Volume 3A
Non Technical Summary

Celtic Interconnector

March 2021

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Introduction

The Celtic Interconnector[1] project will create an electrical interconnection between Ireland and France to allow the exchange of electricity between the two countries. It is being developed by EirGrid, the electricity Transmission System Operator (TSO) in Ireland, and its French counterpart, RTE (Réseau de Transport d'Électricité).

Recognised as a Project of Common Interest (PCI) by the European Union, the Celtic Interconnector project responds to European challenges by facilitating progress towards a low-carbon electricity mix and contributing to more secure, more sustainable and better priced electricity.

The main elements of the Celtic Interconnector project are:

- A High Voltage Direct Current (HVDC) submarine cable of approximately 500 km in length laid between the Ceinture Dorée coast in Brittany France, and the Cork coast in Ireland. The submarine cable will be either buried beneath the seabed or laid on the seabed and covered for protection;
- A landfall location in Ireland and France, where the HVDC submarine circuit will come onshore and terminate at a transition joint bay;
- A HVDC underground cable (UGC) in both countries between the landfall location and a converter station compound;
- A converter station to convert the electricity from HVDC to High Voltage Alternating Current (HVAC) and vice versa;
- A HVAC UGC in both countries between the converter station compound and the connection point to the National Grid;
- A connection to the National grid; and,
- A fibre optic link, with associated power supply, will also be laid along the route for operational control, communication and telemetry purposes.

The key elements of the project are illustrated in Figure 0.1 and Figure 0.2.

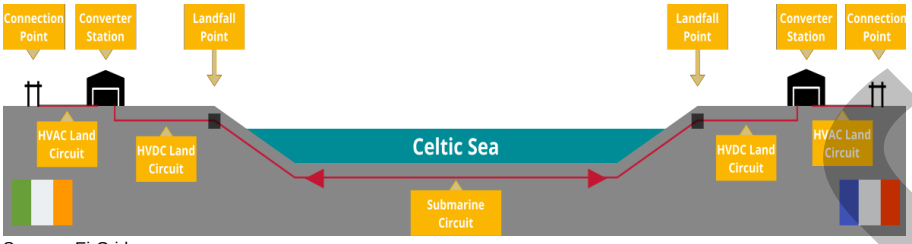
Following pre-application consultation between EirGrid and the Irish Competent Authorities for the onshore element (An Bord Pleanála) and the offshore element (the Foreshore Unit of the Department of Housing, Local Government and Heritage) of the project, it has been agreed that Environmental Impact Assessment Reports (EIARs) will accompany the separate consent applications to assist the Irish Competent Authorities in carrying out EIA for these project elements.

This document is a non-technical summary providing a brief overview of the associated impacts and mitigation of the onshore elements of the Celtic Interconnector within for the Irish planning jurisdiction i.e. land – based elements. It is recommended that the planning drawings (Volume 1B) and the main EIAR document (Volume 3C) are reviewed in order to obtain detailed information.

Information on associated impacts and mitigation of the elements of the Celtic Interconnector within the Irish jurisdiction for the foreshore and offshore elements is available in Volume 3B (the Non Technical Summary) and Volume 3D (the EIAR).

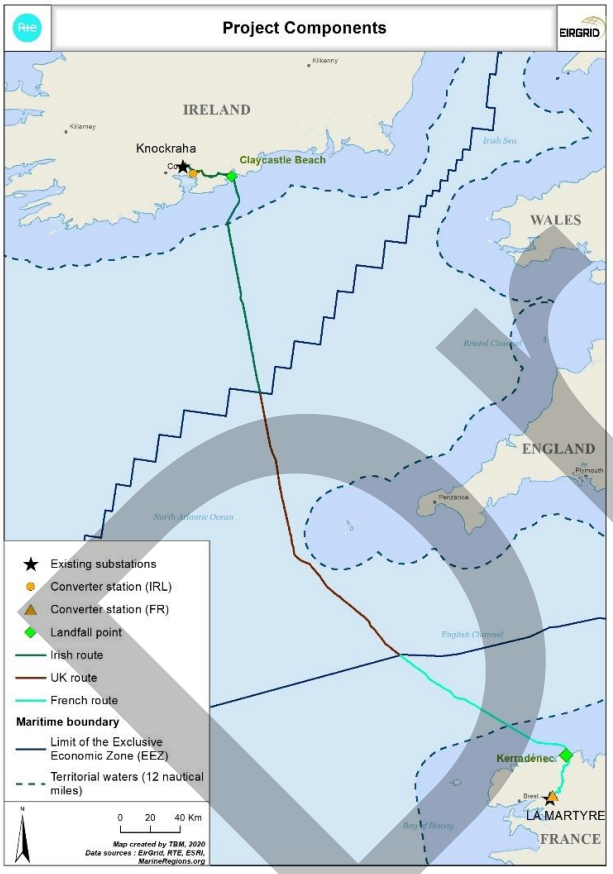
[1] An interconnector is an electrical transmission connection which crosses or spans a border between countries connecting the transmission systems of those countries.

Figure 0.1: Celtic Interconnector (Project Overview)



Source: EirGrid

Figure 0.2: The Celtic Interconnector



Source: TBM Consulting Group

Alternatives Considered

The Irish onshore elements of the Celtic interconnector project have been developed in accordance with EirGrid's bespoke six-step Framework for Grid Development, as presented in Figure 0.3.

Figure 0.3: EirGrid Six-Step Framework for Grid Development

Source: EirGrid

In accordance with EirGrid's Framework, a comprehensive and consistent multi criteria analysis was applied to decision making at various stages of project development, including in considering a variety of alternatives. The multi criteria analysis facilitated a balanced consideration of the following criteria relating to project development.

- Environmental;
- Socio-Economic;
- Technical;
- Deliverability; and
- Economic.

The alternatives considered for the onshore (land) elements of the project are presented in the reports below which are appended to Appendix 1 of EIAR Volume 3C Part 2. The reports are also available to view on EirGrid's project website[2].

- Feasibility Study - Converter Station Site & Route Identification in Ireland (ESBI, 2016)
- Network Analysis Celtic Interconnector Feasibility Study (EirGrid, November 2016)
- Step 3 Onshore Constraints Report (Mott MacDonald, April 2019)
- Step 3 - Performance Matrix Assessments (EirGrid, Spring 2019)
- Offshore Constraints Report (Wood, April 2019)
- Step 4 Consultation Report (Traverse, April 2020)
- Step 3 Preferred Options Report (Mott MacDonald, August 2019)
- Step 4A Consultant's Development Options Report (Mott MacDonald, November 2019)
- Step 4 Project Update Document (EirGrid, Spring 2020)
- Step 4B Consultant's Development Options Report (Mott MacDonald, November 2020)

Do Nothing Scenario

Non-implementation of the Celtic Interconnector project would mean foregoing its benefits and slowing down the development of renewable energy required to combat climate change.

Alternative proposals would likely be developed at the proposed site of the converter station compound within IDA owned lands zoned for Industrial use at Ballyadam in County Cork.

[2] Related Documents (eirgridgroup.com) (https://www.eirgridgroup.com/the-grid/projects/celtic-interconnector/related-documents/index.xml)

Connection to the Irish Transmission Network

A Step 2 feasibility study carried out by EirGrid in 2016 considered the substations at Knockraha in County Cork and Great Island in County Wexford as potential connection points for the Celtic interconnector project to the Irish national grid. The analysis undertaken concluded that the transmission system can accommodate the potential power flows from the Celtic Interconnector significantly better by way of the connection point at Knockraha rather than a connection point at Great Island. Knockraha 220 kV substation was subsequently identified as the connection point for the Celtic Interconnector project to the Irish national grid.

Landfall Options

Following identification of Knockraha substation as the connection point, the following landfall options in the East Cork area were further considered:

- Inch Beach
- Ballycroneen Beach
- Ballinwilling Strand (Western Approach) (BW2)
- Ballinwilling Strand (Eastern Approach) (BW1)
- Redbarn Beach
- Claycastle Beach

Ballinwilling Strand 2, Redbarn Beach and Claycastle Beach landfall location options were shortlisted for further assessment. Claycastle Beach was chosen as the proposed Irish landfall for the submarine cable, primarily due to its offshore approach which follows a sediment channel with sufficient depth to bury the cable and protect it against fishing and shipping without the requirement for rock cutting or external protection (by way of rock placement).

Converter Station Site Options

Ten general location area options (Converter Station Location Areas) for the siting of the converter station were initially identified in 2016. A further four general location area options were identified and considered in 2019. The following seven Converter Station Site (CSS) options within six shortlisted converter station site zones were identified.

- CSS 1 Ballyadam;
- CSS 6 Leamlara;
- CSS 9A Knockraha;
- CSS 9B Knockraha;
- CSS 10 Pigeon Hill;
- CSS 12 Kilquane (Meeleen); and
- CSS 14 Ballyvatta.

In 2020, having reviewed and considered the outcomes of the assessment process from a multi-criteria perspective, as well as considering public and stakeholder feedback in respect of the options, and having undertaken technical, environmental and other analysis of the site options under consideration, the Ballyadam site was identified for the siting of the converter station.

In presenting this decision, the report cited social and deliverability aspects and management of challenges through technical and site design. This demonstrates the relevance and importance of undertaking a multi-criteria approach to project decision-making, as per EirGrid's Framework for Grid Development.

Onshore HVAC Route Selection

A HVAC connection is required between the proposed CSS at Ballyadam and the identified connection point at Knockraha. Given the length of any UGC route along relatively narrow local roads, and the need for the UGC to cross under the existing live railway line, there are a number of challenges associated with this HVAC connection. A number of options were therefore considered, as outlined below:

- A 220 kV UGC in a two cables per phase arrangement.
- A 400 kV UGC.
- A 220 kV double circuit overhead line (OHL) 'loop in' plus a 220 kV single cable per phase UGC.

The 220 kV "loop-in" was not considered further due to its performance against environmental, social, technical, deliverability and economic criteria, when compared with the 220 kV and 400 kV UGC options.

The 220 kV UGC option would require a trench width of approximately 2m. The 400 kV UGC option would require a trench width of approximately 1m.

Due to cross-country routing requirements, more hedgerow removal and more drain crossings would be required to facilitate the 220 kV option when compared with the 400 kV option. As the majority of the 400 kV option would be constructed in the road it is also preferred from a cultural heritage perspective. The 400 kV HVAC tail option was subsequently identified for the HVAC land circuit connection.

Onshore HVDC Route Selection

The N25 National Road between Carrigtwohilll and Midleton is planned for major upgrading, including widening to full dual carriageway status, and provision of a new or modified interchange in the vicinity of the IDA site at Ballyadam. Installing the DC cable within the N25 corridor in advance of these major planned construction and upgrading works would inevitably form a significant and adverse constraint to the road project as the cable would have to be fully assured of protection within what will comprise a major construction site. Bringing the UGC off the N25 through the core built-up area of Midleton would also unduly impact on this town; particularly in terms of traffic disruption, disturbance and nuisance, and conflict with existing services, for no meaningful benefit in comparison with use of an alternative local road route. Consequently, the proposed HVDC route will follow a local road route to the east and north of Midleton, extending north and north-westwards off the N25 at Churchtown (Two Mile Inn).

The Greenway along the disused Midleton to Youghal railway line is being developed by Cork County Council. This is occurring under licence, with the ownership of the alignment remaining with Iarnród Éireann. The duration of the lease is likely to be in the order of 15-20 years. The design life of a circuit such as the Celtic Interconnector is in the order of 40-60 years. While engagement with the Cork County Council Greenway development team will continue in terms of crossings of the Greenway by the HVDC cable at a number of locations along its route, it remains the case that the Greenway is not of itself a preferred option for routing the HVDC land circuit of the Celtic Interconnector, relative to a route primarily within the public road, given its potential future use as an operational rail corridor.

EirGrid has undertaken significant engagement with the communities of Castlemartyr and Killeagh, two villages on the N25 which require to be traversed by the HVDC UGC. It is clear, both from this engagement, and from technical and environmental studies undertaken to date, that routing a HVDC cable circuit through both villages presents particular issues. EirGrid has also received ongoing feedback from the community representatives of the two villages favouring a solution which minimised disruption and nuisance for the village cores in the laying

of the UGC. For these reasons cross-country UGC alignments around Castlemartyr and Killeagh are proposed.

Ballyvergan Marsh

Due to structural constraints associated with the railway bridge to the north of Claycastle Beach, it is necessary to divert the onshore (land) cable off road for approximately 160m under the proposed Mildleton to Youghal Greenway (currently under construction).

Approximately 65 metres of the 241 metres of land cable will be installed within Ballyvergan Marsh pNHA (site code 000078) to the west of the railway bridge. Installation of the cable to the east of the railway bridge was considered, however, there is insufficient space in the verge to facilitate the required works.

Project Need

As a PCI, the Celtic Interconnector project has been identified as meeting the criteria detailed in Article 4 of the EU Regulation 347/2013 on guidelines for trans-European energy infrastructure i.e. the project contributes significantly to at least one of the following specific criteria:

- Market integration, inter alia through lifting the isolation of at least one Member State and reducing energy infrastructure bottlenecks; competition and system flexibility;
- Sustainability, inter alia through the integration of renewable energy into the grid and the transmission of renewable generation to major consumption centres and storage sites; and,
- Security of supply, inter alia through interoperability, appropriate connections and secure and reliable system operation.

The Celtic Interconnector will:

- **Facilitate an increase in the use of renewable energy**: an interconnection between Ireland and the continent will increase the integration of renewable energy at the European level and enable France and Ireland to move forward in terms of the energy transition (in line with national policies in respect of the development of renewables);
- **Provide security of supply**: pooling resources will enable both countries to better cope with contingencies and spikes in electricity consumption. Interconnection will promote mutual assistance between both countries and will work in both directions;
- **Improve European solidarity on energy**: the Celtic Interconnector project will be a benchmark project in terms of European Solidarity on energy. It will enable Ireland to benefit directly from the European integrated electricity market. The Celtic Interconnector will be Ireland's only direct transmission link with another Member State of the European Union;
- **Promote the movement of electricity flows at a European level**: by promoting the movement of electricity in Ireland, in France and throughout all of continental Europe, the Celtic Interconnector will enable European consumers to benefit from a more open electricity market; and
- **Support the development of a more sustainable electricity mix in France and in Ireland**: The Celtic Interconnector will contribute to European objectives of a low-carbon energy future, promoting the development of other renewable energy sources and their integration into the European electricity system.

In this context, the project enjoys strong support from both the French and Irish governments, as well as from the European Commission. Of particular note in this regard, the completion of the project is specifically included in the current Programme for Government.

Project Overview

The Celtic interconnector will connect to the Irish electricity transmission system at Knockraha substation in County Cork via a High Voltage Alternating Current (HVAC) underground cable of approximately 11km in length. Alternating current (AC) is the technology utilised on the Irish electricity transmission network.

Commented [DH1]: **TO BE CONFIRMED IN FINAL APPLICATION FILE**

Electricity is best carried over long distances by means of HVDC technology. As such, a HVDC submarine cable will connect to a HVDC onshore underground cable at a Transmission Joint Bay (TJB) north of the car park at Claycastle Beach near Youghal in County Cork. The HVDC onshore UGC is approximately 32km in length.

Commented [DH2]: **TO BE CONFIRMED IN FINAL APPLICATION FILE**

The majority of the HVAC and HVDC underground cables (UGCs) will be installed within the existing public road network. Off-road (cross-country) routes are proposed at particular locations to avoid constraints. In particular, these include:-

- The villages of Killeagh and Castlemartyr will be avoided by means of cross-country routing; this will minimise disruption and nuisance for these villages, their residents and communities, and for traffic passing through the villages which are both located on the N25 Cork-Waterford-Wexford / Rosslare National route.
- North of Claycastle Beach where, due to structural constraints associated with an existing narrow railway bridge, it is necessary to divert the UGC off road for approximately 241 metres in the area of, and under, the planned Midleton to Youghal Greenway (currently under construction). Approximately 65 metres of the 241 metres of land cable for this off-road section will be installed within Ballyvergan Marsh proposed Natural Heritage Area (pNHA) (site code 000078).

The HVAC and the HVDC UGCs will terminate at a proposed converter station compound on a brownfield site within the Industrial Development Authority (IDA) development landholding at Ballyadam, between Carrigtwohill and Midleton, East Cork.

As the name suggests, the converter station will convert HVDC electricity to HVAC, and vice versa. The converter station compound and ESB substation will measure approximately 3.6 hectares. The converter station compound will measure approximately 250m x 150m and include three main buildings, the tallest element being up to 25m in height. The compound will also include associated and ancillary development such as electrical equipment and apparatus, stores and other buildings, drainage, road and landscaping infrastructure.

Commented [DH3]: **TO BE CONFIRMED IN FINAL APPLICATION FILE**

Figure 0.3 below illustrates the geographical context of the proposed development in the Irish Onshore section of the Celtic Interconnector project.

Cable trenches will be excavated (as noted above these will primarily be within or at the verge of public roads), and ducts will be installed, with the road reinstated. The UGC will be delivered to site on drums and will be pulled through the cable ducts. Fibre optic cables will also be laid along with the electricity cables.

Joint bays (underground chambers) will also be constructed along the cable routes, and are used to join together ('joint') consecutive lengths of cable and to facilitate the cable pulling. Typically, joint bay separation for a HVAC cable is between approximately 500m and 850m and joint bay separation for a HVDC cable is between approximately 750 to 1000 metres.

To facilitate traffic management at locations where joint bays are to be located within the carriageway, the use of temporary passing bays is proposed. These are off-road strips of land on one side of a joint bay (approximately 50-80m in length), that are cleared and can facilitate vehicle movements around the joint bay, thereby avoiding or minimising the need for road closures. The creation of a passing bay is carried out prior to the commencement of joint bay construction. This will entail removing the top layer of ground to the side of the carriageway

(including hedges where present) and temporarily storing it local to the site for reinstatement following the works. New hedges will be planted as part of re-instatement works, where practicable.

Figure 0.4: The Proposed Development

Source: Mott MacDonald

Other traffic control measures will also be implemented as appropriate along the cable routes. These are likely to include road diversions, temporary closures and stop / go traffic management. All traffic management measures will be implemented in the context that the laying of UGC is a linear construction process, generally at a rate of approximately 50m per day for public roads where there are generally little or no access constraints, and at a rate of approximately 20m per day on more constrained local roads.

A number of crossings of watercourses, drainage ditches, utilities, railway lines and the Midleton to Youghal Greenway will also be required along the cable route. These crossings will be facilitated by either open cut trenching or by use of Horizontal Directional Drilling (HDD) as and when appropriate. The specific detail of each crossing will be developed by the appointed contractor.

Laydown areas, where construction materials can be temporarily stored, and construction compounds, where welfare facilities can be provided, will also be provided along the route.

The converter station, and sections of the cable routes, are located within areas of known karst (soluble rock) features. Karst regions typically contain un-mapped underground draining systems with sinkholes and caves.

The proposed converter station site at Ballyadam is zoned for industrial use and was formerly intended for the location of the Amgen biotechnology manufacturing facility. Prior to 2007, the site was in agricultural use. Following grant of consent, between ca. 2007 and 2009, the site

was prepared for development. Extensive clearance of surface vegetation was carried out (with the exception of the woodland on a knoll to the south of the site) and substantial earthworks were undertaken. Stone / gravel was imported for roads and hardstand areas. The preparatory site works were abandoned in ca. 2009 / 2010, and since then, revegetation has been taking place with grassland vegetation / habitat developing on calcareous soils in recent years. The proposed development site now includes Near Threatened plants, and European protected habitat parcels. Prior to enabling works (and in the appropriate season), these will be moved to a temporary storage area to be located south of the proposed construction compound. Post-construction, these features will be moved from the temporary storage area to their new permanent location.

There are two depressions within the proposed converter station footprint in the north eastern section of the IDA site. It is understood that these were excavated as part of permitted ground improvement works carried out by Amgen and were subsequently abandoned between approximately 2007 and 2009 / 2010. These depressions currently collect rainwater and will be infilled to facilitate development of the converter station. An area of compensatory storage will be developed to replace this storage capacity.

For the converter station construction, it is expected that a peak of approximately 300 Heavy Goods Vehicles (HGV) movements per day will be required during the most intense period of the construction phase. It is also expected that approximately 10 abnormal load movements will be required. Abnormal load deliveries will include elements such as construction cranes, the transport of electricity transformers to the site, and equipment to place the transformers on their plinths.

Vegetation removal will be required to facilitate the works. The removal of hedgerows, treelines or scrub vegetation will not take place from March to August inclusive having regard to the Wildlife Act 1976 S.I. No. 39/1976, as amended (unless a suitably experienced ecologist has determined that nesting birds are absent or otherwise protected from injury or disturbance). Where practicable, vegetation will be re-instated on completion of the works.

The number of construction workers anticipated to be employed during the construction phase is expected to peak at approximately 100 persons for the converter station. Crew sizes for the installation of the cable routes are estimated at approximately 10 persons per crew.

Subject to the grant of statutory approvals, it is anticipated that the construction phase, including finalisation of management plans and discharge of conditions, will commence in Q4 2022. The construction of the converter station, including enabling works and equipment installation, will take approximately 36 months, commencing in Q4 2022. Installation of the land cables is anticipated to take approximately 24 months. Overall, construction of the Celtic Interconnector project is currently anticipated to be complete by 2026. Thereafter, there will be a lengthy period of testing and commissioning prior to full energisation of the Interconnector. Safety requirements for the installation operations / procedures and weather condition will however ultimately dictate the final programme.

The following sections provide a summary of the impact assessments presented in Volume 3C for each topic in turn. Mitigation and monitoring measures are presented separately below.

Population and Human Health

The potential for impacts on population and human health are for the most part associated with the construction phase due to potential nuisance and disturbance impacts (potential noise and dust emissions and traffic) on the receiving environment.

There will be an imperceptible temporary increase in economic spend in the local communities during the works as a result of construction workers spending in the area. It is not expected that

there will be an impact on the demographic profile (population or housing) during the construction phase of the proposed development.

Due to the width of the joint bays and nature of the road network in the area mans that road closures may be required along the route during the construction phase. Accessibility to private properties and lands will be maintained at all times during construction, however there may be potential temporary disruptions. There will be a permanent change in land use due to construction of the converter station site. There will also be increased traffic in the area surrounding the site due to construction vehicles and alteration of access tracks. There will be a temporary negative impact on housing, land use and facilities during the construction phase of the development as the majority of the HVAC / HVDC cable routes follow the existing road alignment. Temporary disruption will be transient in nature and impacts will be brief / temporary in nature.

Construction works at the landfall at Claycastle will result in temporary nuisance in relation to traffic, dust and noise and restricted movements along Claycastle Beach and the car park during the construction phase. There will be temporary to short-term negative impacts on tourism recreation and amenities (such as at Claycastle Beach, and the Midleton – Youghal Greenway) as a result of the proposals due to severance of access and disturbance.

Given the nature of the development, the sensitivity of human health and wellbeing receptors to disturbance impacts is considered to be slight during the construction phase. There will be no significant long-term adverse effects.

Given the nature of the proposals, the potential for impacts on population and human health are for the most part associated with the construction phase. Significant adverse impacts during the operational phase are not likely. There will however be benefits for communities impacted by the proposals due to the proposed community benefit scheme.

Electric and magnetic fields, often referred to as EMFs, are produced both naturally and as a result of human activity. Natural sources of EMFs include the earth's geomagnetic field and electric fields from storm clouds. When electric current flows, both electric and magnetic fields are produced and are present wherever electricity is used, such as in the home or office, and in the vicinity of equipment that makes up the electricity supply system. Independent and authoritative international panels of scientific experts have reviewed studies on possible health effects from EMFs. These have concluded, based on the weight of the evidence available, that the power frequency electric and magnetic fields encountered in normal living and working conditions do not cause adverse health effects in humans when properly designed and constructed. These form the basis for guidelines published by the International Council on Non-Ionising Radiation Protection (ICNIRP) with regard to EMF, to which EirGrid and ESB Networks have strict regard in the design and operation of the transmission system.

Findings from EirGrid's evidence-based EirGrid's evidence-based Environmental Study on EMF (2016)[3] established that;

The maximum magnetic field strength measured at all overhead lines, underground cables and substation perimeters surveyed was well below the ICNIRP public exposure reference level, set to protect public health. Based on the measured data, magnetic field strengths estimated for overhead power lines and underground cables using records of annual load are also well below the ICNIRP reference level to protect public health under typical (mean or median load) and high-power load (95th percentile) conditions. The maximum electric field strength measured at all overhead lines and substation perimeters surveyed was below the ICNIRP reference level to protect public health. Underground cables produce no electric field above ground.

[3] 181601 EirGrid Study 1 EMF Insides.indd (eirgridgroup.com)

In the context of the above evidence, the design of the Celtic Interconnector has ensured that the strength of the electric and magnetic fields during operation of the proposed development will comply with the ICNIRP and EU guidelines on exposure of the general public to EMF.

Air Quality and Climate

A qualitative assessment of construction dust effects has been undertaken for the different construction activities associated with the proposed development. Across the different construction activities, the level of risk of dust creating nuisance and/or loss of amenity and particulate matter (PM_{10}) leading to adverse health effects (without mitigation) is predicted to range from 'negligible' to 'medium risk'. Following the appropriate implementation of the mitigation measures the air quality impacts associated with dust are predicted to be not significant. As the air quality impacts associated with the proposed development are not significant and ambient pollutant concentrations are well below the relevant air quality standards, no exceedances of air quality standards are anticipated.

The greenhouse gases (GHG) assessment considered the embodied carbon of materials used for construction, transport of materials to site, construction plant emissions, and emissions of sulphur hexafluoride (SF_6). through operation. The total emissions associated with the proposed development are estimated to be 39,650tCO_2e. The emissions must be reduced where possible through the later stages of the design, considering the Irish Government's commitment to net zero by 2050 and the impact all GHG emissions have upon the climate. Any increase or decrease in GHG emissions can be considered to be significant based on their effect on the global climate[4]. Considering the overall benefit of the project to facilitate development and use of renewable energy sources, lifetime savings of GHG emissions are anticipated to outweigh the calculated embodied emissions during construction and anticipated SF_6 emissions during operation.

Land, Soils and Hydrogeology

During the construction phase, impacts to land and land use are anticipated to be moderate adverse but localised and temporary in duration, with land use reinstated where practicable after the works are completed. Operational phase impacts are anticipated to be minimal due to the infrequency of maintenance required. Maintenance activities will be carried out predominantly through manholes where embedded mitigation will ensure that access will result in minimal impacts. The residual risk to land and land use is therefore considered to be insignificant.

Impacts to soils and geology are anticipated to be adequately mitigated through the replacement of vegetation and use of compensatory storage. The risk to these receiving environments, once mitigation measures have been implemented, is therefore considered to be insignificant.

For the majority of receptors within the hydrogeological receiving environment, impacts are adequately mitigated with the mitigation embedded in the design, and therefore the residual risk is considered to be insignificant. Several boreholes/water wells are in close proximity to the proposed construction works and are therefore at greater risk of being impacted. However, it is anticipated that the residual risk to these receptors will be insignificant. With the implementation of the embedded and additional mitigation measures proposed, the Irish onshore elements of the Celtic Interconnector project will not result in a change in status of any WFD quality elements or prevent any groundwater bodies from reaching good status in the future.

The small scale of the scheme relative to the magnitude of the Water Framework Directive (WFD) waterbody is deemed to pose a very low risk to the delivery of long term WFD objectives,

[4] IEMA, 2017, Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance

such that no further (additional) assessment is required. A robust CEMP will be in place during construction to ensure that there are no impacts to groundwater quality during construction.

Surface Water, including Flood Risk

Excavation works, the storage of excavated material, vegetation clearance, crossing of watercourses and infilling of trenches can pose a risk to surface water quality through surface water run-off and the release of sediment to watercourses. Ground damage from construction vehicles and machinery can also cause rutting and increased erosion of soils. Access tracks used during construction may affect surface run-off patterns, creating alternative flow paths, promoting erosion and localised flooding. The sensitivity of the receiving surface water environment ranges from low to very high. The magnitude of adverse surface water quality impacts in the absence of additional mitigation is expected to be Small to Moderate resulting in Moderate to Significant adverse impacts of up to short-term duration prior to the implementation of additional mitigation measures.

A number of unnamed watercourses are required to be crossed within the road network. The drainage patterns associated with watercourses confined to existing culverts will not be impacted significantly as a result of the proposals. Open cut trenching will be carried out in the dry. The existence of a temporary impermeable barrier to facilitate open cut trenching will have a direct impact on the cross section of the channel and is expected to give rise to localised but temporary changes in water depth, velocities and sediment erosion/deposition. The proposed activities could result in localised changes to surface water drainage patterns and restrictions to infiltration of rainfall in soils. Given the largely rural locations of the proposed works existing drainage networks are available and any disturbance would be localised and temporary in duration. Surface water contributions would remain unchanged and would likely discharge to the same catchment. Significant construction phase impacts on surface water drainage patterns are not likely. The sensitivity of the receiving surface water environment ranges from low to very high. The magnitude of adverse impacts in the absence of additional mitigation is expected to be Negligible to Small as there could be some localised temporary impacts resulting in Imperceptible to Moderate adverse impacts prior to the implementation of additional mitigation measures.

All reasonable measures will be taken to avoid unplanned disruptions to water services during the proposed works. This will include thorough investigations to identify and reconfirm the location of all utility infrastructure within the works areas, and the implementation of robust procedures when undertaking works around known infrastructure services. Service disruptions impacting the surrounding residential, social and commercial properties will be kept to a minimum, only occurring where unavoidable. Prior notification of disruptions will be given to all impacted properties. This will include information on when disruptions are scheduled to occur and the duration of the disruption. Consultation with relevant neighbouring parties will be undertaken prior to any proposed disruptions.

During the construction phase temporary construction compounds will be required at the connection point (Knockraha substation), the converter station (Ballyadam) and the landfall (the area of the car park at Claycastle Beach). Welfare facilities will be provided at these locations and any discharges will be connected to a sealed holding tank to be emptied and disposed of off-site by a licenced contractor to an approved licenced facility. Water will be tankered onto site as required. Consequently, significant adverse impacts on water services during the construction phase are not likely.

The converter station will be unmanned and so foul wastewater will only be generated on days that maintenance crews are present on site. Foul water will be collected in proprietary holding tanks which will be periodically emptied by a licensed waste disposal contractor. A storm water drainage system incorporating SuDS features will be constructed to manage the quantity and

quality of runoff during rainfall events. Runoff is proposed to be discharged to an existing 600mm diameter storm water drainage pipe which has been laid in the south-west corner of the existing IDA site.

A compensatory storage area is required and will consist of a below ground and covered storage tank, which will be emptied at a controlled rate via a pumped connection to the storm water drainage system for the proposed converter station access road. It is expected that adverse impacts on surface water quality during operation will be imperceptible.

As the cables are solid insulation type there are no sources of pollution and as they are buried, they will not offer a pathway to any surface water receptors. Site restoration works will be carried out following completion of water crossings, in agreement with Inland Fisheries Ireland. These works may include riverbank stabilization, gravel replacements etc. In all cases, the site will be restored post installation. Adverse impacts in terms of water depth, velocities and sediment erosion/deposition are therefore expected to be imperceptible.

The increase in impermeable surfaces at the converter station site will result in a corresponding increase in surface water runoff, while filling of existing low points and depressions will alter existing drainage patterns within the catchment of the wider IDA site. However, since all surface water generated at the converter station site or flowing towards it will be intercepted and diverted to a sealed underground collection system incorporating SuDS features (flow and pollution control elements plus attenuation storage tanks), there will be a negligible impact on the local surface water drainage patterns and water environment. An imperceptible impact on surface water drainage routes along the cables routes is expected as the land will continue to drain as per the existing situation.

A desk based flood risk assessment of the cable route was undertaken which concludes that the impact on flood risk is considered to be negligible at operation stage due to the cables being buried and so not influencing flood waters. In addition, the cables are characterised by being designed to be not vulnerable to flooding within areas of high / moderate flood risk.

Developments that need to be in areas of high / moderate flood risk for reasons of proper planning and sustainable development require a Justification Test. However, the cable will be designed so that it is considered not to be vulnerable to flooding, thereby being considered appropriate and as such not subject to a justification test for flooding.

A flood risk assessment of the converter station site identified that the infilling of the existing depressions would increase flood risk within the wider IDA site. However, the flood risk assessment has identified that the flood risk is impacted from rainfall events generated on the site only and therefore taken into consideration in the drainage assessment, so as to have a negligible impact on flood risk elsewhere.

With the implementation of the embedded and additional mitigation measures proposed the Irish onshore elements of the Celtic Interconnector project will not result in a change in status of any WFD quality elements or prevent any waterbodies from reaching good status in the future. During the construction phase impacts on surface water quality are anticipated to be localised and brief to temporary in duration of imperceptible significance

During the construction phase, impacts on surface water drainage and water supply and wastewater discharge networks are anticipated to be localised and brief to temporary in duration of imperceptible to moderate significance. Adverse impacts during the operational phase are expected to be imperceptible.

Biodiversity

A Natura Impact Statement (Volume 6) has concluded that, with the implementation of mitigation measures, there will be no adverse effects on the integrity of any European sites in light of the site's conservation objectives as a result of the proposals. The impacts of the Proposed Development, once the mitigation measures are implemented, are presented overleaf.

Table 0.1: Biodiversity

Receptor		Importance	Potential for Impact in Absence of Mitigation	Potential for Residual Impact
Notable habitats	Annex I fixed Dune Habitat	County Importance	Medium term moderate negative impact	The implementation of the reinstatement measures for the habitat are such that there will be no long-term loss of habitat. Thus, the residual effect on the sand dune habitat will be a **temporary not significant negative effect** at a local geographic scale.
	Oak Ash Hazel Woodland	County Importance	Permanent moderate negative impact	Where removal of habitat is required within the passing bay, these trees will be reinstated. It will not, however, be possible to reinstate trees along the roadside which require removal to prevent interference with the cable itself. As such the residual effects on the woodland are will be a **permanent slight negative effect** at a local geographic scale.
	Priority Annex 1 Calcareous Grassland (6210*)	Local Importance (Higher Value)	A permanent significant negative impact	The implementation of translocation, reinstatement and the monitoring regime is such that there will be no permanent loss of Annex I calcareous grassland associated with the proposed development. The residual effect on the habitat will be a **temporary slight negative effect** at a local geographic scale.
	Treelines and hedgerows	Local Importance (Higher Value)	Permanent moderate negative impact	Where removal of habitat is required within the passing bay, treelines and hedgerows will be reinstated. It will not, however, be possible to reinstate deep rooted trees in areas where there is potential for interference with the cable itself. As such the residual effects on the woodland are will be a **permanent slight negative effect** at a local geographic scale
Rare and Protected Flora	Orange foxtail	National Importance	Permanent significant negative impact	The implementation of pre-construction surveys, and where required, translocation of these rare and protected flora will ensure that there is no permanent loss of these species associated with the works. The residual effects to these species are anticipated to be a **temporary imperceptible effect at** a local geographic scale.
	Penny royal	National Importance	permanent significant negative impact	
	Tufted feather-moss	County Importance	Permanent significant negative impact	
	Wild clary	County Importance	permanent significant negative impact	
	Greater knapweed	County Importance	Permanent significant negative impact	
Mammals	Otter	National Importance	Permanent significant negative impact	As outlined previously, while no otter holts were recorded during surveys, there is potential for holts to become established prior to construction commencing. The implementation of pre-construction surveys and measures to protect holts should they be recorded are such that the residual effects to otter will be a **temporary not significant effect** at a county geographic scale.

Receptor		Importance	Potential for Impact in Absence of Mitigation	Potential for Residual Impact
	Badger	Local Importance (Higher Value)	Permanent significant negative impact	The implementation of pre-construction surveys and measures to protect any new or known setts are such that the residual effects to badger will be a **short term imperceptible effect** at a local geographic scale
	Bats	Local Importance (Higher Value)	Permanent significant negative impact	The implementation of pre-construction surveys, and associated mitigation as outlined previously to replace lost roosting features are such that residual effects will be a **short term imperceptible effect** at a local geographic scale
	Red squirrel	Local Importance (Higher Value)	Permanent slight negative impact.	The reinstatement of supporting habitat within the passing bays for red squirrel will reduce the footprint of habitat loss for the species. There will be trees adjacent to the road which cannot be reinstated as they will interfere with the cable itself. As such, the residual impact will be a **short term imperceptible effect** at a local geographic scale
	Pygmy Shrew	Local Importance (Higher Value)	Short term slight negative impact	As outlined in the mitigation measures, clearance of vegetation outside of the breeding season for these species. As such residual impacts will be a **short term imperceptible effect** at a local geographic scale
	Hedgehog	Local Importance (Higher Value)	A temporary slight negative impact.	
	Stoat	Local Importance (Higher Value)	A temporary slight negative impact.	
Watercourses	Owenacurra River	County Importance	Permanent significant negative impact	The measures outlined to protect the watercourses are such that residual impacts will **be short term slight effect** at a local geographic scale.
	All other watercourse crossings	Local importance (Higher Value)	Permanent significant negative impact on watercourses associated with the proposed development.	
Wintering Birds	Waterfowl	National importance	Short-term moderate negative impact on wintering waterfowl associated with the proposed development	Measures to reduce disturbance effects are such that any residual effect to wintering waterfowl will be a **temporary imperceptible effect** at a national geographic scale.
	Winter raptor roost	National importance	Short-term moderate negative impact	Measures to reduce disturbance effects to hen harrier are such that any residual effect will be a **temporary imperceptible effect** at a national geographic scale.
Breeding birds	General	Local Importance (Higher Value)	Permanent slight negative impact on breeding birds.	Mitigation measures outlined to protect breeding birds are such that any residual effects will be **imperceptible** at a local geographic scale.
	Breeding Kingfisher	Local Importance (Higher Value)	Permanent slight negative impact on kingfisher.	

Receptor		Importance	Potential for Impact in Absence of Mitigation	Potential for Residual Impact
Amphibians	Common frog	Local importance (Higher value)	Permanent slight negative impact.	Mitigation measures outlined to protect frog and newt are such that any residual impacts will be **imperceptible** at a local geographic scale.
	Smooth newt	Local Importance (Higher Value)		
Reptiles	Common lizard	Local Importance (Higher Value)	Permanent slight negative impact.	Mitigation measures outlined to protect lizards re such that any residual impacts will be **imperceptible** at a local geographic scale.
Other species of note	Invertebrates of conservation concern presumed present (none protected)	Local Importance (Higher Value)	Permanent medium term slight negative impact	Reinstatement of vegetation and planting with pollinator friendly species mixes are such that effects are anticipated to be **imperceptible** at a local geographic scale.

The Landscape

Table 0.2 identifies if and where there is potential for significant landscape and visual effects to occur.

Table 0.2: Potential for Significant Landscape and Visual Effects

Location	Potential for Significant Landscape and Visual Effects
Connection Point	It is **not likely that significant landscape or visual effects will arise** from the proposed Connection Point aspect of the development at either construction or operational stage. This is due to the combination of the existing substation context of the connection point, the modest scale and characteristic nature the proposed works and the absence of close sensitive visual receptors.
Converter Station Site Compound	The converter station site compound has the most potential of all of the aspects of the proposed project to give rise to significant effects. **Significant effects could occur during both the construction and operational stages of the converter station**. In terms of physical landscape effects on landcover and vegetation, it is not considered that significant effects will arise on this already highly modified site that was previously prepared for major industrial development more than a decade ago. There is potential for the proposed converter station to give rise to significant landscape character effects in relation to the rural landscape that surrounds the wider IDA landholding at Ballyadam to the north, east and west. Significant landscape character effects are less likely to occur in relation to the rural landscape to the south of the substantial N25 road corridor, which also lies adjacent to a large quarry that decreases the integrity of the rural setting. Significant construction stage effects on landscape character are most likely to occur towards the end of the construction stage due to a combination of construction related activity, machinery and material storage being present at the same time as the substantially completed structures. During the operational stage, significant effects will potentially occur due to the presence of the substantial converter station buildings and associated external electrical componentry within an otherwise substantially rural hinterland setting. For similar reasons as described above in relation to landscape character effects, the proposed converter station could also give rise to potentially significant visual impacts at surrounding receptor locations. These include from local residences, particularly within 1km to the north of the site where elevated views across the site are afforded. Also, from the surrounding road network and from centres of population including Carrigtwohill and Midleton. It is not considered likely that the proposed converter station will generate significant visual impacts along any designated scenic routes within the relevant study area as none have clear views in the direction of the site.
Landfall Area	The only potential for significant landscape or visual effects to occur in relation to the proposed landfall area is during the construction stage, because there will only be very minor surface expression of the development during the operational stage. However, because the construction stage is temporary and its effects almost fully reversible through reinstatement of the prevailing land cover, **significant impacts are not likely to occur.**
HVDC / HVDC Cable Routes	The only potential for significant landscape or visual effects to occur in relation to the proposed HVDC / HVAC onshore UGCs is during the construction stage, because there will only be very minor surface expression of the development during the operational stage. However, because the construction stage is short-term, its effects are transient along the cable route and almost fully reversible through reinstatement of the prevailing land cover, **significant impacts are not likely to occur**.
Construction Compounds Laydown Areas and Passing Bays	The only potential for significant landscape or visual effects to occur in relation to the proposed laydown and passing bay areas is during the construction stage, because they are only temporary installations and prevailing land cover will be restored thereafter. Thus, **significant impacts are not likely to occur.**

The focus of landscape and visual mitigation measures is the converter station at Ballyadam and specifically, reducing the perceived scale and massing of the proposed buildings through a recessive colour scheme and screening them / assimilating them using perimeter screen planting. Consequently, the only aspect of the development for which the residual impacts differs from the likely impacts is in relation to visual impacts at the converter station. A summary

of the pre-mitigation and post-mitigation (residual) impacts at relevant viewpoints is set out in table 0.3 below.

Table 0.3: Viewpoint Assessment Summary (Converter Station Compound)

VP No.	Location	Pre-mitigation Significance	Residual Impact Significance
VP1	Designated scenic route on local road north of Carrigtwohill	Imperceptible	Imperceptible
VP2	Local road north of site at Ballyadam	Substantial moderate	Moderate
VP3	Local road intersection at Carrigane	Moderate	Moderate slight
VP4	Local road and housing cluster near entrance to Water Rock Golf Course	Slight	Slight
VP5	Local Road at Lysaghtstown	Slight	Slight-imperceptible
VP6	N25 at entrance to IDA landholding	Slight	Slight-imperceptible
VP7	N25 south of site	Imperceptible	Imperceptible
VP8	N25 near entrance to residential housing cluster	Imperceptible	Imperceptible

As can be seen from the table above, the proposed mitigation measures, once established, are deemed to reduce the visual impact of the converter station at VP2, VP3, VP5 and VP6. The most critical of these is VP2, representing a local road and nearby residences to the north of the site, where the pre-mitigation impact is substantial-moderate. In this instance, the combination of the dispersed colour scheme and perimeter screen planting serve to perceptually reduce the scale and massing of the main converter station building as well as reducing the clutter associated with lower external electrical components at the eastern end of the site. A similar scenario occurs in respect of VP3 which is more elevated but further away then VP2, but also to the north. At VP5 and VP6 the reducing effects of mitigation are more subtle and only result in reductions from Slight to Slight-imperceptible significance, but this is consistent with design approach to mitigate insofar as possible even where potentially significant impacts are not predicted.

Archaeology and Cultural Heritage

There is abundant evidence for prehistoric settlement in County Cork, and this is evident in the study area. Though few can confidently be dated to early prehistory—Mesolithic to Neolithic—there is clear evidence for settlement from at least the early Bronze Age along the scheme route. Most impacts during the construction phase are likely to be direct impacts as a result of sub-surface disturbance or construction works. All impacts at this phase are considered to be negative and permanent. It is not considered that the on-road route options will have any impact on townland boundaries where the townland boundary has already been transected by the existing roadway (and the scheme route will be within that existing break) or where the existing roadway demarcates the current townland boundary. Direct impacts to townland boundaries have only been identified where the proposed scheme requires a new break or the removal of a section of extant townland boundary. Indirect impacts at operation stage would largely occur as a result of impacts on the setting of site (notably visual impacts) and on the integrity and character. With the exception of the Connection Point at Knockraha, Converter Station at Ballyadam and Landfall at Claycastle the scheme infrastructure should be largely sub-surface with limited potential for visual impacts. As a result, no indirect impacts or impacts on setting have been identified at operational phase. A description of impacts to cultural heritage sites is provided in Table 0.4 below.

Table 0.4: Description of Impacts to cultural heritage sites at Construction Phase

CH No	Summary	Description of Impact	Magnitude of Impact prior to implementation of mitigation measures	Baseline Value	Significance of Impact prior to implementation of mitigation measures
CH005	Fulacht fia	On-road Cable Trench will pass through the Zone of Notification for this RMP; there is a possibility that sub-surface archaeological features relating to this site could still be present beneath the carriageway.	Major	Very High	Significant
CH010	Graveyard	On-road Cable Trench will pass through the Zone of Notification for this RMP; there is a possibility that sub-surface archaeological features relating to this site could still be present beneath the carriageway.	Major	Very High	Significant
CH011	Church	On-road Cable Trench will pass through the Zone of Notification for this RMP; there is a possibility that sub-surface archaeological features relating to this site could still be present beneath the carriageway.	Major	Very High	Significant
CH018	Enclosure	On-road Cable Trench will pass through the Zone of Notification for this RMP; there is a possibility that sub-surface archaeological features relating to this site could still be present beneath the carriageway.	Major	Very High	Significant
CH026	Graveyard	On-road Cable Trench will pass through the Zone of Notification for this RMP; there is a possibility that sub-surface archaeological features relating to this site could still be present beneath the carriageway.	Major	Very High	Significant
CH027	Church	On-road Cable Trench will pass through the Zone of Notification for this RMP; there is a possibility that sub-surface archaeological features relating to this site could still be present beneath the carriageway.	Major	Very High	Significant
CH028	Souterrain	Cable Trench will pass through the Zone of Notification for this RMP, where it diverts off-road in the townland of Roxborough; there is a possibility that sub-surface archaeological features relating to this site could still be present within the field to the west of the carriageway through which the cable route passes.	Major	Very High	Significant
CH029	Excavation - miscellaneous	This RMP site has been fully archaeologically excavated, however it is still possible that construction of the convertor station at Ballyadam could uncover further related archaeological features	Major	Very High	Significant
CH030	Fulacht fia	This RMP site has been fully archaeologically excavated, however it is still possible that construction of the convertor station at Ballyadam could uncover further related archaeological features	Major	Very High	Significant

CH No	Summary	Description of Impact	Magnitude of Impact prior to implementation of mitigation measures	Baseline Value	Significance of Impact prior to implementation of mitigation measures
CH031	Fulacht fia	This RMP site has been fully archaeologically excavated, however it is still possible that construction of the convertor station at Ballyadam could uncover further related archaeological features	Major	Very High	Significant
CH032	Burnt mound	This RMP site has been fully archaeologically excavated, however it is still possible that construction of the convertor station at Ballyadam could uncover further related archaeological features	Major	Very High	Significant
CH033	Fulacht fia	This RMP site has been fully archaeologically excavated, however it is still possible that construction of the convertor station at Ballyadam could uncover further related archaeological features	Major	Very High	Significant
CH048	Barrow - mound barrow	On-road Cable Trench will pass through the Zone of Notification for this RMP; there is a possibility that sub-surface archaeological features relating to this site could still be present beneath the carriageway.	Major	Very High	Significant
CH053	Milestone	The access road to Laydown Area will pass through the Zone of Notification for this RMP site.	Major	Very High	Significant
CH061	Burial	On-road Cable Trench will pass through the Zone of Notification for this RMP; there is a possibility that sub-surface archaeological features relating to this site could still be present beneath the carriageway.	Major	Very High	Significant
CH062	Cave	On-road Cable Trench will pass through the Zone of Notification for this RMP; there is a possibility that sub-surface archaeological features relating to this site could still be present beneath the carriageway.	Major	Very High	Significant
CH120	Disour River	Excavation of Cable Trench would impact on this river channel, which is an area of archaeological potential.	Major	Medium / High	Moderate
CH122	Kiltha River / Demesne Landscape	Excavation of Cable Trench would impact on this river channel, which is an area of archaeological potential; it should also be noted that the riverine island and western river channel may be artificial creations relating to the demesne landscape of the Castlemartyr estate immediately to the southwest, so impacts to demesne landscape features are also a possibility.	Major	Medium / High	Moderate
CH123	Dungourney River	Excavation of Cable Trench would impact on this river channel, which is an area of archaeological potential.	Major	Medium / High	Moderate
CH124	Owenacurra Tributary	Excavation of Cable Trench would impact on this river channel, which is an area of archaeological potential.	Major	Medium / High	Moderate

CH No	Summary	Description of Impact	Magnitude of Impact prior to implementation of mitigation measures	Baseline Value	Significance of Impact prior to implementation of mitigation measures
CH127	Site of Vernacular building(s)	Excavation of Cable Trench could uncover any surviving sub-surface remains of this site.	Major	Medium / Low	Slight
CH130	Mill Complex	Excavation of Cable Trench and groundworks at Layover could uncover any surviving sub-surface remains of this site.	Major	Medium / High	Moderate
CH131	Church and Glebe	Excavation of Cable Trench and groundworks at Layover could uncover any surviving sub-surface remains of this site.	Major	Medium / High	Moderate
CH132	Site of Vernacular building(s)	Excavation of Cable Trench could uncover any surviving sub-surface remains of this site.	Major	Medium / Low	Slight
CH137	Owenacurra River	Excavation of Cable Trench would impact on this river channel, which is an area of archaeological potential.	Major	Medium / High	Moderate
CH138	Claycastle Beach	Excavation groundworks associated with the cable landfall infrastructure as well as temporary construction compounds could potentially uncover previously unknown archaeological features, in particular associated with the palaeo-landscape and peat deposits that survive sub-surface at Claycastle Beach.	Major	High	Significant
CH142	Townland Boundary	Cable Route would transect the extant field boundary hedgerow and roadway that demarcates this townland boundary where the cable route deviates briefly off-road to the south of the N25 carriageway. Townland boundary will remain readable within the landscape despite this additional break in its circuit.	Moderate	Medium / Low	Slight
CH148	Townland Boundary	Cable Route would transect the extant field boundary hedgerow and roadway that demarcates this townland boundary. Townland boundary will remain readable within the landscape despite this additional break in its circuit.	Moderate	Medium / Low	Slight
CH150	Townland Boundary	Cable Route would transect the extant field boundary hedgerow and roadway that demarcates this townland boundary. The access road to Laydown Area would also require a new break in this townland boundary. Townland boundary will remain readable within the landscape despite this additional break in its circuit.	Moderate	Medium / Low	Slight
CH155	Townland Boundary	Cable Route would transect the extant field boundary hedgerow that demarcates this townland boundary where the cable route deviates to the north of the existing N25 carriageway into greenfield. Townland boundary will	Moderate	Medium / Low	Slight

CH No	Summary	Description of Impact	Magnitude of Impact prior to implementation of mitigation measures	Baseline Value	Significance of Impact prior to implementation of mitigation measures
		remain readable within the landscape despite this additional break in its circuit.			
CH162	Townland Boundary	Cable Route would transect the extant field boundary hedgerow and roadway that demarcates this townland boundary. Townland boundary will remain readable within the landscape despite this additional break in its circuit.	Moderate	Medium / Low	Slight
CH191	Townland Boundary	Excavation of Cable Trench will need to transect the field boundary hedgerow that demarcates this townland boundary. Townland boundary will remain readable within the landscape despite this additional break in its circuit.	Moderate	Medium / Low	Slight

All sub-surface groundworks associated with the proposed development works will be subject to a programme of archaeological monitoring. Residual archaeology and cultural heritage impacts range from slight to moderate significance.

Roads and Traffic

Likely significant impacts on roads and traffic can be summarised as follows:

- Driver delay: disruption and delay to users of roads from cable installation work in road corridors;
- Driver delay: disruption and delay to users of roads as a result of the additional traffic movements that will be generated by the Project; and
- Community Effects: Disruption and delay of users of footpaths and cycle paths from cable installation work in or adjacent to active travel infrastructure;
- Accidents and Safety: Detrimental impact on road safety as a result of the additional traffic movements that will be generated by the Project.

Table 0.5 overleaf provides a summary of the impact assessment undertaken for both construction and operation phases of the proposals in terms of roads and traffic, with the implementation of mitigation.

Table 0.5: Impact Assessment Summary

Phase	Aspect	Embedded design, mitigation and enhancement measures	Duration of impact	Magnitude of impact (with mitigation)	Significance impact (Residual)
Construction	Driver Delay – disruption and delay to users of roads from cable installation work in road corridors	Implementation of CTMP Co-ordination and engagement with relevant authorities	13 weeks (worst case)	13 minutes (worst case)	Minor (Not Significant) Temporary - less than a year
	Driver Delay – disruption and delay to users of roads as a result of the additional traffic movements that will be generated by the Project	Implementation of CTMP Co-ordination and engagement with relevant authorities	1st Peak - 3 months 2nd Peak – 11 months Or 9 months for a specific road	12% traffic increase on several roads	None (Not Significant) Temporary
	Community Effects (including Severance) - Disruption and delay of users of footpaths and cycle paths from cable installation work in or adjacent to active travel infrastructure	Implementation of CTMP Co-ordination and engagement with relevant authorities	1st Peak - 3 months 2nd Peak – 11 months Or 9 months for a specific road	Potential temporary access arrangements	Minor (Not Significant) Temporary - less than a year
	Accidents and Safety - Detrimental impact on road safety as a result of the additional traffic movements that will be generated by the Project	Implementation of CTMP Co-ordination and engagement with relevant authorities	1st Peak - 3 months 2nd Peak – 11 months Or 9 months for a specific road	Less than 1	None (not significant)
Operation	Driver Delay – disruption and delay to users of roads from cable installation work in road corridors	None	None	None	None
	Driver Delay – disruption and delay to users of roads as a result of the additional traffic movements that will be generated by the Project	None	None	None	None
	Community Effects (including Severance) - Disruption and delay of users of footpaths and cycle paths from cable installation work in	None	None	None	None

Phase	Aspect	Embedded design, mitigation and enhancement measures	Duration of impact	Magnitude of impact (with mitigation)	Significance impact (Residual)
	or adjacent to active travel infrastructure				
	Accidents and Safety - Detrimental impact on road safety as a result of the additional traffic movements that will be generated by the Project	None	None	None	None
Decommission	Driver Delay – disruption and delay to users of roads from cable installation work in road corridors	None	None	None	None
	Driver Delay – disruption and delay to users of roads as a result of the additional traffic movements that will be generated by the Project	None	None	None	None
	Community Effects (including Severance) - Disruption and delay of users of footpaths and cycle paths from cable installation work in or adjacent to active travel infrastructure	None	None	None	None
	Accidents and Safety - Detrimental impact on road safety as a result of the additional traffic movements that will be generated by the Project	None	None	None	None

Material Assets

There is potential for disruption to services during construction works. Impacts would be localised and brief in duration, however, the measures detailed below will ensure that this will not result in significant impacts in the receiving environment.

All reasonable measures will be taken to avoid unplanned disruptions to any services during the proposed works. This will include thorough investigations to identify and reconfirm the location of all utility infrastructure within the works areas, and the implementation of robust procedures when undertaking works around known infrastructure services.

Service disruptions impacting the surrounding residential, social and commercial properties will be kept to a minimum, only occurring where unavoidable. Prior notification of disruptions will be given to all impacted properties. This will include information on when disruptions are scheduled to occur and the duration of the disruption. Consultation with relevant neighbouring parties will be undertaken prior to any proposed disruptions.

During the construction phase temporary construction compounds will be required at the connection point (Knockraha substation), the converter station (Ballyadam) and the landfall (the area of the car park at Claycastle Beach). Welfare facilities will be provided at these locations and any discharges will be connected to a sealed holding tank to be emptied and disposed of off-site by a licenced contractor to an approved licenced facility. Water will be tankered onto site as required. Consequently, significant adverse impacts on utility services during the construction phase are not likely.

The volume of fill (stone) required to construct the converter station is estimated for worst-case assessment purposes at approximately 127,357m^3. The volume of cut required to construct the converter station is estimated at approximately 13,180m^3. These volumes can be reduced if cut ground can be reused on site. Ultimately, the estimations will de dependant on detailed ground investigations to be carried at pre-construction stage. Excavated material will be re-used on site where possible. Waste will be managed in accordance with the Waste Management Hierarchy and *Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities* (EPA. 2020) and the Waste Management Act 1996, and associated Regulations. Consequently, significant adverse effects associated with waste management are not anticipated.

Minimal waste will be generated during the operational phase of the proposals. Any waste generated will be managed in accordance with the Waste management Act 1996 and associated regulations. Consequently, no significant adverse impacts associated with waste management are anticipated.

No significant adverse operational phase impacts on utilities are anticipated.

Noise and Vibration

An assessment of predicted noise and vibration impacts arising during the construction and operation of the proposed development has been undertaken. This has been informed by the prediction of impacts using theoretical and empirical models and the results of background noise surveys conducted in 2020 and 2021.

Noise and vibration arising during construction will be controlled by the implementation of measures set out in the contractor's Construction Noise & Vibration Management Plan (to be included in the CEMP). In general, noise impacts arising during the construction of the connection point, convertor station site compound and landfall are not predicted to result in significant effects provided the works are undertaken during normal daytime working hours.

A large proportion of the proposed route of the HVAC / HVDC underground cable follows the alignment of major and minor roads and consequently passes in close proximity to adjacent dwellings. Noise arising from works to install the HVAC / HVDC underground cable is not expected to be significant due to the its short-term, transient nature in any particular location. The level of ground-borne vibration due to vibratory compaction at residential distances (approximately 16m) is predicted to exceed the threshold at which complaint is likely. However, potential cosmetic damage to light-framed structures (e.g. dwellings) is only likely at distances within approximately 3m of the works. Where this is likely then it is recommended that condition surveys are undertaken.

At the proposed Landfall at Claycastle, the use of vibratory sheet piling to construct the temporary cofferdams is predicted to generate vibration above the threshold associated with likely complaint at any occupied building within approximately 55m of the works.

Providing occupiers with prior notification and limiting the works to less sensitive times of the day are key measures to mitigate the human perception of vibration.

Operational noise impacts are expected to arise at the Connection Point and Convertor Station Site Compound only. In the case of the latter, mitigation of noise from the various items of equipment is required in the form of attenuators, noise shields and acoustic barriers. In both cases, the magnitudes of the predicted noise impacts, including a +5 dB penalty for acoustic features, are not assessed as significant. However, the tonal characteristics of electrical equipment may introduce a noticeable change to the area. It is strongly recommended that the specification of low noise equipment is given priority in the selection and procurement of equipment.

Major Accidents and / or Disasters

The potential for significant adverse effects of the proposed land cable on the environment deriving from its vulnerability to risks of relevant major accidents and / or disasters has been assessed. In all cases it was concluded that the reasonable worst consequences are managed to an acceptable level with existing mitigation in place.

Interaction of Effects

Commented [DH4]: **TO BE INCLUDED IN FINAL APPLICATION FILE**

Decommissioning Phase

The activities associated with the decommissioning phase will be similar to those associated with the construction phase. Therefore, provided that appropriate mitigation is used, the impacts of the decommissioning phase should be, as a worst-case scenario, similar to those at construction phase. Any works required to remove infrastructure as part of the decommissioning phase, will however be subject to relevant consent applications, and associated environmental assessments.

Cumulative Effects

A number of developments are proposed within the immediate environs of the proposals.

Prior to commencement of construction and during the construction phase engagement with the proponents of these developments (including Transport Infrastructure Ireland, the IDA, the Office of Public Works, Irish Water and Cork County Council) will continue and where there is potential for works to be carried out in parallel, appropriate mitigation measures will be implemented including the scheduling of works and regular liaison meetings between project teams to ensure that plans are co-ordinated and impacts on population and human health are minimised.

Transboundary Effects

All elements of the onshore interconnector are found in County Cork, Ireland and no international boundaries are crossed by the works, significant transboundary effects are not likely to occur as a result of the proposals.

Mitigation and Monitoring Measures

The table overleaf sets out the mitigation controls and other best practice measures identified in EIAR Volume 3C Part 2 and identifies the means by which those controls and measures will be secured. The following are provided:

- a unique reference number for each item;
- the section of the EIAR (Volume 3C Part 2) where the mitigation measure is referenced; and
- the monitoring and mitigation measures, as set out in the EIAR.

These measures and conditions set out as part of the planning and foreshore consent process will be incorporated into the CEMP.

A contractual obligation will be included within the tendering processes and implemented on appointment of the Contractor to ensure that the proposed works are developed in compliance with the requirements of the CEMP, and the methods, monitoring and mitigation included in Volume 3C Part 2.

As detailed previously, the Developer will monitor the contractor(s) performance on a regular basis and will undertake compliance checks throughout the duration of the construction period, including:

- Review contractor documents against the requirements of the CEMP;
- Undertake regular audits;
- Continuously check records;
- Set up a contractor reporting structure; and
- Conduct regular meetings where Environmental Health and Safety is an agenda item.

Records of the implementation of the measures identified in the CEMP will be provided if required to the Planning Authority at a time scale to be agreed.

Table 0.6: Mitigation and Monitoring Measures

Volume 3C Part 2 Reference	Aspect	Mitigation and / or Monitoring Measure
Chapters 1 to 3		
Not Applicable	Not Applicable	These chapters do not include any additional mitigation measures
Chapter 4 Population and Human Health		
4.1	Construction Phase	• All work will be carried out having regard to international and national legislation, and best practice guidance, including but not limited to guidance on preventing pollution from construction sites and pollution prevention guidance.
4.2	Construction Phase	• A CEMP will be prepared by the contractor in consultation with the Cork County Council and implemented during the construction phase to safeguard the environment, site personnel, and nearby sensitive receptors, i.e. occupiers of residential and commercial properties, from site activities which may cause harm or nuisance.
4.3	Construction Phase	• The appointed contractors (in collaboration with EirGrid) will be required to maintain close liaison with local community representatives, landowners and statutory consultees throughout the construction period. This is likely to include circulation of information about ongoing activities; particularly those that could potentially cause disturbance, including due to traffic. A telephone number will be provided and persons with appropriate authority to respond to calls and resolve or escalate any problems arising will be available.
4.4	Construction Phase	• Prior to commencement of the development, the appointed Contractor will prepare a Traffic Management Plan which will be developed and implemented to mitigate any potential construction traffic impacts on the public road network. All construction activities, including construction traffic, will be managed through the site CEMP.
4.5	Cumulative Effects	• Prior to commencement of construction and during the construction phase engagement with the proponents of other developments (including Transport Infrastructure Ireland, the IDA and Cork County Council will continue and where there is potential for works to be carried out in parallel, appropriate mitigation measures will be implemented including the scheduling of works and regular liaison meetings between project teams to ensure that plans are co-ordinated and impacts on population and human health are minimised.
Chapter 5 Air Quality (AQ) and Climate (C)		
5.1	AQ: Construction Phase	• The appointed Contractor will prepare and implement a Dust Management Plan (DMP) as part of the project CEMP. For the CEMP, the Contractor will also develop and implement a stakeholder communications plan which will facilitate community engagement prior to the commencement of construction.
5.2	AQ: Construction Phase mitigation applicable to HVAC / HVDC Onshore Circuits, Laydown Areas and Passing Bays	Construction activities associated with the installation of the HVAC / HVDC cables are predicted to have a 'negligible to medium risk' in terms of dust soiling and PM_{10} effects with no mitigation in place. Best practice mitigation measures for these activities are presented below: • Communication:

Volume 3C Part 2 Reference	Aspect	Mitigation and / or Monitoring Measure
		– Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary; and – Display the head or regional office contact information. • Site Management: – Record all dust and air quality complaints, identify causes and take appropriate measures to reduce emissions in a timely manner and record the measures taken: and – Record any exceptional incidents that cause dust and or air emissions, either on or off site, and the action taken to resolve the situation in the log book. • Monitoring: – Carry out regular site inspections to monitor compliance with the DMP and record inspection results. • Preparing and maintaining the site – Avoid site runoff of water or mud. • Operating vehicles/ machinery and sustainable travel: – Ensure all vehicles switch off engines when stationary – no idling vehicles; and, – Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. • Operations: – Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction; – Ensure an adequate water supply on the site for effective dust/ particulate matter suppression/ mitigation using non-potable water where possible and appropriate; and, – Use enclosed chutes and conveyors and covered skips. • Measures specific to demolition: – Ensure effective water suppression is used during demolition operations. • Measures specific to trackout: – Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport; – Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable; and, – Record all inspections of haul routes.
5.3	AQ: Construction Phase mitigation applicable to Landfall at Claycastle	Construction activities associated with the landfall at Claycastle are predicted to have a 'negligible to medium risk' in terms of dust soiling and PM_{10} effects with no mitigation in place. Best practice mitigation measures for these activities are presented below: • Communication: – Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary; and,

Volume 3C Part 2 Reference	Aspect	Mitigation and / or Monitoring Measure
		– Display the head or regional office contact information. • Site Management: – Record all dust and air quality complaints, identify causes and take appropriate measures to reduce emissions in a timely manner and record the measures taken; and, – Record any exceptional incidents that cause dust and or air emissions, either on or off site, and the action taken to resolve the situation in the log book. • Monitoring: – Carry out regular site inspections to monitor compliance with the DMP and record inspection results; and, – Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. • Preparing and maintaining the site: – Avoid site runoff of water or mud; – Plan site layout so that machinery and dust causing activities are located away from receptors as far as possible: and – Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles. • Operating vehicles / machinery and sustainable travel: – Ensure all vehicles switch off engines when stationary – no idling vehicles; and, – Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. • Operations: – Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction; – Ensure an adequate water supply on the site for effective dust/ particulate matter suppression/ mitigation using non-potable water where possible and appropriate; – Use enclosed chutes and conveyors and covered skips. – Minimise drop heights from conveyors loading shovels hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever available; and, – Bonfires and burning of waste materials will be prohibited. • Measures specific to demolition: – Ensure effective water suppression is used during demolition operations; and, – Avoid explosive blasting, using appropriate manual or mechanical alternatives. • Measures specific to earthworks:

Volume 3C Part 2 Reference	Aspect	Mitigation and / or Monitoring Measure
		– Re-vegetate earthworks and exposed areas/ soil stockpiles to stabilise surfaces as soon as practicable; – Use hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil as soon as practicable; and, – Only remove the cover in small areas during work and not all at once. • Measures specific to trackout: – Use water-assisted dust sweepers on the access and local roads, to remove as necessary any material tracked out of site; – Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport; – Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable; – Record all inspections of haul routes; – Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable); and, – Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit and layout permits.
5.4	AQ: Construction Phase mitigation applicable to Ballyadam Converter Station	Construction activities associated with the Ballyadam Converter Station are predicted to have a 'low to medium risk' in terms of dust soiling and PM_{10} effects with no mitigation in place. Best practice mitigation measures for these activities are presented below: • Communication: – Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary; and, – Display the head or regional office contact information. • Site Management: – Record all dust and air quality complaints, identify causes and take appropriate measures to reduce emissions in a timely manner and record the measures taken; and, – Record any exceptional incidents that cause dust and or air emissions, either on or off site, and the action taken to resolve the situation in the log book. • Monitoring: – Carry out regular site inspections to monitor compliance with the DMP and record inspection results; and, – Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. • Preparing and maintaining the site: – Avoid site runoff of water or mud; – Plan site layout so that machinery and dust causing activities are located away from receptors as far as possible; – Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles; – Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;

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		– Remove materials that have a potential to produce dust from site as soon as possible unless being re-used on site; if they are being reused on site cover as described below; and, – Cover seed or fence stockpiles to prevent wind whipping. • Operating vehicles/ machinery and sustainable travel: – Ensure all vehicles switch off engines when stationary – no idling vehicles; – Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable; and, – Impose and signpost a maximum-speed limit of 15mph on surfaced and 10mph on unpaved surface haul roads and work areas. • Operations – Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction; – Ensure an adequate water supply on the site for effective dust/ particulate matter suppression/ mitigation using non-potable water where possible and appropriate; – Use enclosed chutes and conveyors and covered skips; – Minimise drop heights from conveyors loading shovels hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever available; – Avoid bonfires and burning of waste materials; and, – Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. • Measures specific to demolition: – Ensure effective water suppression is used during demolition operations; and, – Avoid explosive blasting, using appropriate manual or mechanical alternatives. • Measures specific to construction: – Avoid scabbling (roughening of concrete surfaces) if possible: – Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place; – Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos where suitable emission control systems to prevent escape of material and overfilling during delivery: and, – For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust. • Measures specific to earthworks: – Re-vegetate earthworks and exposed areas/ soil stockpiles to stabilise surfaces as soon as practicable;

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		– Use hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil as soon as practicable; and, – Only remove the cover in small areas during work and not all at once. • Measures specific to trackout: – Use water-assisted dust sweepers on the access and local roads, to remove as necessary any material tracked out of site; – Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport; – Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable; – Record all inspections of haul routes; – Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable); – Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit and layout permits; – Install hard surfaced haul routes which are regularly damped down with fixed or mobile sprinkler system or mobile water bowsers and regularly cleaned; – Avoid dry sweeping of large areas; and, – Access gates to be located at least 10m from receptors where possible.
5.5	C: Construction Phase	It is important that the design seeks to limit GHG emissions from the earliest stage possible to ensure the greatest reductions can occur. The following high-level approach will be applied and developed when seeking to reduce GHG emissions (as stipulated within PAS 2080): • Build nothing: the design will evaluate the basic need for an asset and / or programme of works and will explore alternative approaches to achieve outcomes set by the asset owner / manager; • Build less: the design will evaluate the potential for re-using and / or refurbishing existing assets to reduce the extent of new construction required; • Build clever: the design will consider the use of low carbon solutions (including technologies materials and products) to minimise resource consumption during the construction, operation and user's use stages of the asset or programme of work; and • Build efficiently: the design will use techniques (e.g. construction, operational) that reduce resource consumption during the construction and operation phases of an asset or programme of work. The latter stages of the design should consider the hotspots as detailed in Section 5.4.1 as the focus for reductions of GHG emissions. The key idea to further consider is the increased reuse of site-won material as this would both reduce the off-site disposal of material and the import of material which currently, based on a worst-case assumption, accounts for 50% of the construction emissions.
5.6	C: Operational Phase	In relation to operational impacts on climate change, the following best practice will be implemented in order to prevent fugitive emissions of SF_6 during operation of the proposed development.

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		• Staff or any sub-contractors involved in equipment installation, servicing or disposal will be trained to ensure they understand the techniques required to minimise the generation of fugitive emissions. The training will include best management practices for handling, managing and monitoring SF_6. • The supply and maintenance of the proposed equipment will comply with all relevant international standards and best practice: – *BS EN 62271-203:2004 High-voltage switchgear and control gear. Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV*; – *BS EN 62271-4. High-voltage switchgear and control gear. Part 4. Use and handling of sulphur hexafluoride (SF6)*; – *PD CLC/TR 62271-303:2009 High-voltage switchgear and control gear. Use and handling of sulphur hexafluoride (SF6)*; – *BS EN 60376:2005 Specification of Technical Grade Sulphur Hexafluoride(SF6) for Use in Electrical Equipment;* – *BS EN 60480:2004 Guidelines for the checking and treatment of Sulphur Hexafluoride (SF6) taken from electrical equipment and specification for its re-use;* – *CIGRE 276: Guide for the Preparation of Customised 'Practical SF6 Handling Instructions.' Task Force B3.02.01 (2005); and* – *BS 6867:1987 Code of practice for maintenance of electrical switchgear for voltages above 36 kV*. • Leak detection methods, i.e. pressure or density monitoring device, will be used as necessary and on a regular basis to identify any sources of fugitive emissions of SF_6 from equipment at the proposed development.
5.7	AQ: Cumulative Effects	• Regular liaison meetings will be held with construction sites within 500m of the site boundary to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.
Chapter 6 Land, Soils and Hydrogeology		
6.1	HVAC / HVDC Route (Embedded)	• Cables are mainly within existing road network. • Land and vegetation will be reinstated, where possible, following construction. • Trench crossings are proposed in dry works area isolated with an impermeable barrier from water courses/temporary concrete ducts. Site restoration post works provision such as riverbank stabilisation. • HDD trench using a comprehensive closed-loop drilling fluid mixing system to minimise volume of fluids required on site with constant monitoring of volume, pressure, pH and viscosity. • Land will be returned to original state following construction • Temporary shelter erected over joint bays during construction to protect from moisture and contamination during jointing. • Before cable installation chamber will be backfilled with appropriate material. Manholes constructed to facilitate maintenance. • Joint chambers will be installed in a staggered approach to reduce width required for installation. • Traffic control measures will be in place as appropriate, including road diversions, closures and stop/go traffic management to reduce temporary disruptions to traffic in the surrounding area.
6.2	Converter Station: (Embedded)	• The proposed internal road access for the Converter Station site has been developed to tie into the existing internal roads within the larger IDA owned Ballyadam site, independent of potential future development of access routes to the Ballyadam site,

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including a potential N25 interchange to the south west The design can however readily connect into such proposals in the future without affecting the conclusions of this EIAR.

- Any contaminated ground identified during enabling works will be handled according to the contractors Construction Environment Management Plan and associated Risk Assessment Method Statements. Any such ground will be characterised according to Waste Acceptance Criteria and dealt with via a bespoke remediation strategy or materials management plan ground. Any waste arising will be managed in accordance with the Waste Management Act 1996, and associated Regulations.
- Any fill that is required will consist of engineered stone that will be brought to site.
- Any contaminated ground identified during enabling works will be handled according to the contractors Construction Environment Management Plan and associated Risk Assessment Method Statements. Any such ground will be characterised according to Waste Acceptance Criteria and dealt with via a bespoke remediation strategy or materials management plan ground. Any waste arising will be managed in accordance with the Waste Management Act 1996, and associated Regulations.
- Any fill that is required will consist of engineered stone that will be brought to site
- Specialist and experienced piling Contractors will be employed to carry out the works. Method statements, piling risk assessments and environmental management plans, specific for the area where the drilling is to take place, will be carried out / prepared in line with contractual agreements.
- The piling risk assessments will include for example, groundwater / aquifer protection and the implementation of robustness monitoring of the works. These documents will be submitted by the Contractor to the planning authorities for discussion and acceptance prior to commencing piling operations.
- The presence of voids would be recognised by an experienced piling operator during the boring of the piles, prior to concrete placement. In such cases, the piling Contractor would install a permanent casing (likely a thin steel sleeve) to retain concrete within the pile bore/shaft. This requirement will be clearly stated in the piling performance specification and contractual agreements.
- Karst subsidence monitoring will form part of the Construction Environmental Management Plan for the Converter Station site.
- The proposed storm water drainage/SuDS system will incorporate the following key features;
  - Traditional storm water collection and conveyance elements such as gutters, downpipes, gullies, channels and below ground pipework
  - Flow control devices (‘hydrobrake’ or equivalent) to restrict the rate of discharge from the site to pre-development runoff rates
  - Below ground attenuation tanks to balance incoming flows and prevent flooding in the event of an extreme storm event
  - Silt traps and hydrocarbon interceptors to remove any pollutants which may have become entrained in the runoff
- Shut-off valve chambers to prevent discharge from the drainage network in the event of an emergency
- An area of compensatory storage will be developed to replace this storage capacity as detailed in Section 2.3.3 Drainage Design and Wastewater Discharge. This ‘cut’ could potentially be used to ‘fill’ the depressions, subject to geotechnical and ground investigation studies. For the purposes of the assessments in this EIAR however it has been assumed that material will need to be imported as a worst-case scenario.

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		• Although a single connection to the public main is proposed, separate connections and meters will be provided for control buildings located in the Converter Station and for those located in the reactor compound to facilitate separate billing. • A looped 'ring main' with hydrants for fire-fighting purposes is also proposed to be provided within the Converter Station and reactor compounds • Area of compensatory storage developed to collect rainwater with impermeable membrane - material will need to be imported. All storm water drainage elements sealed to protect soluble karst rock. • All storm water drainage elements sealed to protect soluble karst rock. Wastewater storing facilities in fully sealed holding tanks.
6.3	Landfall Area: (Embedded)	• Construction works will be conducted in two phases, to mitigate against beach access and disturbance to the public during the busy summer works: • Phase 1 will be conducted in the winter months and will consist of the construction of the transition joint bay chambers, the installation of the cable ducts within open cut trenches up the beach and into the beach car park. The areas will then be reinstated to their original condition prior to completion of this Phase. • Phase 2 will be conducted in the summer months and will consist of the installation of the cables through the Phase 1 ducts. This is achieved by pulling the cables from the cable lay vessel through the ducts by means of a cable winch located within the transition joint bay chambers. • The platform and the trench excavation will be formed by a cofferdam (sheet piling) to mitigate against sea erosion during the winter months. • Excavation works will be completed in winter months (Phase 1) to limit disruption to traffic accessing Claycastle Beach. • Steel piled cofferdams and a causeway for access will be constructed along Claycastle Beach in order to facilitate installation of the submarine cable and the beach and surrounding areas will be reinstated following construction.
6.4	Hydrogeology	• A pre-construction verification survey of the below boreholes will be carried out to confirm whether they remain in use, and the nature of use. If at the time they are used for drinking water purposes, water quality testing of boreholes will be carried out to ensure no degradation of water quality as a result of the construction activities. – 1 x borehole (1707SWW035) 33.5m. Source Use: Unknown – Woodstock – 1 x borehole (1707SWW017) 44.2m. Source Use: Unknown – Longstown – 1 x borehole (1707SWW034) 4.9m. Source Use: Unknown – Woodstock – 1 x borehole (1707SWW036) 25m. Source Use: Unknown – Woodstock – 1 x Dug Well (1707SEW045) 3.7m. Source Use: Unknown – Caherultan – 1 x borehole (1707SEW043) 21.3m. Source Use Unknown. – Lissacrue • One borehole in close proximity to the proposed works is used for public water supply and another for agricultural and domestic use. These two boreholes will be subject to pre-construction verification survey to confirm whether they remain in use, and the nature of use. If at the time they are in use for drinking water purposes, water quality testing of the boreholes will be conducted to ensure no degradation of water quality as a result of the construction activities. – 1 x borehole (2007SWW089) 18.3m Source Use: Agri and domestic use. – Knocknacally.

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		– 1 x borehole (2007SWW041) 44.8m. Source Use: Public supply – Kennel.
6.5	Cumulative Effects	• Prior to commencement of construction and during the construction phase engagement with the proponents of these developments (including Transport Infrastructure Ireland, the IDA, Cork County Council and the OPW) will continue and where there is potential for works to be carried out in parallel, appropriate mitigation measures will be implemented including the scheduling of works and regular liaison meetings between project teams to ensure that plans are co-ordinated and impacts are minimised.
Chapter 7 Surface Water, including Flood Risk		
7.1	Converter Station: Construction Phase (Embedded)	• The converter station site will consist of a new engineered stone fill platform which will raise the proposed site level above its existing level. This will ensure that a sealed, below ground, gravity drainage system can be accommodated. • Rotary bored cast-in-place (socketed into rock) reinforced concrete piles will likely be adopted for all foundations on this site. Specialist and experienced piling Contractors will be employed to carry out the works. Method statements, piling risk assessments and environmental management plans, specific for the area where the drilling is to take place, will be carried out / prepared in line with contractual agreements. The piling risk assessments will include for example, groundwater / aquifer protection and the implementation of robust monitoring of the works. These documents will be submitted by the Contractor to the planning authorities for discussion and acceptance prior to commencing piling operations. • The presence of voids would be recognised by an experienced piling operator during the boring of the piles, prior to concrete placement. In such cases, the piling Contractor would install a permanent casing (likely a thin steel sleeve) to retain concrete within the pile bore/shaft. This requirement will be clearly stated in the piling performance specification and contractual agreements. • Construction of the below ground drainage system will commence on completion of the proposed platform. The access road below ground drainage system will commence on completion of the access road enabling works. • The construction of the proposed site access road will commence at the same time as the piling works. This will consist of removing all poor ground and any material from areas to be cut and removing this material from site. All fill for embankments will consist of engineered stone that will be brought to site. • A Contractors compound will be located within the site boundary and will be located on an area of ground that will be temporarily surfaced with engineered stone and levelled. The compound will house the Contractors cabins and areas for temporary storage of construction materials (excluding cut/fill ground, which will be brought directly to and from site with no need for temporary storage). • Construction of the reinforced concrete piled raft for all of the buildings and structures can commence once the piling is complete. The structures and building will then progress commensurate with typical construction practice. The site contains two depressions which act to reduce flood levels in the wider IDA site. These will be infilled during construction and replaced with a compensatory storage area. The transition of the depressions to the storage area will be managed on site so as not to increase flood risk elsewhere during construction.

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7.2	Converter Station: Construction Phase (Embedded/Monitoring)	• The piling operator will be experienced in successful piling within Karst regions and clear lines of communication with defined roles and responsibilities will be maintained between the site team, the Contractors and the Design Engineers throughout the works. • A minimum of one Geotechnical Engineer and one Resident Engineer will supervise the piling works. Supervision of each piling rig may be required. • Monitoring of the concrete volumes poured into the pile against the estimated volume that the pile requires will be carried out, to ensure that concrete is not being lost into voids in the ground. • Piles will be monitored for potential vertical settlement of fresh concrete, an indicator of potential concrete loss.
7.3	HVAC / HVDC Route (Embedded)	• The cable route will be designed to not be vulnerable to flooding; this includes the avoidance of flood zones A and B where possible. In any case all joint bays and link boxes are designed with watertight connections as standard (as these installations are typically underground) Where it is impossible to avoid Flood Zones A and B the scheme includes embedded mitigation against flood risk.
7.4	Water Crossings by Open Cut (Embedded)	• Open cut water crossings have the potential to generate silt and suspended solids. In order to reduce the risk of discharging sediment it is proposed to carry out these works in a dry works area. • Unless otherwise agreed with IFI, instream works in watercourses with fisheries value will be restricted to the fisheries open season (i.e. July to September inclusive). • At a number of specific river crossing locations instream works may be required. At these locations electrofishing may be carried out to remove fish under licence from IFI. These locations will be agreed with IFI prior to works commencing. A detailed method statement for instream works specific to each river crossing will be prepared and the report authorised by a suitably experience aquatic ecologist. This will be finalised and agreed with IFI. • Where open trenching is proposed, site restoration works will be carried out following completion of the crossing, in agreement with IFI. These works may include riverbank stabilization, gravel replacements etc. In all cases, the site will be restored post installation.
7.5	Water Crossings by HDD (Embedded)	• Pumping of trenches and HDD could result in increased flow to surrounding watercourses if not managed correctly. This could then affect hydrological discharges and dilution, whilst the works could also release contaminants or sediment into the watercourse. • Competent specialist contractors with proven successful drilling experience working on projects within ground conditions similar to those expected within this project will be appointed to undertake the work. • As with all construction works proposed, no drilling works will be allowed to commence until the relevant RAMS and pertinent Health and Safety documents are received from the specialist Contractor and are reviewed and agreed by the Client's representative. These Contractor documents will include method statements, drilling risk assessments and environmental management plans specific to the area where the drilling is to take place. These documents will, as a minimum, list proposals to eradicate any risk or mitigate against them and would include for example utilities/services plans and avoidance measures, groundwater / aquifer protection measures, and implementation of robust monitoring of the works, including action plans to

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		mitigate / rectify any environmental incident. This assessment / management plan is expected to be submitted by the Contractor to the Employers Representative on site for review and comment prior to commencing drilling operations.
7.6	Water Crossings by HDD (Monitoring)	• Constant monitoring by the specialist drilling team of fluid volume pressure, pH, weight and viscosity will be carried out during the proposed works. The volume of cuttings produced will also be monitored to ensure that no over cutting takes place and that hole cleaning is maintained. The mud returns will be pumped to the circulation system trailer by means of a bunded centrifugal pump. The nature of the cuttings will also be monitored to understand the ground conditions as the drilling progresses. • After the initial pilot hole is completed, it will be reamed in a number of passes to reach the required bore size to enable the duct lining to be pulled [usually High-Density Polyethylene (HDPE)]. To ensure that the prevailing geological conditions have suitable cohesion that can maintain the bore during the drilling and reaming process, close attention will be paid by the specialist drilling team to modelled drag forces during pullback with constant monitoring of load stress undertaken to ensure that modelled tensile stress, collapse pressures, hoop stress and buckling stress are not exceeded. In addition to the above measures, the rate of drilling progress will be monitored to assist with the identification of any voids or changes in strata. • Where directional drilling takes place within limestone bedrock beneath a watercourse, settlement will be monitored at the surface to provide an early warning of any unexpected stability issues. If visible settlement occurs the directional drilling contractor will cease boring, although drilling fluid may still be circulated if required to maintain the stability of the drilled hole, until remedial measures can be put in place to stabilise the ground. • In addition, river/stream flows will be monitored upstream and downstream of any directional drilling watercourse crossings. The flow monitoring will be undertaken on a daily basis for five working days prior to the directional drilling, during the directional drilling and for five working days following completion of the directional drilling. If a measurable increase in losses from the watercourse to ground is observed in the reach where the directional drilling took, place bed lining will be undertaken if required by IFI. The exact nature of any bed lining will be determined through consultation with IFI. •
7.7	Construction Compounds and Laydown Areas (Embedded)	• All temporary construction compounds will be secured with hoarding/fencing around the compound perimeters as appropriate. Where temporary construction areas are required and existing hardstanding is not available, engineering stone fill will be laid and compacted and maintained as required for the duration of the works. Once the works are completed, the engineered stone fill will be removed and the land will be reinstated to its original condition. • Temporary facilities will be provided at the construction compounds including construction phase car parking and welfare facilities and temporary material storage areas as necessary. Any discharges from temporary welfare facilities will be connected to a sealed holding tank to be emptied and disposed of off-site by a licensed contractor to an approved licenced facility. • Storage of fuel and refuelling will be undertaken within bunded hardstanding areas. Water will be brought to site via tankers as required.
7.8	Connection Point and Converter Station Operational Phase (Embedded)	• The proposed oil filled transformers at the converter station site and at Knockraha substation will be bunded. The bunds will have the capacity to hold 110% of the volume of oil in each transformer.

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7.9	Converter Station: Construction Phase (Embedded)	• Foul water will be collected in proprietary holding tanks which will be periodically emptied by a licensed waste disposal contractor. The holding tanks will be fully sealed to prevent discharge to ground and will include a high-level alarm and telemetry link to the converter station's control system such that they can be monitored remotely and emptied when necessary. • A storm water drainage system incorporating SuDS (sustainable drainage systems) features will be constructed to manage the quantity and quality of runoff during rainfall events. The system will operate by gravity and be sized to ensure that no internal property flooding occurs for the critical storm with a 1 in 100-year return period including a +20% allowance for climate change. All proposed surfaces and storm water drainage elements will be sealed. • An area of 'compensation storage' adjacent to the compound will be developed. The compensation storage area will be specifically designed to accept and store water during rainfall events and it will be sized to ensure that there is no significant increase in flood risk in the 'post-development' case when compared to the 'pre-development' case. This compensation storage area will consist of a below ground and covered storage tank, which will be emptied at a controlled rate via a pumped connection to the storm water drainage system which will serve the proposed converter station access road. Discharge from the compensation storage area will be restricted to 'greenfield' runoff rates to ensure that there is no significant increase in flood risk elsewhere. Flood water routing in the form of open channel drains and culverts will be installed around the perimeter of the proposed converter station to divert overland flow towards the dedicated compensation storage area, rather than towards the location of the infilled depressions. • Discharge from the converter station site and the associated access roads is proposed to be restricted to greenfield runoff rates in line with the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS Vol. 2 – New Development) which have generally been adopted by Local Authorities across the country.
7.10	Construction Phase (General)	• A full-time on-site Environmental Clerk of Works (EnCoW) will be appointed prior to commencement of works. • Pre-construction surveys will be carried out and seasonal constraints will be confirmed in agreement with IFI and National Parks and Wildlife Service (NPWS) and Cork County Council, as appropriate. • Works will be carried out in accordance with the guidelines set out by IFI in 'Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters' (IFI, 2016). • The IFI Biosecurity Protocol for Field Survey Works will be complied with.
7.11	Construction Phase Surface Water Quality Protection Measures	• Activities will be planned in advance and machinery will be managed to ensure that the number of trips is limited to the minimum required at each location i.e. the more times a piece of ground is tracked, the more likely it is that vegetative cover will be removed and ruts will be created that will act as miniature rivers where dirty water will flow. • Tracking beside streams and tracks will be avoided to avoid damage to the bankside. • Geotextile or timber matting will be used on soft ground, and in all protected areas • A buffer zone of 25-30m will be maintained between storage and working areas and watercourses, taking account of the minimum working area required to facilitate the works. • The time period over which areas of clearance are left open will be reduced insofar as is reasonably practicable. • Re-instatement method statements will be subject to approval by the Ecologist within the Employer's Representative Team

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		• Concrete will be brought to site by covered truck. Wet concrete operations adjacent to watercourses will be avoided where possible. • The Contractor will ensure that all concrete truck wash watering / cleaning is undertaken offsite where possible and remote from watercourses. • In order to reduce the risk of contamination arising as a result of spills or leakages, measures including, but not limited to, the following will be employed. All collected waste will be managed in accordance with the Waste Management Act 1996, and associated Regulations: – Fuels, chemicals, liquid and solid waste will be stored on impermeable surfaces; – Refuelling of plant, equipment and vehicles will be carried out on impermeable surfaces; – All tanks and drums will be bunded in accordance with established best practice guidelines; and – Spill kits will be provided at all compound locations and carried by all crews during underground cable installation works. • Works will not be carried out during Weather Warnings. • Silt fences (to Hy-Tex Premium specification or similar) and silt traps will be installed prior to commencement of works and will be inspected daily to inform adaptive management as required. The locations of same will be determined by the EnCoW. • Site restoration post works will be carried out, in agreement with IFI These works may include riverbank stabilization, gravel replacements etc. In all cases, the site will be restored post installation.
7.12	Construction Phase Silt Control Measures	• Silt fences must be installed in the working areas and not at the watercourse. • Access routes will be delineated such that an appropriate set back distance from watercourses is maintained. Where works are to be undertaken adjacent to watercourses the setback distance will be delineated by the EnCoW on site. • Where distances between the works and watercourse allow, a minimum setback distance of 30m from the watercourse will be maintained. • Where the site is constrained, the best available set back distance will be employed taking account of the minimum working area required to facilitate the works. • Silt fences will be installed downslope of the area where silt is being generated on disturbed ground. • To be effective the silt curtain must contain the area where silt is generated and must terminate on high ground (i.e. an elevated area not in the watercourse). • Silt fences will be constructed using a permeable filter fabric (e.g. Hy Tex Terrastop Premium silt fence or similar) and not a mesh. • The base of the silt fence will be bedded at least 15-30 cm into the ground at 2 metre intervals. • Once installed the silt fence will be inspected regularly, daily during the proposed works, weekly on completion of the works for at least one month, but particularly after heavy rains and periodically thereafter. • The integrity of the silt fencing will be checked daily by the ENCoW and after poor weather conditions (rain or wind) and any failures rectified immediately. • Two lines of silt curtain / fence will be installed, where considered necessary, by the ENCoW. • Any build-up of sediment along the fence boundary will be removed daily.

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		• Silt fences will be maintained until vegetation on the disturbed ground has re-established. Re-instatement method statements will be subject to approval by the Ecologist within the Employer's Representative Team. • The silt fencing must be left in place until the works are completed (which includes removal of any temporary ground treatment). • Silt fences will not be removed during heavy rainfall. • The silt fence will not be pulled from the ground but cutaway at ground level and posts removed. • A record of when it was installed, inspected and removed will be maintained by the EnCoW. • Silt traps will only be placed in drains downstream of working areas where the volume of water flow is expected to be low. • Silt traps will be made of terram or similar material, not mesh. • The trap will be staked into the banks of the drain / watercourse such that no water can flow around the sides. • The material will be bedded into the drain bed/watercourse to prevent water flowing beneath it. • The height of the trap will be lower than the bank heights. The upper edge will be fixed to a timber cross piece. This will allow water to overtop the silt trap and not burst through or around it. • Inspections will be carried out daily; during the proposed works, weekly on completion of the works for at least one month, and after heavy rains, and monthly thereafter until bare areas have developed new growth. • Any build-up of solids will be carefully removed without removing any vegetation growing on the bottom. • In sensitive areas a series of silt traps will be placed in the drain. • The silt trap will not be pulled from the ground but cutaway at ground level and posts removed. • A record of when it was installed, inspected and removed will be maintained by the EnCoW.
7.13	Converter Station: Operational Phase	• Emergency shut-off valves will be included near the downstream end of all storm water drainage networks such that discharge from the site can be prevented during an emergency situation (e.g. a fire or a significant oil / fuel spill). • Silt trap chambers will be included near the downstream end of all storm water drainage networks to remove silt, soil and any other settleable material that may become entrained in site runoff. • All external transformers will be bunded and drained via sump pumps fitted with oil-detection sensors. Stormwater from these sumps will only be pumped into the main collection system when the sensors confirm that the stored rainwater is not contaminated by an oil spill or leak. Storm water from these areas will also pass through a Class 1 'full retention' separator before entering the main site drainage network. • The compensation storage tank will require a pump set to empty and control its rate of discharge to the main site drainage network. This pump set will include a secondary back-up ('stand by') pump in case of failure of the primary ('duty') pump. The storage tank will also include a high-level alarm, SCADA control system and a telemetry link to the converter station's main control system such that it can be monitored and operated remotely. • A regular inspection and maintenance regime will be implemented for the drainage systems as part of the overall operational procedures of the site. This will involve periodic inspection of key elements to confirm that these are operating as intended and whether any cleaning or remedial maintenance works are required.

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7.14	Cumulative Effects	• Prior to commencement of construction and during the construction phase engagement with the proponents of these developments (including Transport Infrastructure Ireland, the IDA, Cork County Council and the OPW) will continue and where there is potential for works to be carried out in parallel, appropriate mitigation measures will be implemented including the scheduling of works and regular liaison meetings between project teams to ensure that plans are co-ordinated and impacts are minimised.
Chapter 8 Biodiversity		
8.1	Construction Phase General	• Pre-construction surveys will be conducted for Sensitive Ecological Receptors outlined in the EIAR, so to tailor mitigation as relevant for specific works locations. This is of particular relevance given the dynamic nature in distribution of some biodiversity receptors and changes in habitat distribution (e.g. due to other land clearance works) that can arise between baseline surveys and commencement phase of projects. For example, bat roost locations in trees may change each year. • An Ecological Clerk of Works will be employed on behalf of the Employers Representative team to ensure all mitigations measures are implemented in full. This will include monitoring and auditing the works and contractor programmes and works method statements, to ensure mitigation is correctly implemented. The EcOW will also ensure any disturbance licenses are arranged based on relevant details outlined in this EIAR and any significant findings of updated pre-construction surveys outlined above. A separate site ECoW will be also employed by the site contractor to ensure on site mitigation is implemented. The EcoW will advise on mitigation measures implementation including the scheduling of works and will be included in regular liaison meetings between project teams to ensure that plans are co-ordinated and impacts are minimised.
8.2	Construction Phase Mitigation for Direct Impacts to Ballyvergan Marsh pNHA	• Prior to works commencing, the works area within the marsh will be fenced to keep the footprint of the works within the wetland habitat to the bare minimum required to achieve the works. • Noise attenuating hoarding will be installed around drilling areas to minimise noise effects out with the works areas. • Bog mats will be utilised throughout the works areas to reduce rutting and direct damage to the habitat. • Where excavation is required, any turves of phragmites will be removed and stored such that they can be reinstated following completion of works. Removal of the turves will be carried out during dry weather conditions and monitored by the site EcOW to ensure kept watered etc. • The turves will not be stored on top of each other as this will result in compaction of the soul. The duration of storage will be kept to the minimum time necessary to allow for the translocation works to complete. • Following the completion of the works bog mats will be removed from the works area and the habitat reinstated. Reinstatement will be to the satisfaction of the NPWS and Local Authority. • Where bare earth remains (for example due to the clearance of scrub within the site) these will be planted at an appropriate time of the year with reed shoots. These shoots will be no less than 20cm in length and will be planted at densities of 10-15 cuttings per square metre. • Any additional requirements as outlined by the NPWS or Local Authority relating to the reinstatement of Ballyvergan Marsh will be incorporated, in agreement with the Client's Representative Team.
8.3	Construction Phase Mitigation for the	• Works are required on the margin of and partially within Annex fixed dune habitat at Claycastle.

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	Protection of Sand Dune Habitat	• Prior to works commencing, the sand dune habitat will be fenced to keep the footprint of the works within the habitat to the bare minimum required to achieve the works. • Where works encroach on the sand dune habitat temporarily, bog mats will be utilised to reduce rutting and direct damage to the grassland habitat. Where works will take place over a longer period, turves of grassland may be removed and stored such that they can be reinstated following completion of works. • The vegetation will be cut as short as possible prior to removal of turves. • Removal of the turves will be carried out during dry weather conditions. • The turves will not be stored on top of each other as this will result in compaction of the soul. The duration of storage will be kept to the minimum time necessary to allow for the translocation works to complete. This will be monitored by the site EcOW with input from specialist botanic expert if required. • Prior to reinstatement of the grassland, the ground will be prepared such that impacts due to possible compaction by the construction plant will be ameliorated.
8.4	Construction Phase Mitigation for the Protection of Calcareous Grassland at Ballyadam	• Translocation of calcareous grassland will be carried out prior to the commencement of the construction of the Converter station site to a temporary storage area. • Prior to translocation works commencing, a Habitat and Plant Translocation and Enhancement Strategy for the calcareous grassland will be established. This will include details which will outline the timing and co-ordination of the works with reference to the overall construction timeline. The plan will also outline the full suite of management criteria required for the habitat. • A strip of land along the western edge of the proposed converter station site has been identified as a potential temporary receptor site for the calcareous grassland and greater knapweed, refer to Figure TBC. The area of calcareous grassland comprises approximately 2,000m^2 while the donor site is approximately TBC m^2 in size. • Prior to works commencing, temporary fencing will be established at both the temporary receptor and donor site to clearly mark out these areas. This will prevent accidental damage to either of the sites. The fencing will remain in place following translocation and during the construction of the converter station. • The underlying bedrock is the same across the site, and given that the donor site has already been stripped back and hardcore placed, there is limited work required in terms of preparation of the site. • Within the area of calcareous grassland there may be certain undesirable negative indicator species which have established. These will be removed prior to translocation. • Given that the donor site consists of sparsely vegetated bare ground, there will not be a requirement to strip topsoil. • Translocation of turves is proposed for the calcareous grassland. The top 15cm of soil will be used to include the rooting zone. Larger turves will have the best chance at successful translocation. • The vegetation will be cut as short as possible prior to translocation. • Translocation will be carried out during dry weather conditions. • The turves will be placed close to the donor site. The turves will not be placed on top of each other as this will result in compaction of the soul. The duration of storage will be kept to the minimum time necessary to allow for the translocation of the soil. • Dependant on weather conditions, watering of the turves may be necessary to prevent them from drying out.

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		• Following removal of turves the earth embankment upon which the grassland has established will be translocated to the temporary donor site. • Once the earth bank has been re-created (i.e. mirrored depth of soil to the original bank) the turves will be placed on the bank. • Additionally, seeds from desirable positive indicator plant species within the converter station footprint will be collected and the bank will be seeded, to encourage establishment. Collection times for the seeds will be species dependant, and sowing will be undertaken by hand. • Following the completion of the translocation, permanent stock proof fencing will be placed surrounding the donor site. • Ashwood[5] outlines that grassland establishment can take between 3 and 5 years. Mowing may be required for the ongoing maintenance of the grassland. This will likely be required on a yearly basis to keep the sward fellow 10cm. • Mowing will take place on a yearly basis in the second and third years and will take place after grasses have set seed. All cuttings will be removed from the site to avoid nutrient enrichment of the sward and shading of seedlings (Croft & Jefferson, 1994; Ashwood, 2014). • A final translocation will take place of the grassland from the temporary translocation site between 3 and 5 years after the initial translocation (to the temporary site). The final translocation site is within the convertor station site. The final translocation and establishment methods will follow the approaches outlined above and as follows. • Long-term management through grazing and/or cutting is essential for maintaining species richness. A long-term management plan will be developed which includes a monitoring and evaluation programme. This will be developed in line with JNCC (2014) guidance and include at a minimum: – The extent of grassland establishment, including details on percentage ground cover, areas where establishment has failed, and the presence of leaf litter. – Sward composition including grass to her ratio, presence of positive indicator species, establishment of greater knapweed, and any negative indicator species present. • A regular evaluation of the management of the habitat will be undertaken, and where issues regarding the establishment are encountered, proposals will be made as to steps to be taken to improve the chances of re-establishment. • Engagement with the IDA will continue and where there is potential for works to be carried out in parallel, appropriate mitigation measures will be implemented including the scheduling of works and regular liaison meetings between project teams to ensure that plans are co-ordinated, and impacts are minimised.
8.5	Construction Phase Mitigation for the protection of Oak Ash Hazel Woodland	• Where clearance is required of oak ash hazel woodland this will be kept to the absolute minimum area necessary to facilitate the works. Reinstatement will be carried out where woodland is removed to facilitate passing bays. Reinstatement will be carried out using suitable tree species which are being removed from the habitat. The area impacted will be replanted so no net permanent loss of this habitat arises.

[5] Ashwood, F (2014) Lowland Calcareous Grassland Creation and Management in Land Generation. Best Practice Guidance for Land Regeneration Note 18.

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8.6	Construction Phase Mitigation for the Protection Hedgerows, Treelines, and Grassland Verges at Passing Bays	• This measure applies to verges along public roadways. All passing bays will be removed on completion of the project. The passing bay will be in place for a period of up to 18 months. However, they will be removed sooner if possible. The contractor will be obliged both by the Client's Representative and by the local authority to reinstate all hedges and roadside verges, where practicable. • Unless otherwise agreed with the Client's Representative and the local authority, the Contractor will re-instate hedgerows, and treelines, to a species-rich condition (i.e. five woody species per 30 m), comprising only native species. • Unless otherwise agreed with the Client's Representative and the local authority, the Contractor will seed all grassland verges with a native wildflower mix (to specification of EC12 Wild Flora for Earth Banks, Bunds and Ditches; http://www.wildflowers.ie/mixes/ec/ec12.htm or similar. • All other sites will be returned as close as possible to their pre-existing condition, using the same woody species removed, or similar verge seed mixes, under the supervision and direction of the ECoW.
8.7	Construction Phase Mitigation for the Protection of Orange Foxtail	• Joint bays (and by proxy, the adjacent passing bays (c.60 m long), were, wherever possible, identified in places which minimised removal of hedgerows and mature trees • Prior to works commencing a detailed survey for the species within suitable habitat where direct impacts will arise, will be carried out by an experienced botanist during its flowering season (optimal survey season for grass is between June and August). The botanist, to be appointed by the Contractor, will coordinate with the Contractors ECoW and, report findings to the Ecologist with the Client's Representative Team. The botanist will be contracted for a period lasting at least one year following the cessation of potentially damaging construction works at the plant location(s) (see monitoring below). • A management plan will be drawn up by the appointed botanist, in consultation with a NPWS grassland specialist. The plan will be specific to the species which will outline the measures to protect the species by either avoiding and protecting the plant species in situ, or (only as a last resort) through the translocation of the plant species to new receptor locations nearby, under licence from the NPWS. Any additional measures as outlined under the terms of the license will also be included. • For a period lasting at least one year following the cessation of potentially damaging construction works at the plant location(s), the appointed botanist will undertake quarterly site visits to photograph and document the success of the mitigation measures, and discharge any conditions associated with any license(s). Where issues regarding the establishment are encountered, the botanist will consult with the NPWS, in agreement with the Contractor and the Ecologist within the Employer's Representative Team, to identify reasonable steps to improve the chances of re-establishment.
8.8	Construction Phase Mitigation for the Protection of Pennyroyal	• Prior to works commencing a detailed survey of suitable habitat (the sand dune habitat at Claycastle) for the species will be carried out by an experienced botanist during its flowering season (August to September). • A management plan will be drawn up specific to the species which will outline the measures to protect the species in the first instance by either avoiding and protecting the plant species in situ or (only as a last resort) through the translocation of the plant species to new receptor locations nearby, under licence from the NPWS. • Where the plant is located within the footprint of the works the temporary removal, storage and reinstatement of the turves of grass as outlined for the protection of the sand dune habitat will allow for the reinstatement of the plant species also. Any additional measures as outlined under the terms of the license will also be included.

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		• Following completion of the works a regular evaluation of the success of the mitigation measures will be undertaken, and where issues regarding the establishment are encountered, proposals will be made as to steps to be taken to improve the chances of re-establishment.
8.9	Construction Phase Mitigation for the Protection of Tufted Feather Moss	• Prior to works commencing a detailed survey of suitable habitat for the species will be carried out by an experienced bryologist. • Where the species is confirmed within the red line boundary, a management plan will be drawn up specific to the species which will outline the measures to protect the species by either avoiding or protecting the plant species in situ, or through the translocation of the plant species to new receptor locations nearby. • Following completion of the works a regular evaluation of the success of the mitigation measures will be undertaken, and where issues regarding the establishment are encountered, proposals will be made as to steps to be taken to improve the chances of re-establishment. • Tufted feather moss is known to be associated with lowland streams and rivers, and can be found on roots of trees and on rocks, boulders, silt, also on tarmac.
8.10	Construction Phase Mitigation for the Protection of Wild Clary	• Prior to works commencing a detailed survey of suitable habitat (the sand dune habitat at Claycastle) for the species will be carried out by an experienced botanist during its flowering season (August to September). • A management plan will be drawn up specific to the species which will outline the measures to protect the species in the first instance by either avoiding or protecting the plant species in situ. • Where the plant is located within the footprint of the works the removal and reinstatement of the turves of grass as outlined for the protection of the sand dune habitat will allow for the reinstatement of the plant species also. Any additional measures as outlined under the terms of the license will also be included. • Following completion of the works a regular evaluation of the success of the mitigation measures will be undertaken, and where issues regarding the establishment are encountered, proposals will be made as to steps to be taken to improve the chances of re-establishment.
8.11	Construction Phase Mitigation for the Protection of Greater Knapweed	• Prior to works commencing a detailed survey of suitable habitat (the grassland at the proposed Converter Station) for the species will be carried out by an experienced botanist during its flowering season (July to September). This will allow for the identification of any additional populations within the ZoI. • A management plan will be drawn up specific to the species which will outline the measures to protect the species. • A short term donor site has been identified TBC. This will allow for storage and protection of greater knapweed plants while the construction phase progresses. • A strip of land along the eastern edge of the proposed converter station site has been identified as a long-term donor site for the calcareous grassland. This will also be used to facilitate the translocation of greater knapweed. The donor site is approximately TBC m2 in size. The underlying bedrock is the same across both areas within the site and given that the donor site has already been stripped back and hardcore placed, there is limited work required in terms of preparation of the site. • Following the establishment of the long-term donor site the greater knapweed plants will be translocated once more from the short-term location.

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		• Following completion of the works a regular evaluation of the success of the mitigation measures will be undertaken, and where issues regarding the establishment are encountered, proposals will be made as to steps to be taken to improve the chances of re-establishment. This will take place regularly in advance of any mowing of the calcareous grassland so as to protect plants from further damage associated with the management of the site.
8.12	Construction Phase Mitigation for the Protection of Otter	• The Contractor will ensure an initial otter survey is undertaken in advance of the commencement of any works within 150m of the works areas as per Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes. This will allow for the identification of any holts have been established prior to commencement of works. • The pre-construction survey will be conducted no more than 10-12 months prior to construction commencing. A secondary inspection of the works areas immediately prior to site clearance will ensure that no new holts have been created in the intervening periods. • Should holts be identified within 150m of the proposed development the following will, at a minimum, be employed, unless otherwise agreed with the NPWS: – No works will be undertaken within 150m of holts where breeding females or cubs are present. – Works within 150m of such a holt can only take place following consultation and in agreement with the NPWS – No wheeled or tracked vehicles of any kind will be used within 20m of active but non breeding holts – No light work such as digging by hand or scrub will take place within 15m of such holts except under license from NPWS – The identified exclusion zones will be fenced and clearly marked on site prior to any invasive works. – All contractors on site will be made fully aware or the procedures in relation to the holts by the EcoW
8.13	Construction Phase Mitigation for the Protection of Badger	• Prior to any works commencing a preconstruction badger survey will be carried out. Surveys will be conducted having regard to *Surveying Badgers* (Harris et al.1989) and record signs of badgers including tracks, hair, latrines and setts. The extent of survey area will be defined with regard to Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA, 2006) as 150m beyond the all works areas within suitable habitat. • Prior to works commencing, sett activity at all identified setts within 150m will be confirmed. This may be confirmed through the use of camera monitoring, setting of footprint traps, soft blocking of the sett entrance or similar. Any risk of disturbance to badger will be subject to disturbance license requirements. • A description of the setts i.e. main sett, annex sett, or outlier sett will be provided by the EcoW along with the level of activity at the sett. This will allow for an understanding of the importance of the setts in the wider context of the local population. • As per the Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA, 2006), where setts have been confirmed, no heavy machinery will be used within 30m of badger setts (unless carried out under licence from the NPWS). Lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances. • Unless otherwise agreed, and under license from the NPWS, during the breeding season (December to June inclusive), none of the above works will be undertaken within 50m of active setts nor blasting or pile driving within 150m of active setts. An assumption that the sett is active will apply unless proven otherwise during the course of investigation.

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		• All identified exclusion zones as outlined above will be clearly marked out on site and communicated to all site staff prior to works commencing. • Where works may interfere with the badger sett directly exclusion will take place as per NRA (2006) guidelines.
8.14	Construction Phase Mitigation for the Protection of Bats	• The Design and Construction of bat mitigation measures will be site specific, and comply with licensing requirements, having regard for relevant guidance including the NRA's "Guidelines for the Treatment of Bats During the Construction of National Road Schemes"[6], and the NPWS Bat Mitigation Guidelines for Ireland[7]. • Trees will not be felled and removed in advance of surveying for bats. Prior to felling of any trees, an initial bat survey of trees to be felled will be undertaken, by a licensed qualified specialist, to assess the suitability of the tree to contain bat roosts as per Bat Surveys for Professional Ecologists: Good Practice Guidelines. • Trees identified with potential roost features of a Moderate to High value will be thoroughly examined, under licence from the NPWS, to ascertain the presence or absence of roosting bats. The trees will be examined for the presence or absence of bats / bat roosts immediately prior to felling. Where timing facilitates it (ie when felling is being undertaken during the active season for bats), emergence surveys may be carried out to determine presence or absence of roosting bats Where felling does not occur within one day of the examination, the trees will be re-assessed. • Where evidence of a roost, or roosting bats has been determined, a license for destruction of a roost and/or exclusion of bats will be required from the NPWS. The procedures for the exclusion of bats and destruction of roost as detailed in the license document will be obeyed, at all times, by the Contractor. • Where bat exclusions are required, they will be undertaken in accordance with the requirements of the bat specialist. They will not be carried out during the breeding season, between the months of June to August inclusive, or during hibernation in the months of November to March inclusive, unless under license from the NPWS. Where the felling of trees found to be suitable as bat roosts cannot be avoided, appropriate mitigation will be agreed with the NPWS and put in place at least one month in advance of any felling or disturbance. • If any bat roost sites are removed by the Works, appropriate replacement bat roost sites will be provided following consultation with the NPWS, and in consultation with the local authority, on public lands. • The Design and Construction of bat mitigation measures will be site specific, and comply with the requirements of the bat specialist, the Standards, the TII's "Guidelines for the Treatment of Bats During the Construction of National Road Schemes", the National Parks and Wildlife Services Bat Mitigation Guidelines for Ireland, the National Parks and Wildlife Service Circular 2/07 Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997.
8.15	Construction Phase Mitigation for the Protection of Red Squirrel	• Prior to works commencing in areas of suitable habitat (i.e. hazel woodland) a targeted survey for the species will be carried out prior to any works taking place. Surveys may include observation surveys, drey counts and feeding remain searches.

[6] https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Bats-during-the-Construction-of-National-Road-Schemes.pdf

[7] Kelleher, Conor & Marnell, Ferdia. (2006). Bat Mitigation Guidelines for Ireland.

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		• Should the species be confirmed within the woodland an assessment of potential for direct impact will be undertaken. Any dreys to be removed will only be removed under license from NPWS. These dreys will be replaced using artificial dreys. Any additional measures outlined by the NPWS under the terms of their license will also be incorporated. • Reinstatement of habitat for the species will take place as outlined for Oak Ash Hazel Woodland in **Error! Reference source not found.**.
8.16	Construction Phase Mitigation for the Protection of Pygmy Shrew, Hedgehog, and Stoat	• Implementation of mitigation for breeding birds as outlined below will avoid vegetation removal during March-August inclusive. This existing mitigation will simultaneously avoid the majority of the main breeding season for pygmy shrew and hedgehog which run from April-October, and stoat, which breeds in May-June (Hayden and Harrington, 2001)
8.17	Construction Phase Mitigation for the Protection of Watercourses	• Mitigation specifically in relation to instream works and protection of fisheries will be conducted in agreement with IFI and follow appropriate guidelines including IFI (2016)[8]. The Contractor will prepare a detailed method statement for instream works specific to each river crossing under supervision and direction of the ECoW. This will be finalised and agreed with IFI, in agreement with the Employer's Representative. • As the river water bodies hold fish species protected under the Wildlife Act and/or the EU Habitats Directive (e.g. Atlantic salmon, lamprey, brown trout, European eel) agreement will be required with IFI for dewatering of the water body reach as part of the instream works required for open trench crossing at stream locations outlined in Table 7.8. A fish salvage operation will be undertaken. The fish salvage operation will be authorised and licensed by the IFI and carried out by either the IFI or by fully qualified, licensed and authorised freshwater ecologists. Instream works will only take place during the period July to September, unless otherwise agreed with IFI. All instream works, silt control measures, sanitising of equipment (to avoid spread of aquatic invasive species), fish salvage operations and habitat protection measures will be monitored by an appropriately experienced ECoW. All instream substrates (gravels, rocks and sand) will be retained during construction and reinstated post works. Bankside turves will also be retained and reinstated post works. Vegetation regrowth on banksides will be monitored for at least three years post works to ensure appropriate development of native semi natural riparian plant growth and where required replanting or control of invasive species will be carried out by the Contractor under the supervision and direction of the ECoW and in agreement with relevant authorities.
8.18	Construction Phase Mitigation for the Protection of Wintering Birds: Waterfowl	• The potential for impact through noise disturbance has been identified for birds at Claycastle landfall site, at Loughs Aderry and Ballybutler pNHA and within Ballyvergan Marsh pNHA. There is potential for works to take place during the wintering season for birds. • Prior to the commencement of the works, a sound reducing hoarding will be placed along work areas adjacent to Ballyvergan Marsh (and moved to follow the cable trenching crews within the marsh itself), at Claycastle beach and along the roadside adjacent to Loughs Aderry and Ballybutler (000446).

[8] Inland Fisheries Ireland (2016). Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.

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		• This will help to reduce the noise impacts associated with the construction phase of the works and also reduce visibility of personnel and machinery. • All plant used during the construction phase will be the quietest of its type practical for achieving the works. • All plant will be operated and maintained in accordance with the manufacturer's recommendations including the use and maintenance of any specific noise reduction measures. • At a minimum the following will be incorporated to reduce the impact further: – The use of mufflers on pneumatic tools. – Effective exhaust silencers. – Sound reducing enclosures. – Pumps and static mechanical plant will be enclosed by acoustic sheds or screens. – Machines in intermittent use will be shut down during periods where they are not required.
8.19	Construction Phase Winter Raptor Roosts	• The potential for disturbance to hen harriers has been identified for works at Claycastle, within Ballyvergan Marsh, and at the road alongside the marsh where works proceed at early morning or late afternoon between November and March inclusive. • Restrictions of high-noise level operations, (e.g. rock breaking and piling) to outside of arrival and departure times as outlined by O'Donoghue 2021 i.e. commencing work no earlier than 50 minutes before sunrise and concluding 90 minutes before sunset. • During the works monitoring for hen harrier will take place by the EnCow.. Should hen harrier be observed returning to a roost, works will cease until the bird has left. Details pertaining to hen harrier activities and subsequent requirements for work stoppage will be recorded daily and provided to the Developer's Ecologist and Local Authority on a weekly basis. • The potential for disturbance to winter raptor (hen harrier) roosts has been identified for works at Claycastle, within Ballyvergan Marsh, and at the road alongside the marsh where works proceed at late afternoon between November and March inclusive.
8.20	Construction Phase Mitigation for the Protection of Breeding Birds	• As outlined in the description of the development the clearance of trees, and scrub will take place outside of the breeding season for birds where possible or as determined by risk of disturbance to a nest site. A suitably qualified ecologist / EcOW will conduct pre-construction surveys to assess risk of disturbance to nesting birds to inform tree clearance activity. • The reinstatement of habitat for breeding birds will take place as outlined in section 8.9.1 in relation to the reed swamp at Ballyvergan Marsh, and in section 8.9.3 in relation to hedgerows, treelines and woodland reinstatement. Habitat reinstatement will be monitored by the site EnCoW. • Specialist surveys will be carried out for kingfisher in line with NRA guidance.These will incorporate a survey area of 500m upstream and downstream of the works where suitable habitat exists. Surveys will be carried out between March and July. Features likely to be of note to kingfisher will be recorded and watches of suitable nest areas undertaken. The loss of any potentially suitable nesting sites will be compensated through the addition of artificial nesting sites along nearby sections of watercourse and within the breeding territory. The provision of any new nesting sites for kingfisher will be undertaken in line with NPWS and IFI consultation.

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8.21	Construction Phase Mitigation for the Protection of Amphibians	• A pre-construction survey for smooth newt and frogs species will be undertaken prior to works commencing at potential suitable breeding habitat (ditches ponds and drains impacted). • When surveying for the species biosecurity measures will be followed to ensure that there is no incidental spread of vector borne diseases between waterbodies. This includes the cleaning, disinfection and drying of all equipment and will have regard to guidelines from Inland Fisheries Ireland. • Should either species be recorded, translocation of the species to areas outside of the proposed development footprint will be undertaken, in consultation with the NPWS. Any translocation of these species will be under license by the NPWS. • Where common frog is recorded within the footprint of the works, any spawn or adult frogs recorded will be captured and removed from affected habitat by hand net and translocated to the nearest area of available suitable habitat. • Where smooth newt are recorded, juveniles or adults will be captured and translocated to the nearest suitable wetland feature outside of the works areas.
8.22	Construction Phase Mitigation for the Protection of Viviparous Lizard	• Prior to the commencement of works within suitable habitat a dedicated survey to ascertain the presence or absence of viviparous lizard within the works areas will be undertaken. Key areas include fixed sand dune habitat, Ballyadam and Ballyvergan marsh. Should their presence be confirmed viviparous lizard within the works area will be translocated under license by NPWS to prevent direct impact on the species. Any translocation will be suitable habitat. • Measures for the reduction of habitat loss are as outlined previously. •
8.23	Construction Phase Mitigation for the Prevention of Spread of Invasive Species	• Japanese knotweed, Himalayan balsam, three cornered leek, and sea buckthorn have all been recorded in proximity to the development. There is potential for additional stands of scheduled invasive species to be present within or adjacent to the works areas in accessible areas, or if populations establish between the completion of date of EIA surveys, and the commencement of construction. • Prior to works commencing a full invasive species survey will be carried out. The pre-construction invasive species survey will be carried out within the works areas, including compound locations and laydown areas, and along proposed access routes to identify the presence of all invasive species within and adjacent to works areas. • The findings of this invasive species survey will be incorporated into an Invasive Species Management Plan (ISMP) for the works. • The Invasive Species Management Plan will be in place prior to any works commencing. The Invasive Species Management Plan will be a live document, regularly reviewed and updated throughout the works to include for any additional invasive species encountered. • The Invasive Species Management Plan will set out site-specific and species-specific measures to manage invasive species. • Any stands of invasive species that are recorded within the site will be clearly marked out as restricted areas. This exclusion zone will incorporate a buffer such that below ground growth is accounted for, noting the reduced extents for Japanese knotweed based on recent research9 . No works will be carried out within the exclusion zones unless fully supervised by the EnCoW.

[9] Fennell, M., Wade, M., & Bacon, K. L. (2018). Japanese knotweed (Fallopia japonica): an analysis of capacity to cause structural damage (compared to other plants) and typical rhizome extension. PeerJ, 6, e5246.

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		• The appointed EnCoW will carry out a toolbox talk for all construction personnel which will provide information on how to identify and manage invasive species. • The EnCoW will also implement additional biosecurity measures on site such as the visual inspection of vehicles for evidence of attached plant or animal material prior to entering and leaving the works area. • A Check, Clean, Dry protocol will be undertaken with all equipment, machinery and vehicles entering and leaving the Proposed development site boundary. • Where works are carried out within watercourses, all machinery will be inspected and will be completely dry prior to works commencing to prevent the risk of pathogen translocation. All machinery will be cleaned following completion of the works. • Any fill that is required as part of the proposed development will be from a licensed facility
8.24	Operational Phase (Converter Station)	• The detailed design of outdoor lighting will incorporate in full design recommendations10 from Bat Conservation Ireland as follows: – Hours of illumination: provide some hours of darkness. – Light levels: install lighting that meets the lowest light levels permitted under health and safety. Specification and colour of light treatments: use low-pressure sodium lights instead of high-pressure sodium lights or mercury lamps. If mercury lamps are to be used, fit them with UV filters. – Column heights of lamp posts: reduce the amount of light spillage where it is not needed by restricting the height of lamp columns. – Type of lamps and luminaries to be installed: directional lighting means lighting is directed to where it is needed and thus prevents light spillage and light pollution. – Using modern light technology that restricts the horizontal plane of the luminaries thereby directing the lighting to where required ensuring light is not directed at an angle greater than 70 degrees from the vertical plane. • The final lighting plan will be reviewed by an experienced bat ecologist to ensure lighting levels are minimised for the site and excessive light spill is avoided at locations where lighting is not required and directed away from treelines and other retained habitat with some ecological value.
8.25	Construction Phase (Monitoring)	• During construction, monitoring will be carried out, and reported by the Contractrors Ecologist, in agreement with the Client' Representative Team, and having regard for relevant conditions and licenses where required. • Following completion of construction, the obligation for monitoring (e.g. of translocation and enhancement areas) will pass to the developer's Ecologist, with having regard for relevant conditions and licenses. • Monitoring will take place of areas of translocation within the converter station, any areas where turves were reinstated at the landfall site and at Ballyvergan Marsh. The monitoring of these sites will be carried out by a suitably qualified ecologist. This will enable the identification of potential barriers to successful establishment and determine the overall success of the process.

[10] Bat Conservation Ireland (December 2010). Bats and Lighting Guidance for; Planners, engineers, architects and developers.

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		• Where establishment has been found to fail, steps can be taken to boost the chances of establishment. This can include measures such as re-seeding of areas where there is die-back, and removal of negative indicator species such as bramble where the establishment of same will put the habitat at risk of degradation. • The intervals at which the monitoring will take place will be determined by the relevant ecologist, having regard for licenses, and planning conditions. However, at a minimum it is expected that annual monitoring take place for the initial five years following reinstatement/translocation. Following the five-year monitoring it may be reviewed to determine whether the monitoring period requires extension. There may be no requirement for extension should the habitats fully establish by that time. Monitoring reports will be provided to the Ecologist within the Employer's Representative Team. • As outlined in section 8.1.1.8 monitoring will also be conducted at river crossings where instream works, and river bankside disturbance works took place.
8.26	Mitigation for the Protection Hedgerows, Treelines, and Grassland Verges at Passing Bays	• This measure applies to verges along public roadways. – All passing bays will be removed on completion of the project. The passing bay will be in place for a period of up to 18 months. However, they will be removed sooner if possible. The contractor will be obliged both by the Client's Representative and by the local authority to reinstate all hedges and roadside verges, where practicable. – Unless otherwise agreed with the Client's Representative and the local authority, the Contractor will re-instate hedgerows, and treelines, to a species-rich condition (i.e. five woody species per 30 m), comprising only native species. – Unless otherwise agreed with the Client's Representative and the local authority, the Contractor will seed all grassland verges with a native wildflower mix (to specification of EC12 Wild Flora for Earth Banks, Bunds and Ditches; http://www.wildflowers.ie/mixes/ec/ec12.htm or similar. • All other sites will be returned as close as possible to their pre-existing condition, using the same woody species removed, or similar verge seed mixes, under the supervision and direction of the ECoW.
8.27	Cumulative Effects	• Prior to commencement of construction and during the construction phase engagement with Cork County Council and the Office of Public works (OPW) and ESB and Irish Water will continue and where there is potential for works to be carried out in parallel, appropriate mitigation measures will be implemented including the scheduling of works and regular liaison meetings between project teams to ensure that plans are co-ordinated and impacts are minimised.
Chapter 9 The Landscape		
9.1	Operational Phase	• The main focus of mitigation for landscape and visual impacts is in respect of the main buildings of the converter station, which are large in scale and prominently visible from some receptors within the surrounding landscape, particularly from the north. Two methods of mitigation will be utilised, which will work in combination. • The first mitigation measure is a dispersed colour pattern for the facades of the buildings that graduates from darker earthy / vegetation tones at the base of the buildings to lighter sky coloured tones towards the upper sections. The purpose of the colour scheme is to; – Break down the perceived scale and massing of the proposed converter station buildings – Provide a dark plinth to the base of the buildings to reduce the perceived vertical height

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		– To provide earthy / vegetation tones through the base and mid sections of buildings to tie into surrounding existing and proposed vegetation patterns. This has been done in a blocky geometric manner that balances the obvious industrial nature of the development without appearing as an overt attempt to camouflage it. – To provide a light-tone recessive colour scheme for upper sections of buildings likely to be viewed against a backdrop of sky: • The second mitigation measure is the provision of a band of screen planting along the northern and western sides of the main converter station building and a more formal treeline along the southern boundary of the site. It is intended that this reach a height of around 8-10m over the course of approximately 5-7 growing seasons and will consist of some advanced nursery stock (semi-mature trees) at planting stage in combination with a majority of whip transplants. Optimisation of the ecological function of this planting will also be a consideration though the use of pollinator species insofar as possible. • The mitigation measures outlined above have been incorporated into a post-mitigation establishment set of photomontages to aid the assessment of residual visual impacts. • Landscape and visual mitigation measures are not considered necessary in relation to the landfall area and HVDC/HVAC UGC routes as there will be no material effects from the operational stage above ground elements. Likewise, for temporary / short term elements of the project, including the construction compounds laydown Areas and passing bays, specific landscape and visual mitigation measures are not considered necessary.
9.2	Cumulative Effects	• Internal landscaping similar to that set up as a precedent by measures proposed on the converter station site (southern boundary) will aid visual integration and consolidation of development within the wider IDA site (if implemented).
Chapter 10 Archaeology and Cultural Heritage		
10.1	Construction Phase	• An underwater archaeological survey and evaluation will be undertaken for all watercourses along the scheme route with particular regard to the Disour River (CH120), Kiltha River and associated demesne landscape (CH122), Dungourney River (CH123) and Owenacurra River (CH137) and its tributary (CH124). This survey and evaluation should – Be carried out by a suitably qualified and suitably experienced underwater archaeologist under licence – Incorporate appropriate dive and wade survey as well as metal detection survey – Result in a detailed report setting out any findings and outlining any further mitigation measures that should be employed in relation to the proposed development. This report should be submitted to the National Monuments Service (DHLGH). • Note, where a HDD methodology is proposed to facilitate a crossing, this should avoid any direct impact on the subject river or water course at that location. • A combination of advance geophysical survey and advance archaeological test trenching should be carried out for all off-road sections of the cable routes as well as the proposed Laydown Areas. This advance prospection should: – Be carried out by a suitably qualified archaeologist under licence – Result in a detailed report setting out any findings and outlining any further mitigation measures that should be employed in relation to the proposed development. This report should be submitted to the National Monuments Service (DHLGH). • Where a section of an upstanding townland boundary must be removed then:

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		– A representative cross-section of the townland boundary should be investigated and recorded by a suitably qualified archaeologist prior to removal. • A suitably qualified and experienced Project Environmental Specialist will be appointed to develop a Project Environmental Remains Strategy in relation to the investigation and sampling of the submerged landscape and peat deposits along the cable route at Claycastle Beach (CH138). It will be prepared in accordance with the *TII Palaeo-environmental Sampling Guidelines*. • Exposed peat deposits to the SW of the cable route at Claycastle Beach (CH138) which include the site of a possible *fulacht fiadh* trough (CA3007) should be fenced off from the construction works for their duration with a minimum exclusion zone of 15m. • The site of the metal object (CA3001) should be fenced off from the construction works for their duration with a minimum exclusion zone of 15m. However, if this is not possible to protect the site then a full archaeological excavation of this feature should be carried out to preserve this feature by record and to establish its relationship to the peat deposits further to the SW. • The exact location of milestone CH053 should be identified on the ground by an archaeologist and demarcated precisely on all drawings for this section of the scheme. An exclusion zone a minimum of 15m in diameter should be established around the location of the site. It should be fenced off for the duration of construction works on that section of the scheme and while Laydown Area LDA-DC05 is in use/operation. • All sub-surface groundworks associated with the proposed development works will be subject to a programme of archaeological monitoring. – This should be carried out by a suitably qualified archaeologist under license and in accordance with the provisions of the National Monuments Acts 1930-2004. – If significant archaeological material is encountered during the course of archaeological monitoring, then resolution of any such significant material will be determined in consultation with the National Monuments Service (DHLGH). – Where possible, every reasonable effort should be made to preserve in situ or reduce the impact on any identified archaeological material. Where preservation in situ cannot be achieved, either in whole or in part, then a programme of full archaeological excavation should be implemented to ensure the preservation by record of the portion of the site that will be directly impacted upon. This work should be carried out by a suitably qualified archaeologist under license and in accordance with the provisions of the National Monuments Acts 1930-2004. – A written report will be prepared detailing the results of all archaeological work undertaken.
Chapter 11 Roads and Traffic		
11.1	Construction Traffic management Plan	• The temporary effects of construction (none of which have been assessed as 'significant') or otherwise) will be mitigated through adoption of a regulated and approved CTMP. A summary of key CTMP mitigation elements follow, however the framework CTMP is provided in full as Appendix 11.2. • The assessment of post mitigation effects has been undertaken on the assumption that key measures set out in the CTMP will be developed as appropriate by the appointed contractor and be implemented during the project construction phase. • The appointed contractor will agree temporary traffic management measures then adopt and monitor an appropriate way of working in consultation with Cork County Council, the appointed contractor, TII and/or their Agents and An Garda Síochána as

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appropriate. Construction activity generated vehicles (with the exception of site personnel in cars and vans) will travel on pre-defined routes to and from the relevant sites to reduce effects on existing local traffic.

- The framework CTMP has been developed for the purposes of this assessment and will be further developed as necessary in consultation with Cork County Council and the Gardai prior to construction commencing. The CTMP will document outline measures to promote the efficient transportation of components and materials to site, whilst reducing congestion and disruption which might impact negatively on local communities or general traffic and in particular the emergency services. The CTMP will be considered a 'live' document and will be developed accordingly to include current information per the following:
  - a programme of delivery types/numbers by month;
  - a statement of which public roads are to be used by construction traffic;
  - a statement of which public roads are not to be used by construction traffic;
  - a statement of which local towns and villages are to be avoided (completely or on stated days and times);
  - details of all proposed mitigation measures, list of contacts, and details of measures that will be implemented to limit the potential of vehicle stacking on any part of the public road network;
  - if appropriate, details of speed restrictions through sensitive areas and procedures to ensure pedestrian safety adjacent to worksites; and
  - details of temporary signage to be installed at defined locations.
- To minimise inconvenience to the local community in terms of obstructive parking, adequate car parking for permanent site personnel, visitors and deliveries would be provided within the Ballyadam worksite compound. Adequate vehicle parking space would be provided on-site and car parking will not be permitted on any public road network adjacent to the site, so that sight lines would be maintained and to minimise potential for obstruction and delay for other road users.
- Furthermore, only vehicles essentially required to facilitate construction will be allowed to attend cable route worksites. Car sharing would be promoted to construction personnel by the contractor during the induction process.
- The appointed contractor could employ a number of sub-contractors and all would fall under the umbrella of the CTMP and would have an obligation to adhere to the Plan, this obligation would form part of the procurement process and would be written into any contract of employment.
- Compliance would be monitored by the Project Manager, on behalf of the appointed contractor, via spot checks to ensure that vehicles follow the measures set out in the CTMP and recording of any complaints. The appointed contractor would stipulate that all contractors disseminate these rules to their sub-contractors.
- In advance of undertaking abnormal load deliveries necessary permitting, approvals and infrastructure accommodation works will be agreed with relevant authority and implemented accordingly. Delivery vehicles will only follow agreed routes and will be delivered overnight to minimise potential for delay and obstruction to general traffic.
- In liaison with EirGrid, the appointed contractors will be required to maintain close liaison with local community representatives, landowners and statutory consultees throughout the construction period. This is likely to include circulation of information about ongoing activities; particularly those that could potentially cause disturbance, including due to traffic.
- The appointed contractor would nominate a person to be responsible for the co-ordination of all elements of traffic and transport during the construction process (Liaison Officer). This person would liaise with the local community so that the community has a

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		direct point of contact within the developer organisation who they could contact for information purposes or to discuss matters pertaining to traffic management or site operation. • If the construction phase of any notably sized development(s) appears likely to overlap with the Project, the appointed contractor would seek to liaise with the appropriate developer organisation regarding the scheduling of deliveries to identify potential means of reducing the effects of combined construction.
11.2	Construction Access Arrangements	• Transportation, including deliveries to and from the construction areas will be taken from the existing public road network. The local area road network is shown on **Error! Reference source not found.**. Given the nature of construction of the cable route, t here will be multiple work sites along the route throughout the construction programme. • The construction methodology, including construction access arrangements are provided within Chapters 2 and 3. The proposed programme of worksite locations will be confirmed by the appointed contractor as an integral part of their adopted CTMP, the framework of which is provided as Appendix 11.2. All construction vehicle drivers will be instructed to access their destination worksite via an approved route
11.3	Cumulative Effects	• Prior to commencement of construction and during the construction phase engagement with these sites where there is potential for works to be carried out in parallel, appropriate mitigation measures will be implemented including the scheduling of works and regular liaison meetings between project teams to ensure that plans are co-ordinated and impacts are minimised.
Chapter 12 Material Assets		
12.1	Construction Phase: Utilities	• All reasonable measures will be taken to avoid unplanned disruptions to any services during the proposed works. This will include thorough investigations to identify and reconfirm the location of all utility infrastructure within the works areas, and the implementation of robust procedures when undertaking works around known infrastructure services. • Service disruptions impacting the surrounding residential, social and commercial properties will be kept to a minimum, only occurring where unavoidable. Prior notification of disruptions will be given to all impacted properties. This will include information on when disruptions are scheduled to occur and the duration of the disruption. Consultation with relevant neighbouring parties will be undertaken prior to any proposed disruptions.
12.2	Construction Phase: Waste Management	• A Construction Waste Management Plan (as part of the CEMP) will be prepared by the appointed contractor and agreed with the Planning Authority prior to commencement of development. The plan will provide for the segregation of all construction wastes to facilitate optimum levels of re-use, recovery, and recycling operations. • The plan will be prepared in accordance with waste management guidance and the principles as outlined in Design Out Waste: A design team guide to waste reduction in construction and demolition projects (EPA, 2015) and Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects, Department of the Environment, Heritage and Local Government (DoEHLG), June 2006. • All operations at the site will be managed and programmed in such a manner as to prevent / minimise waste production and maximise upper tier waste management (i.e. re-use, recycle, and recovery) in line with the Waste Hierarchy where technically and economically feasible. • Waste arisings will be handled, stored, managed and re-used or recycled as close as practicable to the point of origin.

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		• Wastes sent off site for recovery or disposal will only be conveyed by an authorised waste contractor and transported from the proposed development site to an authorised site of recovery / disposal in accordance with the Waste Management Act 1996 and associated amendments and regulations and in a manner which will not adversely affect the environment. All employees will be made aware of their obligations under the Plan. • The Plan will be available for inspection at the site of the proposed substation at all reasonable times for examination by the Local Authority.
12.3	Construction Phase: Waste Management	• All waste generated during the operational phase will be managed in accordance with the relevant provisions of the Waste Management Act 1996 and associated amendments and regulations, particularly with regard to the use of appropriately permitted waste contractors and destinations for waste materials.
12.4	Cumulative Effects	• There will be a need to ensure that where works are occurring in parallel that appropriate mitigation measures are considered, including the scheduling of works, regular liaison meetings between project teams to ensure plans are co-ordinated and impacts are minimised.
Chapter 13 Noise and Vibration		
13.1	Construction Phase	• The Contractor will prepare and implement a Construction Noise and Vibration Management Plan (CNVMP) as part of the CEMP. • Set out within the CNVMP, the Contractor will be obliged to comply with Local Authority controls on noise and vibration during construction. The guidance given in BS 5228:2009+A1:2014 Part 1 and Part 2 describes appropriate measures and limits for the control of noise and vibration from construction activities. These have been used for this assessment however the appointed contractor will consult the Local Authority to agree limits and measures of control to be applied. Where feasible, the transition pits for horizontal directional drilling will be screened to ensure that there is a barrier between the source and sensitive receptors. The location of the noise barrier will be set out and agreed in advance of the works. A comprehensive noise and vibration monitoring protocol will also be set out within the CNVMP. • For the CEMP, the Contractor will also develop and implement a stakeholder communications plan which will facilitate community engagement prior to the commencement of construction.
13.2	Construction Phase Mitigation applicable to the Connection Point	Further to the mitigation measures set out within the CNVMP, the Contractor: • Limit all noise-emitting works to the daytime and evening periods only; and • Where night works are required, provide prior notification to the occupiers of nearby dwellings. Separate measures on the western boundary to limit the spread of operational noise are expected to offer benefits in reducing the impact of construction works on site.
13.4	Construction Phase Mitigation applicable to HVAC / HVDC Onshore Cabling Route	Further to the general mitigation measures set out within the CNVMP, the Contractor: • Provide prior notification to the occupiers of dwellings within 16m of the works and limit vibratory compaction works in the proximity of these dwellings to the daytime period only;

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		• Where vibratory compaction work is required within 3m of any light-framed structure (e.g. residential building), and subject to the consent of relevant landowners: – Conduct a structural condition survey before and after works – Undertake measurements of vibration close to the foundation of closest part of the building to the works – Consider the use of a dead-weight roller where feasible to avoid vibratory methods
13.5	Construction Phase Mitigation applicable to the Convertor Station Site	Further to the general mitigation measures set out within the CNVMP: • Limit all noise-emitting works to the daytime and evening periods only • Where night works are required, provide prior notification to the occupiers of nearby dwellings.
13.6	Construction Phase Mitigation applicable to the proposed Landfall Area at Claycastle	Further to the general mitigation measures set out within the CNVMP (but with an exception for certain works restrictions proposed in Chapter 8 Biodiversity for wintering birds in Ballyvergan Marsh), the Contractor will: • Limit all noise-emitting works to the daytime and evening periods only (but note restriction on winter-time morning work at Ballyvergan Marsh in Chapter 8 Biodiversity); • Where night works are required, provide prior notification to the occupiers of nearby dwellings; and • Provide prior notification to the occupiers of dwellings within 55m of the temporary cofferdams works and limit vibratory compaction works to the daytime period only.
13.7	Construction Phase Mitigation applicable to the Converter Station Site	The assessment is based on the proposed layout of equipment, including the stated mitigation measures to give the unit sound power levels given in **Error! Reference source not found.**. The sound power levels of the selected equipment should not be exceeded. The m easures include: • Acoustic enclosure of the power transformer; • Silencers applied to the power transformer cooling fans • Acoustic enclosure of the compensation reactors and top hat attenuators; • Sound shield fitted to the harmonic filter capacitors; • Sound shield and top hat attenuator fitted to the harmonic filter reactors; • Sound shield and top hat attenuator fitted to the DC smoothing reactors; and • Silencers applied to the power valve cooling fans and surrounding 4m acoustic barrier. Given the low-frequency tonal noise characteristics of electrical equipment, the selection and procurement process should prioritise low noise specification.

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13.8	Cumulative Effects	• In line with the recommendations of BS 5228:2009+A1:2014, regular liaison meetings are held with construction sites which could expose the NSLs described above to levels of construction noise that are less than 10 dB below the applicable noise category. Where the levels of construction noise from other sites are less than 10 dB below the applicable noise category, it is possible that combined impacts with the proposed development could exceed the threshold. In this case, it is important that plans are co-ordinated and any adverse noise and vibration impacts are minimised.
Chapter 14 Major Accidents and / or Disasters		
Not applicable	Not Applicable	This chapter does not include any additional mitigation measures