also be made to the Design and Access Statement (Ref 17.2) and Design Code (Ref 17.3) which accompany the planning application.

2.2 Converter Station Design

Selection of Converter Station Technology

2.2.1 Viking Link could utilise self-commutated voltage source conversion (VSC) or line-commutated current source conversion (CSC). VSC technology was selected; the main benefits of this technology are its ability to control reactive power and active power independently to keep the voltage and frequency stable. In addition VSC technology allows for a more compact converter station layout and reduces the operational land take required compared to alternative high voltage Direct Current (DC) technologies.

Siting of the Converter Station

2.2.2 The proposed site occupies a single large field of approximately 30 ha (0.3 km^2), however, the minimum operational area required for the proposed converter station excluding other considerations such as security, perimeter roads, drainage or landscaping is approximately 5 ha (0.05 km^2). Key environmental and engineering considerations which have informed the siting of the converter station based on minimum operational requirements within the proposed site are illustrated in Figure 17.4 and include:

- The potential for noise impacts on residential properties in the vicinity.
- The potential for visual impacts on residential properties in the vicinity.
- The risk of the proposed site flooding and the likely extents of flooding within the site.
- The location and distribution of known archaeological remains present within the site.
- The location of maintained drains including a 10 m separation distance from them.

- The agricultural quality of the underlying soils present within the proposed site.
- The location(s) of potential entry and exit points for AC and DC cables.
- The location(s) of potential permanent road access points to the proposed site.

2.2.3 Within the proposed site the key constraints which have informed the siting of the converter station have been flood risk, archaeology and land quality. Other siting constraints or considerations relate to constraints located on the boundary of or outside the proposed site; for example application of a 10 m separation distance from maintained drains, or residential properties located to the east and west of the proposed site.

2.2.4 The Flood Map for Planning (Ref 17.4) identifies a proportion of the proposed site is at risk of flooding (Flood Zone 3), however, part of the north west and west of the proposed site lies outside of the extent of flooding. The proposed converter station has been located within the north west of the proposed site to reduce the extent of the converter station which may be at risk of flooding.

2.2.5 As illustrated in the figure cropmarks have been identified within the proposed site. Further archaeological investigation (Ref 17.5) was undertaken to establish the presence and extent of archaeological remains within the site and the results used to inform siting of the proposed converter station such that it could avoid known archaeological remains as much as possible and inform pre-construction mitigation requirements.

2.2.6 Soil surveys were undertaken within the proposed site (Ref 17.6) and the results of these have helped to inform an evaluation of soil sensitivity. These identified the soils to the east of the site to be more sensitive further reinforcing the rationale for siting the converter station within the west of the proposed site.

2.2.7 Whilst the proposed site is located away from settlement there are individual properties located to the east and west. In siting the proposed converter station consideration was given to the distance between it and residential properties whilst taking into account the key constraints present within the proposed site. The location of the converter station in the north west of the proposed site ensures both residential properties are at least 600 m from the converter station, however, the key consideration with respect to reducing visual and noise impacts on these properties relates to the layout of the converter station.

Layout of the Converter Station

2.2.8 In parallel with the siting of converter station, consideration was given to the layout of buildings and outdoor electrical equipment within it. Key environmental and engineering considerations which have informed the layout of the converter station zone include:

- The potential for noise impacts on residential properties in the vicinity.
- The potential for visual impacts on residential properties in the vicinity.
- The location(s) of potential entry and exit points for the AC and DC cables.
- The location(s) of potential permanent road accesses to the proposed site.

2.2.9 The scale of buildings which form part of the converter station and low lying open nature of the landscape means that there is no layout in which buildings can be positioned completely out of views. In developing the layout of the converter station consideration was given to the location of buildings with the aim of reducing potential visual effects as much as practicably possible, for example through reducing the extent of building mass visible. It was identified that by locating the larger buildings to the south of the site and the smaller buildings or outdoor equipment to the north that the extent of buildings visible to nearby residential properties could be reduced. Other layouts were discounted as they result in the larger buildings being more prominent in views from nearby residential properties.

2.2.10 The layout of the converter station has also been developed to direct noise away from residential properties as much as practicably possible. Given the location and distribution of individual properties it was concluded that developing a layout in which the converter station was orientated with the noisiest equipment facing north was preferable as this directs noise away from the nearest residential properties. In alternative layouts this equipment would be directed more towards residential properties on North Ing Drove.

2.2.11 The key technical considerations in developing the layout of the converter station are the locations of entry and exit points for the DC and AC cables respectively. By locating the larger buildings in the south of the site DC cables would enter the site at its southern extent and AC cables exit at its northern extent. Taking into account the location of the connection point at Bicker Fen 400 kV Substation to the north it is preferable for AC cables to exit the site to the north, if they exited the site to the south the land take would increase due to the bending radii of the AC cables.

Appearance of the Converter Station

2.2.12 Through the development of the base design consideration has been given to alternative appearances which could be applied to the proposed converter station, this includes alternative design styles, colours and materials. Alternative design styles comprising a contextual style and a functional style were consulted on:

- Contextual style: This was based on the converter station assimilating an appearance based on agricultural buildings which are commonplace in the wider landscape.
- Functional style: This was based on the converter station assimilating an appearance based on typical electricity transmission infrastructure such as substations.

2.2.13 The contextual style was concluded to be inappropriate as the scale of the buildings forming part of the proposed converter station would be significantly larger than typical agricultural buildings. Consequently NGVL have selected the functional design style. Further details on the design style and appearance of the proposed converter station are contained in the Design and Access Statement (Ref 17.2) and Design Code (Ref 17.3).

Access to the Converter Station

2.2.14 Access to the proposed converter station site is currently provided by a network of local roads, however, these are considered unsuitable due to a combination of their size, condition and the potential impact on the local community. In order to provide access for construction of the proposed converter station and AC cable route and once construction is completed for operational traffic, consideration has been given to the development of a new permanent access roads connecting the proposed converter station with the existing highway network (A52).

2.2.15 Three alternative options for the permanent access road were considered as illustrated in Figure 17.5:

- Option 1 (approximately 2.8 km long) which broadly follows the railway line adjacent to the A52 in a western direction before turning north to the proposed site. Whilst this option follows existing linear features (railway line and field boundaries), it was discounted due to the proximity to the railway line and the potential restrictions this would place on the design.
- Option 2 (approximately 2.8 km long) which broadly follows field boundaries in a north western direction before turning north to the proposed site. This option was identified as the most preferred as by following existing boundaries it results in the least disturbance to existing agricultural land use.
- Option 3 (approximately 2.7 km long) which follows a more direct route from the A52 before following the same route as Option 2. This option was discounted, whilst it would enable a more direct route it bisects an existing field and would result in greater disturbance to existing agricultural land use.

2.3 AC Cable Route Design

AC Cable Design

2.3.1 The proposed AC cable route requires either six or twelve cables dependent on its design. The six cable solution comprises two trenches with three cables per trench whilst the twelve cable solution comprises four trenches with three cables per trench. NGVL propose to use a six cable solution for the proposed AC route. This meets the technical requirements of the Project and requires less land take than an alternative twelve cable solution.

AC Cable Routeing

2.3.2 Given the relatively short distance from the proposed converter station site to the existing Bicker Fen 400 kV Substation (approximately 2 km) the approach to route development has focused predominantly on consideration of engineering requirements and feedback from potentially affected landowners. Key considerations which have informed the selection of the proposed AC route include:

- The potential temporary and permanent land take required.
- The potential impact on agricultural land.

- The requirement to cross drains and other obstacles.

2.3.3 Three alternative options for the AC underground cable route were considered as illustrated in Figure 17.6:

- Eastern option (approximately 2.3 km long) exiting the proposed converter station site in an eastern direction then bearing north. This option approaches the connection point from the east and requires connections to switch bays at the north and south of Bicker Fen 400 kV Substation.
- Southern option (approximately 1.36 km long) exiting the proposed converter station site in a northern direction continuing north. This option approaches the connection point from the south and requires routeing within Bicker Fen 400 kV Substation to make connections to switch bays at the north and south of the connection point.
- Western option (approximately 2.14 km long) exiting the proposed converter station site in a northern direction. This option approaches the connection point from the west and requires connections to switch bays at the north and south of Bicker Fen 400 kV Substation.

2.3.4 The eastern option was identified as the preferred option. This option best balances technical and engineering requirements with impact on agricultural land use. This option is routed within open agricultural land with a short section within an area of saturated ground to the east of Bicker Fen 400 kV Substation. The route requires up to six crossings including four drains as well as crossings of Middle Fen Drove and Vicarage Drove.

2.3.5 Whilst the southern option is the shortest, most direct option and requires fewer crossings, the requirement to route AC cables within Bicker Fen 400 kV Substation was identified as a significant technical constraint. The southern option would require the least land take during construction and operation but the requirement to route AC cables through Bicker Fen Wind Farm and within the footprint of an operational substation is considered to be a significant constrain. As a result this option was discounted.

2.3.6 The western option is the longest option requiring the most crossings of drains and other infrastructure including a crossing of the Triton Knoll Offshore Wind Farm Electrical System which also connects to Bicker Fen 400 kV Substation. As a result, the western option would require the greatest land take during construction and operation. This would include wider areas where crossings of drains and other infrastructure are required to be deeper. As a result this option was discounted.

3 The Proposed Converter Station

3.1 Overview

3.1.1 Converter stations are key parts of high voltage DC electricity transmission system. They convert electricity from AC to DC and vice versa depending on the direction of operation of the interconnector. For the purposes of the Project and describing the proposed converter station, it has been assumed that electricity is being converted from DC to AC for onward transmission via the NETS (e.g. Viking Link is importing electricity to Great Britain from Denmark).

3.1.2 As previously noted the detailed design of the proposed converter station is dependent on the Contractor so the base design has been developed taking into account examples of previously constructed converter stations in order that it can accommodate the final design.

3.1.3 The proposed converter station comprises a range of specialist electrical equipment some of which must be located within buildings as well as some which can be located outdoors. The height of the buildings which are required takes into account the height of equipment contained within them as well as safety clearances required to construct and maintain the equipment. Indicative plans illustrating the layout of the equipment which make up the proposed converter station are shown in Figure 17.7. These have been included for informative purposes only and do not form part of the planning application.

3.1.4 A description of the main components of the proposed converter station is provided in Table 17.2 below.

Table 17.2 Proposed Converter Station – Key Components

Component	Details	Reference on Figures 17.7 and 17.8
DC switch hall	This contains the termination of the DC onshore underground cables together with HVDC switchgear (specialist DC electrical equipment) to connect these to the power electronics. This equipment can be enclosed in a building up to 24 m high or located outdoors.	1
Valve halls and AC reactor (ancillary equipment)	This contains high voltage power electronics equipment that converts electricity from DC to AC and vice-versa. This is located indoors in buildings up to 24 m high. It also contains specialist equipment to control the environmental conditions within the building.	2

Table 17.2 Proposed Converter Station – Key Components		
Component	**Details**	**Reference on Figures 17.7 and 17.8**
Control building	This contains control panels and associated operator stations for operating the converter station as well as protection and communication equipment. Offices, welfare facilities and other auxiliary systems are also located within the control building.	3
Cooling fans	This comprises external fan units located outside of the Valve Halls. The fans are used to cool down the valves. Power electronic valves may be cooled by water or glycol. Coolant is pumped through the fan units.	4
Transformers	These are normally located outdoors and change the AC voltage electricity between the voltage needed for transmission via the AC transmission system (the NETS) and the voltage needed to connect to the power electronic equipment for conversion from AC to DC within the Valve Halls. The transformers are separated by firewalls.	5
AC switchyard	This connects the proposed converter station to the NETS. It includes a range of electrical equipment which is located outdoors including harmonic filtration and reactive power compensation equipment, circuit breakers, transformers, busbars, insulators and subject to detailed design shunt reactors. Note, the AC switchyard could be located within a building, however, this is subject to detailed design.	6
Diesel backup Generator	This would be used in the event of a failure of the low voltage electricity supply provided by the Distribution Network Operator (DNO).	7
Spare parts building	This building houses spare parts and components. Adjacent hardstanding areas provide storage for a spare transformer and spare cable drums.	8

3.2 The Proposed Converter Station – Base Design

Layout

3.2.1 The proposed converter station site layout is illustrated in Figure 17.9. It comprises a number of zones which make up the proposed converter station. These zones are described in Table 17.3. The proposed converter station comprises four main zones: building and electrical equipment, perimeter road, hardstanding and security zones (in combination these are referred to as the

proposed converter station zone). Outside these zones, the proposed site comprises ancillary zones including landscape planting, attenuation, hardstanding and the reinstated zones.

3.2.2 It should be noted that all of the zones are based on the maximum area required to accommodate a converter station and could reduce through the detailed design following appointment of a Contractor.

Table 17.3 Proposed Converter Station – Assessment Parameters

Zone	Description	Maximum area (m^2)
(1) Building and outdoor electrical equipment zone	This comprises two areas which have been defined based on the maximum heights of the building(s) and/or outdoor electrical equipment which could be constructed within them. • Sub-zone A to the north of the converter station zone containing buildings up to 16 m tall and/or outdoor electrical equipment up to 24m tall. This would include components such as the transformers and AC switchyard. • Sub-zone B to the south of the converter station zone containing buildings and/or outdoor electrical equipment up to 24 m tall. This would include components such as the DC switch hall, valve halls and AC reactor.	48,000
(2) Perimeter road zone	This comprises a permanent perimeter road which would form a continuous circuit around the converter station to facilitate access. It has been defined taking into account the largest vehicles which will require access to the site as well as appropriate clearances.	17,200
(3) Security zone	This comprises an 8 m wide 'buffer' zone within which security fencing would be erected. This provides clearance between the perimeter road and landscape zones. It would include security fencing up to 3.5 m tall and incorporate security gates for pedestrian and vehicle access/egress to/from the site. CCTV cameras will also be installed at regular intervals.	8,500
(4) Additional hardstanding zone	This comprises an area for permanent car parking for up to twenty vehicles as well as an area of hardstanding to provide a permanent laydown area for the storage of equipment and plant as well as providing an area to be used for siting of temporary offices and welfare facilities in the event of future maintenance activities. Part of the hardstanding will be within the security zone and the remainder will be situated outside of the security fence.	14,200

Table 17.3 Proposed Converter Station – Assessment Parameters		
Zone	**Description**	**Maximum area (m^2)**
(5) Reinstated zone	This comprises all areas within the site which are not required for permanent development. The reinstated zone lies to the east of the converter station and could potentially be returned to agricultural use. The reinstated areas to the north and south of the converter station would be seeded but would not be returned to agricultural use.	108,300
(6) Attenuation zone	This comprises an area of the site which would be used to establish an attenuation pond as part of the permanent drainage scheme. The pond(s) have been sized based on estimated runoff rates from the developed areas to establish the maximum area required.	10,900
(7) Landscape planting zone	This comprises a variable 30-40 m wide 'buffer' zone which follows the perimeter of the converter station site. Within this zone a combination of earthworks and landscape planting will provide permanent landscape screening. Further detail is illustrated in a landscape masterplan in Figure 17.14.	89,600

3.2.3 Figures 17.10 and 17.11 illustrates indicative plans showing how the detailed design of a converter station could be developed within the layout of the base scheme design. These have been included for informative purposes only and do not form part of the planning application.

Scale

3.2.4 The base design has been developed to accommodate the proposed converter station based on the maximum dimensions, in particular the height of the buildings and outdoor electrical equipment which could be constructed by the Contractor as part of their detailed design. As noted above the height of the buildings which are required takes into account the height of equipment contained within them as well as safety clearances required to construct and maintain the equipment.

3.2.5 The indicative dimensions of the key components of the proposed converter station are set out in Table 17.4 below. Note that for some of the components the maximum heights of buildings and /or equipment have been provided (denoted by '*'). Indicative cross sections are illustrated in Figure 17.12.

Table 17.4 Proposed Converter Station – Key Components Indicative Dimensions						
Component	**Sub-zone**	**In / Outdoor**	**No. of Units**	**Dimensions (m)**	**Footprint (m^2)**	**Height (m)**
DC switch hall	B	Indoor or Outdoor	One	140 by 40	5,600	24*

Table 17.4 Proposed Converter Station – Key Components Indicative Dimensions						
Component	Sub-zone	In / Outdoor	No. of Units	Dimensions (m)	Footprint (m^2)	Height (m)
Valve hall	B	Indoor	Two	70 by 45	6,300	24*
AC reactor (ancillary equipment)	B	Indoor or Outdoor	Two	70 by 35	4,900	24*
Control building	A / B	Indoor	One	50 by 20	1,000	15
Cooling fans	B	Outdoor	Two	24 by 15	720	8
Transformer area	A	Outdoor	Two	45 by 20	1,800	16*
Transformers	B	Outdoor	Seven**	15 by 15	1,575	16*
AC switchyard	A	Indoor or Outdoor	One	140 by 35	4,900	24*
Backup diesel generator	A	Outdoor	One	15 by 10	150	5
Spare parts building	A	Indoor	One	35 by 35	1,225	12

* Maximum height of building or outdoor electrical equipment (as per parameters set by Zone 1).

** Three transformers for each pole plus one spare.

3.2.6 Existing ground levels within the proposed converter station site vary from approximately 2 to 3 mAOD. Within the proposed converter station zone it is proposed to re-profile the ground in order to form a level platform on which construction will take place. The ground level will be re-profiled so that zone 1 (building and electrical equipment zone) is located at 2.9 mAOD with zones 2, 3 and part of 4 slightly below this. An initial cut / fill exercise has been undertaken and it indicates that to establish this re-profiled ground level approximately 21,000 m^3 of material will require to be imported to site. Exact amounts of material to be imported will required to be confirmed prior to construction. All of the maximum heights described above in Table 17.4 are in addition to the re-profiled ground level. Land outside of the proposed converter station zone on the eastern part of the site will be re-profiled to approximately 2 mAOD as part of site establishment.

3.2.7 The permanent access road will be constructed to 2.7 mAOD. This will reduce the risk of flooding but will also allow agricultural traffic to cross the access road at agreed crossing locations with limited impact on the movement of vehicles or adjacent agricultural activities.

Appearance

3.2.8 The building units which make up the proposed converter station will be constructed to a similar specification in terms of their materials and colours. Details of the proposed appearance of the converter station are described in the Design Code (Ref 17.3) which sets out design principles to be followed in finalising the detailed design relation to architectural design, materials and colours. These are intended to help reduce the potential visual impact of the proposed converter station by breaking up its scale and mass.

3.2.9 Outdoor electrical equipment will be similar in appearance to the equipment which is present in a typical substation for example the outdoor electrical equipment at the existing Bicker Fen 400kV Substation.

Access

Permanent Access and Parking Provision

3.2.10 Access to the proposed converter station will be provided by a new 2.8 km long permanent access road from the existing public highway network (A52). The proposed permanent access road includes a new junction with the A52, a new bridge crossing of the Hammond Beck, culvert crossings of other drains and a new junction with North Ing Drove. It is up to 6 m wide enabling two-way traffic flows as well as movements of Heavy Goods Vehicles (HGVs) and Abnormal Indivisible Loads (AILs). Only one-way traffic flows will be permitted when AILs are accessing or egressing the site. It will require some land raising to reduce the risk of flooding. A plan of the permanent access road, including the proposed junction arrangement where it connects to the A52 is illustrated in Figure 17.13. Further details are provided as part of the planning application.

3.2.11 A wooden post and wire fence will be installed on both sides of the access road with field gates located at a number of locations to provide ongoing access to landowners using adjacent fields for agriculture. Secured field gates will also be installed immediately off the A52 and at North Ing Drove in order to prevent unauthorised use of the road. A permanent security gate will be installed in the security zone where the access road approaches the proposed converter station.

3.2.12 In addition to the permanent access road there will be internal roads within the proposed converter station; this includes the perimeter road zone as well as internal roads between buildings and outdoor electrical equipment. These will be used to provide permanent access to the buildings and outdoor electrical equipment for regular inspections, maintenance and unplanned repairs should they be required.

3.2.13 Provision for car parking and vehicle turning is also included within the additional hardstanding zone. Up to twenty car parking spaces will be located to the south east of the proposed converter station. These are for the use of operations and/or maintenance staff who will be required to operate, monitor and maintain electrical equipment and plant.

Construction of the Permanent Access

3.2.14 To enable construction of the access road a temporary construction compound with a footprint of approximately 1 ha will be established close to the junction with the A52. The location of this is illustrated in Figure 17.13. This compound will be left in-situ for the duration of the construction period so that it may be used for overspill storage and temporary stacking of vehicles delivering material and equipment to the converter station site.

3.2.15 With the exception of the Hammond Beck crossing, which requires a larger temporary working area, construction of the access road will occur within a 16 m wide corridor which is located at least 5 m away from the drains it runs parallel to. Construction of the bridge crossing will occur within an area of approximately 0.4 ha (0.004 km^2). It will also require temporary access via an existing field track from North Ing Drove to the western side of Hammond Beck. This will only be used to provide access during construction of the access road. After its completion all construction traffic will use the permanent access road.

Landscaping

3.2.16 A landscape plan illustrating the location and extent of proposed landscape planting is contained in Figure 17.14. The landscape mitigation is predominantly made up of woodland and woodland edge planting around the perimeter of the proposed site. There will be breaks in the perimeter planting to accommodate the AC and DC cables as well as the permanent access road. In key locations to enhance the screening effect of the landscape planting bunds up to 2.5 m are also proposed. Within the proposed site, the landscape planting comprises wildflower grass seed mix in the reinstatement zone and a wetland and pond edge wildflower mix in the attenuation zone.

Drainage

3.2.17 Details of the proposed drainage scheme are described in the Outline Drainage Strategy (Ref 17.7). It is proposed to convey surface water runoff to onsite attenuation pond which will be located within the attenuation zone. The detailed design of the attenuation pond will be finalised by the Contractor, however, the attenuation zone has been sized to accommodate the largest pond based on the maximum extents of the proposed converter station. The attenuation pond will drain to either the adjacent Mill Drain or the North Ing Drive Drain at a flow rate to be agreed with the IDB.

Lighting

3.2.18 Lighting will be required at the proposed converter station site for safety and security. The lighting scheme will include directional and where practical low-level lighting to limit potential nuisance to neighbouring properties. During periods of low light and/or darkness lighting will activate when personnel enter or exit the converter station or the site security gates are open.

Security lighting will be installed at the perimeter of the converter station zone and will be configurable to activate on alarm only or be motion activated during periods of low light/darkness.

Security

3.2.19 As described in Table 17.3 fencing will be erected in the security zone. This will comprise a 3 m high mesh security fence with 0.5 m high barbed wire affixed to the top (giving a total height of 3.5 m). The fencing will also incorporate security gates for pedestrian and vehicle access/egress. At the base of the fencing a concrete anti-burrow cill will be installed. In addition CCTV cameras will be positioned along the fence at regular intervals. These will be set back at least 3 m from the fence line and be positioned on top of 4.5 m high lattice towers.

Reinstated Land

3.2.20 Approximately 10.83 ha (0.1083 km^2) of land within the site will be reinstated following construction. This includes small parcels of land to the north and south of the proposed converter station zone and a larger area to the east. This larger area will be separated from the converter station and contained by a post and wire fence. It may be returned to agricultural use following completion of construction or otherwise agreed with the landowner and SHDC. If it is returned to agriculture a short section of access track approximately 0.15 km long will be constructed from the permanent access road to the reinstated zone in order to provide access to this area for farming.

3.3 Design Mitigation Measures

3.3.1 The base design of the UK Onshore Scheme has been developed in parallel with the EIA providing opportunities to embed mitigation measures within the design. Table 17.5 identifies some of the key design measures which have been incorporated into the design of the proposed converter station and therefore form part of the planning application. A detailed register of mitigation which has been incorporated into how the proposed converter station will be designed and constructed is contained within chapter 27.

Table 17.5 Proposed Converter Station – Key Design Mitigation Measures

Environmental Consideration	Description of Design Mitigation
Landscape and visual	Landscape planting is proposed on field boundaries around the proposed converter station. In key locations landscape bunds are proposed to enhance the effectiveness of planting.
	A Design Code has been developed which sets out the principles with which the detailed design must comply. This includes considerations relating to the selection of colours and materials.

Table 17.5 Proposed Converter Station – Key Design Mitigation Measures	
Environmental Consideration	**Description of Design Mitigation**
Operational noise	Noise mitigation, such as acoustic screens and noise enclosures, have been applied to significant noise sources within the proposed converter station.
Flood risk and drainage	Land within the proposed converter station zone will be re-profiled such that it is a minimum of 200 mm above the modelled 1 in 1,000 year flood depth. Along the proposed permanent access road land will also be re-profiled.
	An outline drainage strategy has been developed to ensure surface water runoff generated by the proposed converter station is appropriately attenuated prior to discharge to existing drains.
Pollution prevention	The proposed converter station will include measures such as oil interceptors to ensure potential pollutants are collected and not directly released to the water environment.
Ecology	As much as possible landscape planting and site reinstatement promotes biodiversity through selection of appropriate seed mixes.

3.4 Construction of the Proposed Converter Station

Construction Programme

3.4.1 Construction of the proposed converter station is planned to be undertaken over a period of 24 to 36 months from approximately 2019 to 2022. An indicative construction programme is illustrated in Table 17.6. The exact phasing of some activities will depend on the Contractor and detailed design, however, the general timing and phasing below has been used to inform the EIA.

Table 17.6 Proposed Converter Station – Indicative Construction Programme															
Activity	**2019**			**2020**				**2021**				**2022**			
	2	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Preparatory works including access road construction and site establishment															
Civil construction works including earthworks , foundations and erection of buildings															

Table 17.6 Proposed Converter Station – Indicative Construction Programme															
Activity	2019			2020				2021				2022			
	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Mechanical and electrical works including installation of AC and DC cables															
Testing, commissioning and site reinstatement including landscape planting.															

Construction Activities

3.4.2 Construction of the proposed converter station will comprise a number of activities as set out below:

- Preliminary works: This will include further site investigation and preconstruction surveys required to be undertaken in advance of construction.
- Access road construction: This will include construction of the permanent access road from the A52 to the proposed site including the crossing of the Hammond Beck.
- Site establishment: This includes vegetation clearance, soil removal and establishment of all temporary facilities including site offices, lay down and storage areas and welfare facilities, development of electricity and water supplies and erection of security fencing or hoarding.
- Earthworks: This will include land re-profiling in order to establish a level platform comprised of crushed rock on which the proposed converter station will be constructed.
- Civil engineering works: This will include construction of building foundations, foundations for outdoor electrical equipment development of the site's permanent drainage system and construction of internal roads and car parking arrangements.
- Building works: This will include the construction of all building units including erection of steel frames and cladding.
- Cable installation: This will include the installation of underground DC cables entering the converter station as well as underground AC cables between the converter station and the existing Bicker Fen 400 kV Substation.
- Provision/installation of permanent services: This will include water supplies, foul drainage, low voltage electricity supply and telecommunications.
- Mechanical and electrical works: This will include installation of high voltage AC and DC electrical equipment and transformers.

- Commissioning: Following completion of all construction works there will be a period of commissioning and testing.
- Site Reinstatement & Landscape Works: This will include removal of site offices and temporary facilities, land reinstatement and landscape works.

Construction Arrangements

Site Layout

3.4.3 Figure 17.15 provides an indicative layout of the site during the construction phase. The exact layout will depend on the Contractor appointed to design and construct the proposed converter station. The eastern part of the site, referred to as a temporary construction area, will accommodate temporary construction facilities whilst the construction of the proposed converter station will occur in the western part of the site. This will include a temporary construction compound occupying up to 2 ha (0.02 km^2). It includes provision for:

- Site offices including offices and meeting rooms.
- Staff welfare facilities including portable chemical toilets, kitchen and mess room.
- Storage areas for construction vehicles, plant, equipment and other materials.
- Appropriately bunded areas to be used for the storage of oils and other fuels.
- Wheel washing facilities to be used by construction vehicles and plant.
- Segregated waste management storage areas.
- Car parking for construction staff and site visitors.
- Rock crushing and concrete batching facilities.

3.4.4 As noted above the permanent access road will be constructed first and as such will require an additional temporary construction compound to be established. This additional temporary construction compound will occupy up to 1 ha (0.01 km^2) and will be located close to the junction with the A52. It will be used for providing temporary facilities and storage during construction of the permanent access road. Following completion of the road the compound will be demobilised but the hardstanding left in-situ for the duration of construction of the proposed converter station so that it can be used for overflow and storage. It will be fully reinstated following completion of construction.

Access Arrangements

3.4.5 Access to the site during construction will be provided by the permanent access road. This will be constructed prior to work beginning on the proposed converter station. Vehicles accessing the converter station site will include light vehicles (LVs) (cars and vans) and HGVs or AILs to deliver construction materials, pre-fabricated components (such as precast concrete, electrical switchgear, transformers and busbars); equipment and plant including excavators, bulldozers and cranes; and mobile cranes and hydraulic access platforms required to erect and connect electrical equipment.

Hours of Working

3.4.6 For the purposes of the EIA it has been assumed that construction activities will in general be undertaken during daytime periods. There will be some periods during which out of hours working and/or 24 hour working will be required such as delivery of abnormal loads, during concrete pouring activities or works within buildings once they have been erected.

Staffing & Employment

3.4.7 The number of staff present on site will vary according to the construction phase and activities being undertaken. Due to the nature of the construction works it is likely that staff levels will be at their highest during the earthworks and civil engineering works with up to 150 personnel on site at any one time. Staffing levels will generally decrease as construction is progressed through to the commissioning phase.

Site Environmental Management

3.4.8 During construction, the Contractor will be required to undertake all works in accordance with a Construction Environmental Management Plan (CEMP) (Ref 17.8). As a minimum, the CEMP will implement the mitigation measures identified within this Environmental Statement (ES). The CEMP will set out a variety of control measures for mitigating the potential environmental effects of construction works including control and management of noise, dust, surface water runoff, waste and pollution control.

3.4.9 The Contractor will employ an Environmental Clerk of Works (ECoW) who will be responsible for the implementation of the CEMP. The ECoW will be supported by environmental specialists such as ecologists or archaeologists as required.

3.5 Operation of the Proposed Converter Station

General Operation

3.5.1 Following a period of commissioning and testing the proposed converter station will operate continuously throughout the year. Whether it is importing electricity (converting DC to AC) or exporting electricity (converting AC to DC) will depend on supply and demand of and for electricity in Great Britain and Denmark.

Regular Maintenance

3.5.2 Maintenance works and inspections will be undertaken periodically during operation. Typically this will require staff to access the site in cars and/or vans. The frequency and duration of maintenance activities and safety checks will be dependent on the Contractor's recommendations for the equipment installed.

Unplanned Maintenance

3.5.3 In the event of a breakdown corrective repairs would be required. These repairs could occur at any time and for this reason 24/7 access to the proposed site would be required for all vehicle types including HGVs and AILs. Dependent on the nature of the breakdown temporary accommodation such as site offices may be required on site. If required these would be located within the additional hardstanding zone at the southern side of the proposed converter station.

Staffing & Employment

3.5.4 The proposed converter station will be operated by a small team based on site with a minimum of two operators present at all times. During normal operation there will be approximately six personnel on site, divided between three shifts over a 24-hour period. During maintenance (planned and unplanned) the number of personnel present on site would increase with the number of staff proportionate to the nature of the maintenance works being undertaken.

Emissions from the Converter Station

3.5.5 During general operation the proposed converter station will not generate significant emissions to air, water or soil. Rainfall within the site will be collected, treated and drained via the drainage system described above.

3.5.6 Backup diesel generators will be present on the proposed site. These will only be operated in the event of a fault with the converter station's power supply, however, they will require to be regularly tested. Whilst operation of diesel backup generators will result in some emissions of Sulphur Oxide (SOx), Nitrogen Oxide (NOx) and Particulate Matter (PM) to air these are considered to be negligible.

3.5.7 Sulphur hexafluoride (SF6) will be utilised in the proposed converter station for electrical insulation purposes. It is an extremely effective electrical insulator that has significant advantages over alternative materials. It is non-flammable, a critical requirement in the high-voltage applications for which it is used, and because of its effectiveness, takes up less volume than an equivalent insulating volume of an oil alternative. The volume of SF6 present will depend on the detailed design of the proposed converter station; should Gas Insulated Switchgear (GIS) be used as an alternative to Air Insulated Switchgear (AIS) the volume of SF6 required would increase. All SF6 insulated switchgear is fully tested in the factory by a gas leakage detector to ensure that as far as reasonably practicable there is no leakage from any of the components, however, during operation of the proposed converter station some minor leakage may occur. During operation of the proposed converter station minor trace amounts of SF6 may be released.

3.6 Decommissioning of the Proposed Converter Station

3.6.1 The anticipated operational life of the proposed converter station is approximately 40 years. It is likely that during this period refurbishment and plant replacement will extend the life of the

converter station rather than decommissioning taking place. In the event that Viking Link ceases operation the proposed converter station would be decommissioned.

3.6.2 The scale and nature of activities undertaken would be similar to those described previously for construction in section 3.4. The main components would be dismantled and removed for recycling wherever possible. Where this is not possible disposal would be undertaken in accordance with the relevant waste disposal regulations at the time of decommissioning.

3.7 Proposed AC Cable Route

Physical Characteristics

3.7.1 Table 17.7 provides a description of the key physical and technical characteristics of the proposed AC underground cable.

Table 17.7 Proposed AC Underground Cable – Key Characteristics

Consideration	Description
Operating voltage	400 kV
Route length	Approximately 2.34 km
Working width	Typically 50 m (wider at locations of trenchless crossings)
Permanent easement	Typically 25 m (wider at locations of trenchless crossings)
No. of cables	Six high voltage AC cables and two fibre optic cables
AC cable diameter	Approximately 150 mm
No. of trenches	Two trenches, each containing three AC cables and one fibre optic cable
Trench width	Typically 1.5 m
Trench depth	Typically 1.5 m
Minimum depth of cover	Agricultural land – typically 0.9 m (900 mm) Watercourses – typically 2.0 m (2000 mm) Roads – typically 0.75 m (750 mm)
Backfill material	Soil and cement bound sand (CBS) or other thermally suitable material
Cable section length	Typically 700 m to 1 km (subject to detailed design)
Cable joints	Cable joints and above ground earthing link pillars (up to 4 required)
Fibre optic cable pits	Buried box with inspection cover (up to eight required e.g. every 250 m)

* Note one fibre optic cable which provides communications between the proposed converter station and the existing Bicker Fen 400 kV Substation will be laid separately.

3.7.2 The proposed AC cables will be laid in sections approximately 700 m to 1 km in length. These will be connected at joint bays with above ground earthing link pillars. The exact number of these will depend on the detailed design but it has been assumed up to four could be required. The link

pillars will be located within a small fenced off area. Buried inspection boxes for the fibre optic cable will also be required (it has been assumed up to eight could be required), however, these will be flush to the ground or buried at the same depth as the cables.

Route Description

3.7.3 Following identification of the preferred AC cable route it was modified in consultation with landowners. The proposed AC cable route is illustrated in Figure 17.16. The AC route is approximately 2.34 km long. It follows as direct a route as possible taking into account the environmental and engineering constraints which are present between the proposed converter station and the connection point at the existing Bicker Fen 400 kV Substation. The route exits the proposed converter station site at its north eastern boundary and terminates at the Bicker Fen 400kV Substation at it eastern boundary. The AC route splits in two with section proposed to connect to switch bays in the south and north of the connection point. Approximately 1.21 km of the proposed AC cable route lies within SHDC and 1.13 km within BBC. The proposed AC cable route is within open agricultural land with a short section within an area of boggy, vegetated ground to the east of Bicker Fen 400 kV Substation. The route requires a small number of crossings including crossings of drains and Vicarage Drove; these are identified in Appendix 17.1. Within the application boundary allowance has been made for a Temporary Works Area (TWA) adjacent to the existing Bicker Fen 400 kV Substation.

Installation of the AC Cable

3.7.4 The proposed AC cable route is defined by a 150 m wide corridor within which the 50 m working width required for AC cable installation will be established. Details of the working width are contained in Figure 17.17. It comprises:

- Two trenches within which AC and fibre optic cables will be laid.
- Temporary access road to allow movement of construction traffic along the AC cable route.
- Areas for temporary storage and management of excavated top and sub soils.
- Areas for temporary drainage and water management.

3.7.5 The proposed AC cable route will be installed by a combination of open cut and trenchless methods. Open cut methods will be utilised in open agricultural land. A detailed description of these methods is contained in chapter 5. A schedule of crossings which are required as part of the AC cable route is included in Appendix 17.1.

3.7.6 The majority of obstacles encountered will be crossed using trenchless methods with the exception of unnamed drains closer to the connection point which may be crossed using open cut methods. This is because closer to the existing Bicker Fen 400 kV Substation there are a number of buried utilities present and open cut methods will ensure that these can be avoided.

Operation of the AC Cable

3.7.7 Following completion of construction a 25 m wide permanent easement will apply to land over and adjacent to the proposed AC underground cable (e.g. 12.5 m either side of the proposed route). The purpose of the easement is for the protection and maintenance of the proposed AC cables during the Project's operation. Note that the easement will need to be widened above trenchless crossings where underground cables need to be spaced further apart to prevent heating effects.

3.7.8 Once operational activity along the proposed AC cable route would generally be limited to non-intrusive inspections and cable repairs. The latter would only be required in the unlikely event of a cable fault. Where a fault does occur the location of the fault would be identified and the faulty section of cable replaced. The activities involved in cable repair would be similar to those outlined above for installation albeit over a much smaller section.

Decommissioning of the AC Cable

3.7.9 In the event that the Project ceases operation the proposed underground AC cable would be decommissioned. Dependent on the prevailing requirements the redundant cables could either be left in-situ or all or parts of the cables could be removed for recycling. Where this is not possible removed cables would disposed of in accordance with the relevant waste disposal regulations at the time of decommissioning.

4 References

Ref 17.1 Infrastructure Planning Commission (February 2011) Advice Note Nine: Rochdale Envelope

Ref 17.2 National Grid Viking Link (August 2017) Design and Access Statement

Ref 17.3 National Grid Viking Link (August 2017) Design Code

Ref 17.4 Environment Agency (accessed June 2017) Flood Map for Planning

Ref 17.5 National Grid Viking Link (August 2017) Environmental Statement Appendix 23

Ref 17.6 National Grid Viking Link (August 2017) Environmental Statement Appendix 20

Ref 17.7 National Grid Viking Link (August 2017) Outline Drainage Strategy

Ref 17.8 National Grid Viking Link (August 2017) Outline Construction Environmental Management Plan

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