Moyvannan Electricity Substation

Environmental Impact Assessment Report

Annex 7.4: Water Framework Directive Assessment

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WATER FRAMEWORK DIRECTIVE ASSESSMENT
MOYVANNAN ELECTRICITY SUBSTATION,
CO. ROSCOMMON

FINAL REPORT

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1. INTRODUCTION

1.1 BACKGROUND

Hydro-Environmental Services (HES) were requested by Galetech Energy Services (GES) to complete a Water Framework Directive (WFD) Compliance Assessment for a planning application for the proposed Moyvannan Electricity Substation, Co. Roscommon (the 'project'). The project will comprise the construction and operation of a 110 kilovolt (kV) electricity substation connecting to the existing Athlone-Lanesborough 110kV overhead electricity line, the installation of c. 7.5km of underground electricity line between the electricity substation and the permitted Seven Hills Wind Farm grid connection infrastructure and all associated site development works.

The purpose of this WFD assessment is to determine if any specific components or activities associated with the project will compromise WFD objectives or cause a deterioration in the status of any surface water or groundwater body and/or jeopardise the attainment of good surface water or groundwater status. This assessment will determine the water bodies with the potential to be impacted, describe the proposed mitigation measures and determine if the project is in compliance with the objectives of the WFD.

This WFD Assessment is intended to supplement the EIAR submitted as part of the planning application.

1.2 STATEMENT OF AUTHORITY

HES are a specialist hydrological, hydrogeological and environmental practice that delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford. We routinely complete impact assessments for hydrology and hydrogeology for a large variety of project types including wind farms and grid connections.

This WFD assessment was prepared by Michael Gill, Conor McGettigan and Nitesh Dalal.

Michael Gill (BA, BAI, Dip Geol., MSc, MIEI) is an Environmental Engineer and Hydrogeologist with over 22-years' environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments of wind farms and renewable projects in Ireland. He has substantial experience in surface water drainage design and SUDs design, and surface water/groundwater interactions. For example, Michael was involved in the Environmental Impact Statement/Environmental Report (EIS/EIAR) for Seven Hills Wind Farm, Oweninny Wind Farm, Cloncreen Wind Farm, and Yellow River Wind Farm, and over 100 no. other wind farm related projects.

Conor McGettigan (BSc, MSc) is an Environmental Scientist with over 4 years' experience in the environmental sector in Ireland. Conor holds an M.Sc. in Applied Environmental Science (2020) and a B.Sc. in Geology (2016) from University College Dublin. Conor routinely prepares the hydrology and hydrogeology chapters of EIARs for wind farm developments. Conor has also prepared several flood risk assessments and Water Framework Directive compliance assessments for various renewable energy developments in Ireland.

Nitesh Dalal (B.Tech, PG Dip., MSc) is an Environmental Scientist Intern with over 7 years' experience in environmental consultancy and environmental management in India. Nitesh is pursuing an M.Sc. in Environmental Science (2024) and holds a PG Diploma in Health, Safety and Environment from Annamalai University, India (2021) and B.Tech. in Environmental Engineering (2016) from Guru Gobind Singh Indraprastha University, India (2016).

1.3 WATER FRAMEWORK DIRECTIVE

The EU Water Framework Directive (2000/60/EC), as amended by Directives 2008/105/EC, 2013/39/EU and 2014/101/EU ("WFD"), was established to ensure the protection of the water environment. The Directive was transposed in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003).

The WFD requires that all member states protect and improve water quality in all waters, with the aim of achieving good status by 2027 at the latest. Any new development must ensure that this fundamental requirement of the WFD is not compromised.

The WFD is implemented through the River Basin Management Plans (RBMP) which comprises a six-yearly cycle of planning, action and review. RBMPs include identifying river basin districts, water bodies, protected areas and any pressures or risks, monitoring and setting environmental objectives. In Ireland the first RBMP covered the period from 2010 to 2015 with the second cycle plan covering the period from 2018 to 2021.

The River Basin Management Plan (2018 - 2021) objectives, which have been integrated into the design of the proposed wind farm development, include:

- Ensure full compliance with relevant EU legislation;
- Prevent deterioration and maintain a 'high' status where it already exists;
- Protect, enhance and restore all waters with aim to achieve at least good status by 2027;
- Ensure waters in protected areas meet requirements; and,
- Implement targeted actions and pilot schemes in focused sub-catchments aimed at (1) targeting water bodies close to meeting their objectives and (2) addressing more complex issues that will build knowledge for the third cycle.

Furthermore, the Department of Housing, Local Government and Heritage are currently reviewing the submissions made on the Draft River Basin Management Plan (2022 - 2027) which was out for public consultation in Q4 of 2021 and Q1 of 2022. The draft plan will be updated with a view to finalisation and publication in Q3/Q4 of 2022. As of September 2024, the plan has not been published while the draft plan is available to view at https://www.gov.ie/en/consultation/2bda0-public-consultation-on-the-draft-river-basin-management-plan-for-ireland-2022-2027/.

2. WATERBODY IDENTIFICATION AND CLASSIFICATION

2.1 INTRODUCTION

This section identifies those surface water, groundwater bodies and protected areas with potential to be affected by the project and reviews any available WFD information.

2.2 SURFACE WATERBODY IDENTIFICATION

On a regional scale, the project site is located within 2 no. surface water catchments. The electricity substation site and the northern section of the underground electricity line are mapped within the Upper Shannon (Lough Ree) regional surface water catchment within Hydrometric Area 26E. Meanwhile, the southern section of the underground electricity line is mapped in the Upper Shannon (Mid Shannon) regional surface water catchment within Hydrometric Area 26G. Both of these regional surface water catchments are situated in the Shannon Irish River Basin District.

More locally, within the Upper Shannon (Lough Ree) Catchment the project site is mapped within 2 no. WFD river sub-basins. The electricity substation site and c. 1.6km of the underground electricity line are mapped in the Shannon (Upper)_110 WFD river sub-basin. Meanwhile, c. 1.8km of the underground electricity line is mapped in the Ballybay_010 WFD river sub-basin. There is a distinct lack of mapped surface water features in both of these river sub-basins.

Within the Upper Shannon Catchment, the project site is drained by the Cross (Roscommon) River with c. 1.4km of the underground electricity line mapped in the Cross (Roscommon)_010 WFD river sub-basin and c. 2.7km mapped in the Cross (Roscommon)_020 WFD river sub-basin. There is 1 no. mapped watercourse crossing over the Cross (Roscommon) River in the townland of Derryglad. This is an existing crossing along a public road. The Cross (Roscommon) River is mapped as flowing to the southeast and discharges into the River Shannon downstream of Athlone.

Figure A below is a local hydrology map of the area.

Table A presents the catchment area of each surface waterbody downstream of the project from. The waterbodies which are located in close proximity to the project site are more susceptible to potential water quality impacts as a result of activities associated with the project. The potential for the project to impact a waterbody decreases further downstream due to the increasing catchment area to the surface waterbody and resulting increase in flow volumes. However, we note the lack of surface waterbodies in the area of the electrical substation site and as a result groundwater will be the primary receptor.

Table A: Catchment Area Downstream of Project Site

WFD River Sub-Basin	Total Upstream Catchment Area (km^2)
Shannon [Upper] sub-catchment (Shannon[Upper]_SC_090)	
Shannon (Upper)_110	~2800
Ballybay_010	14.18
Shannon [Upper] sub-catchment (Shannon[Upper]_SC_100)	
Cross (Roscommon)_010	46.05
Cross (Roscommon)_020	80.7
Cross (Roscommon)_030	103.9
Cross (Roscommon)_040	117.85
Shannon (Upper)_120	~3500

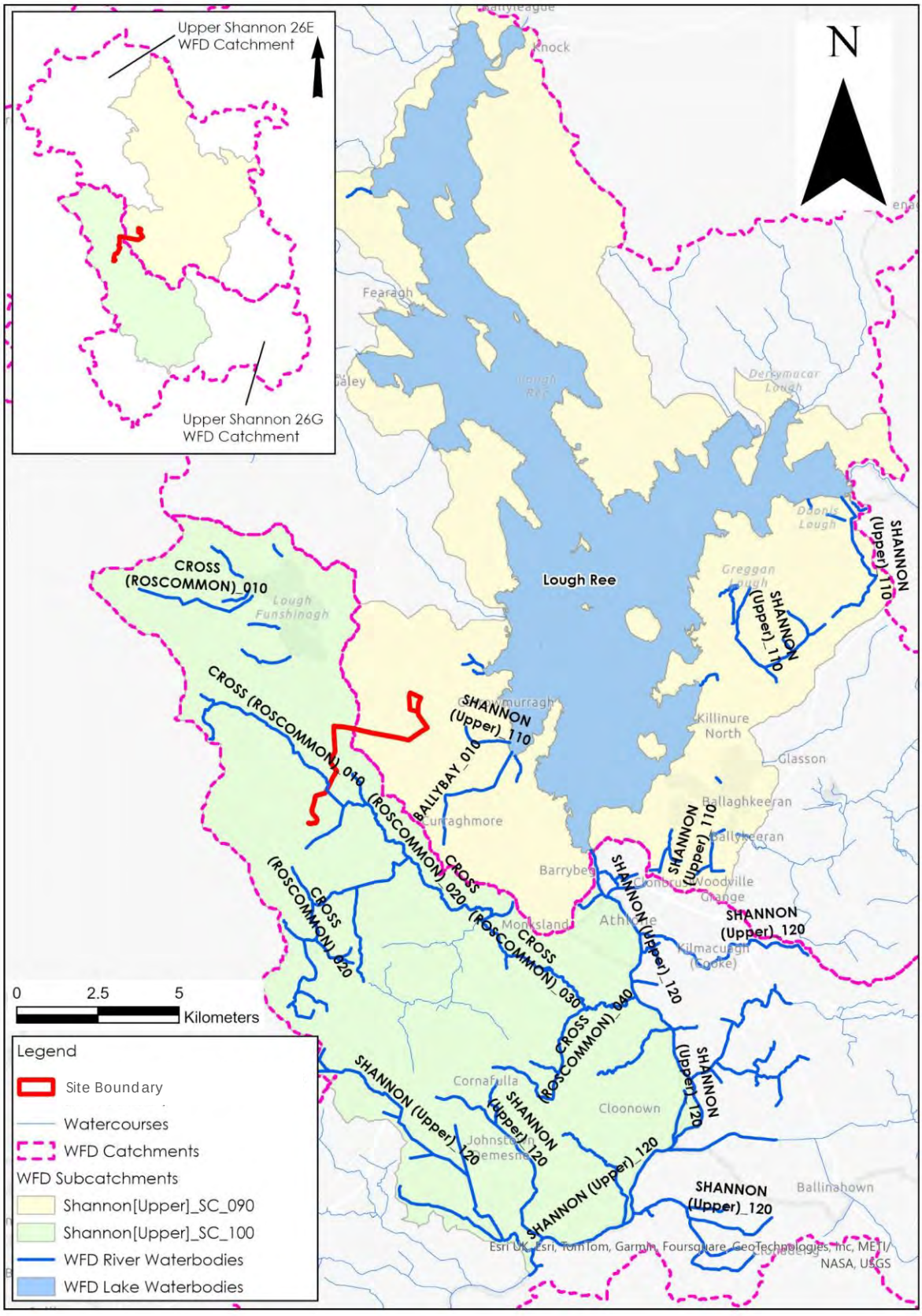

Figure A: Local Hydrology Map

2.3 SURFACE WATER BODY CLASSIFICATION

A summary of the WFD status and risk result for Surface Water Bodies (SWBs) downstream of the project are shown in Table B. The overall status is based on the ecological, chemical and quantitative status of each SWB.

Local Groundwater Body (GWB) and Surface Water Body (SWB) status information is available from (www.catchments.ie).

As described in Section 2.2 above, the northern portion of the project site is mapped in the Shannon (Upper)_110 and the Ballybay_010 river sub-basins. The Shannon (Upper)_110 SWB achieved "Poor" status in the latest WFD cycle (2016-2021) and is also deemed to be "at risk" of failing to meet its WFD objectives by 2027. Significant pressures on the Shannon (Upper)_110 SWB include agricultural activities, hydromorphology (barriers to fish migration) and nutrient pollution. The Ballybay_010 SWB has a "Moderate" WFD status, while its risk status is currently under "review".

Both the Shannon (Upper)_110 and the Ballybay_010 SWBs discharge into the Lough Ree lake waterbody. Lough Ree achieved "Good" WFD status and is "not at risk" of failing its WFD objectives in the future.

The underground electricity line continues southwards into the Cross (Roscommon)_010 river sub-basin. The Cross (Roscommon)_010 SWB achieved "Moderate" status in the latest WFD cycle and is "at risk". Agriculture and hydromorphology are the significant pressures identified for this SWB. Further downstream, the Cross River (Cross (Roscommon)_20, _030 and _040 SWBs all achieved "Moderate" status and are considered to be "at risk".

The Cross River discharges into the Shannon (Upper)_120 SWB which is of "Poor" WFD status. The Shannon (Upper)_120 SWB is also deemed to be "at risk" with significant pressures such as hydromorphology, peat drainage and extraction activities negatively impacting on this SWB.

The SWB status for the 2016-2021 WFD cycle are shown on Figure B.

Table B: Summary WFD Information for River Water Bodies

SWB	Overall Status 2010-2015	Overall Status 2013-2018	Overall Status 2016-2021	Risk Status 3rd Cycle	Pressures
Shannon[Upper]_SC_090					
Shannon (Upper)_110	Unassigned	Poor	Poor	At risk	Agriculture, hydromorphology & other
Ballybay_010	Unassigned	Poor	Moderate	Under review	None
Lough Ree	Moderate	Good	Good	Not at risk	None
Shannon[Upper]_SC_100					
Cross (Roscommon)_010	Poor	Poor	Moderate	At risk	Agriculture & Hydromorphology
Cross (Roscommon)_020	Good	Good	Moderate	At risk	None
Cross (Roscommon)_030	Good	Moderate	Moderate	At risk	Agriculture, hydromorphology & urban wastewater
Cross (Roscommon)_040	Moderate	Moderate	Moderate	At risk	Hydromorphology & peat
Shannon (Upper)_120	Poor	Poor	Poor	At risk	Hydromorphology & peat

2.4 GROUNDWATER BODY IDENTIFICATION

According to GSI mapping (www.gsi.ie), the majority of the project site is underlain by Dinantian Pure Bedded Limestones which are classified by the GSI as a Regionally Important Aquifer – Karstified (conduit). Meanwhile, a small section of the overall landholding to the north of the electricity substation is underlain by Dinantian Pure Unbedded Limestones which are classified by the GSI as a Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones

The project site is located within the Funshinagh Groundwater Body (GWB) which has a karstic flow regime. Flow path lengths can be up to a several kilometres in length. Overall, groundwater flow will be towards Lough Ree, but the highly karstified nature of the bedrock means that, locally, groundwater flow directions can be highly variable (GSI, 2003).

The GWB status for the 2016-2021 WFD cycle are shown on Figure B.

2.5 GROUNDWATER BODY CLASSIFICATION

The project site overlies the Funshinagh GWB (IE_SH_G_091). The Funshinagh GWB achieved 'Good Status' in all 3 no. WFD cycles. This GWB is deemed to be not at risk of failing to meet its WFD objectives. No significant pressures have been identified to be impacting this GWB.

Table C: Summary WFD Information for Groundwater Bodies

GWB	Overall Status 2010-2015	Overall Status 2013-2018	Overall Status 2016-2021	Risk Status 3rd Cycle	Pressures
Funshinagh	Good	Good	Good	Not at risk	None

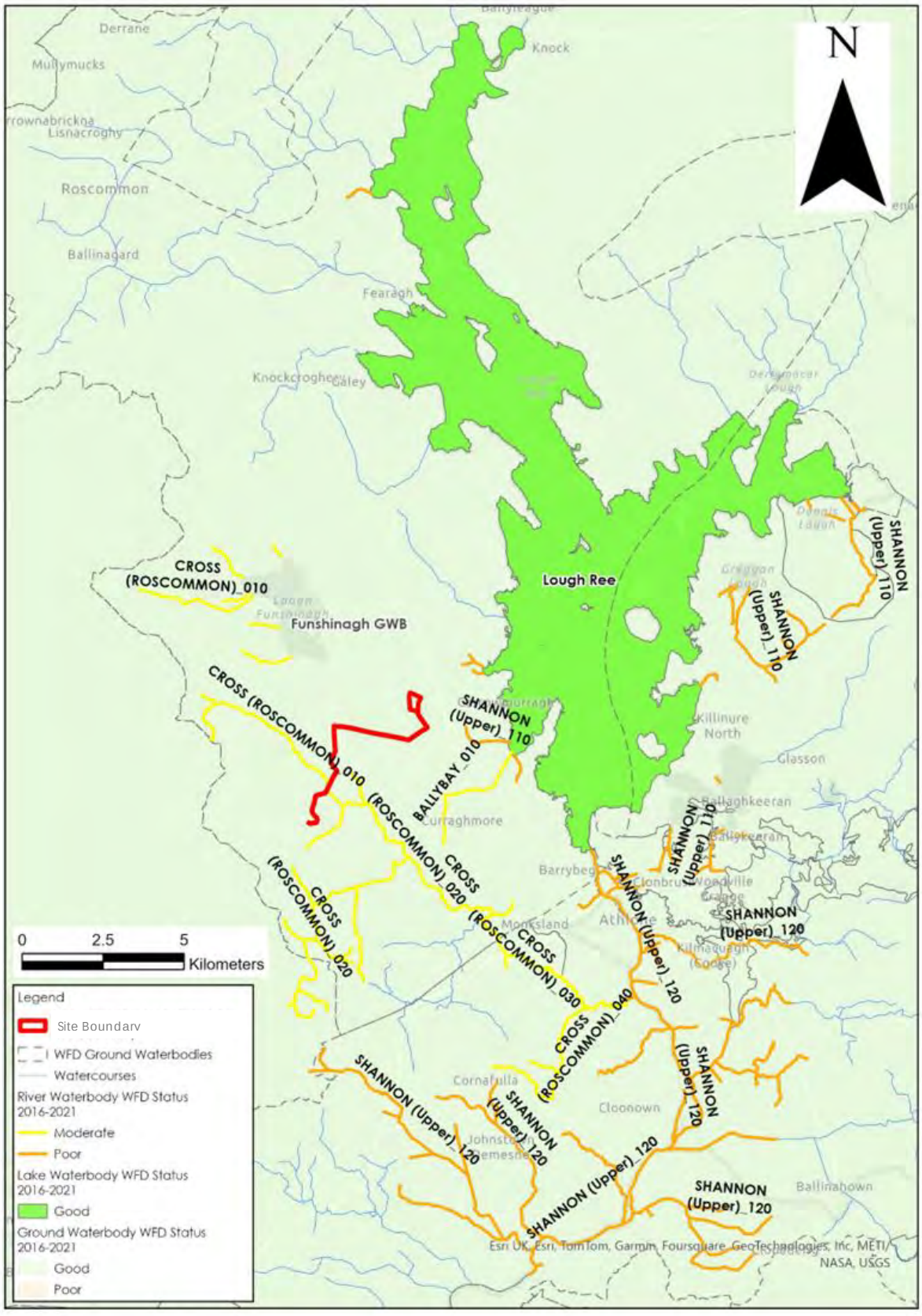

Figure B: WFD Groundwater and Surface Waterbody Status (2016-2021)

2.6 PROTECTED AREA IDENTIFICATION

The WFD requires that activities are also in compliance with other relevant legislation, as considered below. Nature conservation designations, bathing waters, Nutrient Sensitive Areas (NSA's), shellfish protected areas and Drinking Water Protected Area's (DWPA) within the vicinity of the project site are considered at as part of the assessment.

2.6.1 Nature Conservation Areas

Within the Republic of Ireland, designated sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), candidate Special Areas of Conservation (cSAC), Special Areas of Conservation (SAC) and Special Protection Areas (SPAs).

Ramsar sites are wetlands of international importance designated under the Ramsar Convention (adopted in 1971 and came into force in 1975), providing a framework for the conservation and wise use of wetlands and their resources.

There are no designated sites mapped within the immediate vicinity of the site. The nearest designated sites to the electricity substation site include the Lough Ree SAC/pNHA (Site Code: 000440) and the Lough Ree SPA (Site Code: 004064). These designated sites are located c. 2km east of the electricity substation. However, as stated previously, there is a distinct lack of surface water features in the area of the electricity substation site, therefore there is no direct connection between the electricity substation site and Lough Ree. The only potential connection is via groundwater flowpaths in the underlying limestone bedrock aquifer, with the GSI stating that the overall direction of groundwater flow in the Funshinagh GWB is towards Lough Ree.

Lough Slawn pNHA (Site Code: 000611) is located c. 10.5km to the northeast of the electricity substation site. Lough Slawn pNHA is situated in the townlands of Ballagh, Culnagore, Elfeet Burke, Leab and Carrowbeg in Co. Longford. It is a small piece of water, nearly circular, containing 6 small islands. It contains about 23 acres, is 133 ft. above low water mark, and its water is divided between the townlands of Ballagh, Carrowbeg, Leab, Elfeet Burke and Culnagore. Traced underground connections show that groundwater flows southwards from Lough Funshinagh. Therefore, the project site is located downgradient of this pNHA. This pNHA is located upstream of the electricity substation, hence the project has no potential to impact this pNHA.

Lough Funshinagh SAC/pNHA (Site Code: 000611) is located c. 2km to the northwest of the electricity substation site. Traced underground connections show that groundwater flows southwards from Lough Funshinagh. Therefore, the project site is located downgradient of this SAC/pNHA.

The nearest designated site to the underground electricity line is the Ballynamona Bog and Corkip Lough SAC (Site Code: 002339). This SAC is located c. 900m south of the southern end of the underground electricity line at Brideswell. There is no direct hydrological connection between the project site and this SAC. Furthermore, the EPA mapping database illustrates a small 1st order stream flowing to the northeast from the SAC and any groundwater flow from the areas of the underground electricity line is likely to emerge as baseflow in this surface water feature. However, the possibility of groundwater reaching the SAC cannot be discounted.

Castlesampson Esker SAC/pNHA is located c. 3.8km south of the underground electricity line. There is no direct hydrological connection between this SAC/pNHA and the project site. However the possibility of groundwater reaching the SAC cannot be discounted.

The underground electricity line has hydrological connections with the River Shannon Callows SAC/pNHA (Site Code: 000216) and the Middle Shannon Callows SPA (Site Code: 004096) via the Cross (Roscommon) River. The River Shannon Callows SAC/ pNHA and the Middle Shannon Callows SPA are situated c. 14.2km downstream (hydrological flowpath length) of the watercourse crossing along the underground electricity line. However, a quantitative analysis, based on flow volumes in the Cross (Roscommon) River (EPA Hydrotool Nodes – www.catchments.ie) has shown that there is no potential for effects downstream of EPA Node 26_4018, located c. 2.34km upstream of the SAC designation.

2.6.2 Bathing Waters

Bathing waters are those designated under the Bathing Water Directive (76/160/EEC) or the later revised Bathing Water Directive (2006/7/EC).

There are no bathing waters in or directly adjacent to the catchments identified under the Bathing Water Regulations 2008.

2.6.3 Nutrient Sensitive Areas

Nutrient Sensitive Areas (NSA) comprise Nitrate Vulnerable Zones and polluted waters designated under the Nitrates Directive (91/676/EEC) and areas designated as sensitive areas under the Urban Wastewater Treatment Directive (UWWTD)(91/271/EEC). Sensitive areas under the UWWTD are water bodies affected by eutrophication associated with elevated nitrate concentrations and act as an indication that action is required to prevent further pollution caused by nutrients.

There is one NSA downstream of the project which is the Shannon River Upper (_120) NSA, downstream of Athlone urban wastewater agglomeration. The Shannon River Upper (_120) NSA objectives are being met.

2.6.4 Shellfish Waters

The Shellfish Waters Directive (2006/113/EC) aims to protect or improve shellfish waters in order to support shellfish life and growth.

There are no designated shellfish areas in the catchment identified catchments.

2.6.5 Drinking Water

The closest abstraction for drinking water is located on the River Shannon as it flows through Athlone. The Shannon (Upper)_120 SWB is listed in Article 7 Abstraction for Drinking Water. This Drinking Water Protected Area (DWPA) serves Athlone Water Supply (Athlone Water Treatment Plant) and is downstream of the electricity substation site via indirect groundwater flow from the site towards Lough Derg.

The Athlone Water Treatment Plant is located in Athlone town centre and is upstream of where the Cross River discharges into the Shannon. Therefore, there is no potential for the works along the underground electricity line to impact this abstraction. Similarly, there is no potential for the works at the electrical substation site to effect this DWPA as Lough Ree acts as a hydrological buffer between the site and the DWPA. The large volumes of water within the lough will provide significant dilution.

3. WFD SCREENING

As discussed in Section 2, there are a total of 7 no. SWBs which are located in the vicinity and downstream of the project. There are 6 no. river waterbodies and 1 no. lake waterbody downstream of the project site. In addition, 1 no. GWB underlies the project site. Protected areas are also located in the wider area including the Lough Ree SAC/SPA and pNHA.

3.1 SURFACE WATER BODIES

The waterbodies in the immediate vicinity and downstream of the project site are shown in Figure A and described in Section 2.2 above.

With consideration for the construction and operational phases of the project, it is considered that the Shannon (Upper)_110, the Ballybay_010 and the Cross (Roscommon)_010 and _020 SWBs are included for further assessment due to the presence of proposed works within these river sub-basins. The inclusion of the Ballybay_010 and Shannon (Upper)_110 SWBs is considered to be very conservative as there are no surface water features within these river sub-basins in the vicinity of the project. The greatest potential for effect on surface waters would be associated with the works along the underground electricity line in the vicinity of the Cross River. The proposed works must not in any way result in a deterioration in the status of these river waterbodies and/or prevent them from meeting the biological and chemical characteristics for good status in the future.

Both the Shannon (Upper)_110 and the Ballybay_010 river watercourses discharge into the Lough Ree lake waterbody. However, the Lough Ree SWB has been screened out due to the lack of a direct hydrological connection between the project site and the lake waterbody, its distant location (~2.5km) from the site and the large volumes of water within the lough, making it less susceptible to potential water quality impacts. The proposed works have no potential to cause a deterioration in the status of this screened out SWB and/or jeopardise its attainment of good surface water status.

The Cross River (Cross (Roscommon)_030 and _040 SWBs) downstream of the underground electricity line have been screened out due to the small-scale works (i.e. underground electricity line in an existing road carriageway), and the increasing flow volumes in the Cross River. The proposed works have no potential to cause a deterioration in the status of this SWB and/or jeopardise its attainment of good surface water status.

Downstream of the River Cross, the Shannon (Upper)_120 SWB has also been screened out of the WFD Compliance Assessment. As outlined in Table A the catchment area for the Shannon (Upper)_120 SWB downstream of the Cross River increases dramatically. This decreases the potential for the project to impact on the status of this SWB. The proposed works have no potential to cause a deterioration in the status of this screened out SWB and/or jeopardise its attainment of good surface water status.

3.2 GROUNDWATER BODIES

The Funshinagh GWB is carried through to the WFD Compliance Assessment due to its location directly underlying the project site. The proposed works must not in any way result in a deterioration in the status of this GWB and/or prevent it from meeting its qualitative and quantitative characteristics for good status in the future.

3.3 PROTECTED AREAS

The nearest designated site is the Ballynamona Bog and Corkip Lough SAC (002339) located c. 900m south of the underground electricity line. The SAC comprises a relatively small portion of what was once a large bog complex, and includes areas of high bog and cutover bog,

and also the turlough, Corkip Lough. However, there is no direct hydrological linkage between the project site and the SAC. Furthermore, due to the shallow nature of the underground electricity line works, no groundwater level effects will occur. However, the possibility of groundwater reaching the SAC cannot be discounted and as a result this SAC will be included in the WFD Compliance Assessment.

Similarly, Castlesampson Esker SAC / pNHA (001625) is c. 3.8km south of the underground electricity line. Castlesampson Esker is a complex site with an esker, turlough and raised bog. There is no direct hydrological linkage between the project site and the SAC/ pNHA. However, the possibility of groundwater reaching the SAC cannot be discounted and as a result this SAC will be included in the WFD Compliance Assessment.

The Lough Ree SAC / pNHA (000440) and SPA (004064) is located c.2km east of the electricity substation location. There is no direct hydrological linkage between the project site and Lough Ree as the nearest mapped watercourses within the Shannon (Upper)_110 and Ballybay_010 river sub basins (that drain to Lough Ree) are 1.2km and 1.5km east from the project site respectively. Additionally, according to the GSI's Funshinagh GWB Initial Characterisation Report (2003), overall groundwater flow, in the area of the site will be towards Lough Ree and its SAC/SPA/pNHA designations. An assessment is required to consider the potential impacts of the project on this designated site.

Lough Slawn pNHA has been scoped out of the WFD Compliance Assessment as the pNHA is located upstream of the electricity substation (~10.5km to the northeast, and on the eastern shoreline of Lough Ree) and there is no hydrological connection between this pNHA and project site.

Lough Funshinagh SAC/pNHA has been scoped out of the WFD Compliance Assessment as traced underground connections have revealed that the groundwater from the lough flows to the south and discharges in the vicinity of the Cross (Roscommon) River. Therefore, the project site is downgradient of the Lough Funshinagh SAC/pNHA and cannot affect the conservation objectives of this SAC.

Furthermore, the River Shannon Callows SAC/pNHA and the Middle Shannon Callows SPA have been scoped out of the WFD Compliance Assessment due to Lough Ree acting as a hydrological buffer between the electricity substation site and these designated sites. Furthermore, increasing flow volumes in the Cross (Roscommon) River will provide adequate dilution and will prevent any potential contamination sources associated with the underground electricity line from reaching these designated sites.

3.4 WFD SCREENING SUMMARY

A summary of WFD Screening discussed above is shown in Table D.

Table D: Screening of WFD water bodies located within the study area

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
Surface Water Body	Upper Shannon Catchment (HA:26E)			
	River	Shannon (Upper)_110	Yes	The project site is mapped within the Shannon (Upper)_110 river sub-basin. An assessment is required to consider the potential impacts of the project on this SWB
	River	Ballybay_010	Yes	The project site is mapped within the Ballybay_010 river sub-basin. An assessment is required to consider the potential impacts of the project on this SWB
	Lake	Lough Ree	No	Lough Ree has been screened out due to the lack of direct hydrological connections between the project site and the lake waterbody, its distant location from the project site and the large volume of water within the lake. The project has no potential to impact the status of this SWB.
	Upper Shannon Catchment (HA:26G)			
	River	Cross (Roscommon)_010	Yes	The underground electricity line is mapped within the Cross (Roscommon)_010 river sub-basin. An assessment is required to consider the potential impacts of the project on this SWB.
	River	Cross (Roscommon)_020	Yes	The underground electricity line is mapped within the Cross (Roscommon)_020 river sub-basin. A crossing is proposed (at an existing bridge) at the boundary between the Cross (Roscommon)_010 and _020 SWBs. An assessment is required to consider the potential impacts of the project on this SWB.
	River	Cross (Roscommon)_030	Yes	The Cross (Roscommon)_030 SWB is located directly downstream of the Cross (Roscommon)_020 SWB and the proposed crossing over the Cross River. An assessment is required to consider the potential impacts of the project on this SWB.
	River	Cross (Roscommon)_040	No	The Cross (Roscommon)_040 SWB has been screened out due to its distant location from the project site and the increasing volumes of water within the Cross River. Therefore, the project has no potential to effect the status of this SWB.
	River	Shannon (Upper)_120	No	The Shannon (Upper)_120 SWB has been screened out due to its distant location from the project site (~10km) and the large volumes of water within the Shannon (Upper) River. Therefore, the project has no potential to effect the status of this SWB.
Groundwater Bodies				
Groundwater Body	Groundwater	Funshinagh	Yes	The project is mapped to overlie the Funshinagh GWB. An assessment is required to consider the potential impacts of the project on this GWB.
Protected Areas				
Protected Areas	Nature Conservation Areas	Lough Ree SAC/pNHA/SPA	Yes	The Lough Ree SAC/pNHA/SPA is mapped at a distance of 2km from the electricity substation site. Groundwater from the local area will discharge to Lough Ree. An assessment is required to consider the potential impacts of the project on this designated site.
		Lough Slawn pNHA	No	The Lough Slawn pNHA is mapped at a distance of ~10.5km from the electricity substation site in Northeast. The pNHA is located upstream of the electricity substation and there is no hydrogeological connection between this pNHA and electricity substation. Therefore, the project has no potential to impact this pNHA.

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
		Lough Funshinagh SAC/pNHA	No	There are no direct hydrological linkages between the project site and this designated site. The SAC/pNHA is also located upgradient of the project site, with groundwater flowing southwards from the lough towards the Cross River. Therefore, no hydrological or hydrogeological impacts will occur on this designated site.
		Ballynamona Bog and Corkip Lough SAC	Yes	The Ballynamona Bog and Corkip Lough SAC is mapped at a distance of c. 900m from the underground electricity line. The potential for groundwater flows to reach the SAC cannot be discounted. An assessment is required to consider the potential impacts of the project on this designated site.
		Castlesampson Esker SAC/pNHA	Yes	The Castlesampson Esker SAC/pNHA is mapped at a distance of c. 3.8km from the underground electricity line. An assessment is required to consider the potential impacts of the project on this designated site.
		River Shannon Callows SAC/pNHA	No	The River Shannon Callows SAC/pNHA is hydrologically linked to the project via the Cross River. However, due to its distant location downstream from the project (~10km) and due to the large flow volumes within the Shannon River, the project has no potential to impact this SAC/pNHA.
		Middle Shannon Callows SPA	No	The Middle Shannon Callows SPA is hydrologically linked to the project via the Cross River. However, due to its distant location downstream from the project (~10km) and due to the large flow volumes within the Shannon River, the project has no potential to impact this SPA.
	Nutrient Sensitive Area	Shannon (Upper)_120 NSA	No	The Shannon (Upper)_120 NSA has been screened out due to its distant location from the project site (~10km) and the increasing volumes of water within the Shannon (Upper) River.
	Drinking Waters	Shannon (Upper)_120 DWPA	No	The Shannon (Upper)_120 DWPA has been screened out due to its distant location from the project site (~10km) and the increasing volumes of water within the Shannon (Upper) River.

4. WFD COMPLIANCE ASSESSMENT

4.1 DEVELOPMENT PROPOSALS

The project assessed within the EIAR and this WFD Compliance Assessment comprises of a 110kV electricity substation, including all associated development works to accommodate its construction, operation, maintenance and the export of electricity to the national grid via the existing Athlone-Lanesborough overhead electricity transmission line, and c. 7.5km of underground electricity line. The project is described in full at Chapter 3.

The main characteristics of the project that could affect the water environment comprise the following:-

- Establishment of the temporary construction compound within the electricity substation site, which will involve the excavation of spoil and the emplacement of the compound. Runoff from these construction areas have the potential to affect water quality. In addition, welfare facilities will be provided at the temporary construction compound. Wastewater effluent will be collected in a wastewater holding tank and periodically emptied by a licenced contractor;
- Construction of the proposed site access tracks and upgrade of existing site entrance. These activities have the potential to affect water quality;
- Replacement of the existing wooden pole-set with 2 no. lattice-type interface masts has the potential to affect water quality;
- Construction of the electricity substation and compound will be completed with a ground bearing foundation. Wastewater effluent will be collected in an underground concrete holding tank and periodically emptied by a licenced contractor for the operational phase of the project. Construction of the substation and associated compound has the potential to affect water quality;
- Construction of the underground electricity line will involve the excavation of a trench predominately within the public road, placement of ducting and backfilling with lean-mix concrete and compacted engineered fill. These works have the potential to affect water quality; and,
- Storage of excavated spoil within the 2 no. spoil deposition areas within the electricity substation site has the potential to affect water quality.

During the operational phase, the water supply for the control building at the substation site will be obtained from Uisce Éireann infrastructure. Uisce Éireann have confirmed that the existing local infrastructure has sufficient capacity to serve the project. There will be no requirement for a groundwater well.

4.2 POTENTIAL EFFECTS

4.2.1 Construction Phase (Unmitigated)

4.2.1.1 Potential Surface Water Quality Effects from Works at Electricity Substation Site

Construction phase activities will require earthworks resulting in removal of vegetation cover and excavation of topsoil and subsoils. These activities can result in the generation of suspended solids in drainage water.

Hydrocarbons and cement-based compounds will be used during the construction phase. Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to surface waters at all construction sites. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the

environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in the death of aquatic organisms.

Release of effluent from wastewater treatment systems also has the potential to impact on surface waters if site conditions are not suitable for an on-site percolation unit.

However, there are no drainage outlets at the electricity substation site other than recharge to ground. Groundwater is the primary receptor and potential effects on groundwater are assessed below. Surface water can only be indirectly impacted by works at the electricity substation site via groundwater recharge and lateral migration of groundwater. The potential for the works at the electricity substation site to effect the WFD status of downgradient SWBs is limited.

A summary of potential status change to SWBs arising from works within the electricity substation site during the construction phase of the project in the unmitigated scenario are outlined in Table E.

Table E: Potential Surface Water Quality Effects Downstream of the Electricity Substation Site during Construction Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Shannon (Upper)_110	IE_SH_26S021660	Poor	Poor
Ballybay_010	IE_SH_26B210730	Moderate	Moderate

4.2.1.2 Potential Surface Water Quality Effects Along the Underground Electricity Line

Based on WFD mapping, there will be a requirement for 1 no. watercourse crossing along the underground electricity line. This crossing is located at an existing crossing between the Cross (Roscommon)_010 and Cross (Roscommon)_020 SWBs.

Due to the close proximity of the Cross River at the crossing locations, there is a potential for surface water quality impacts during trench excavation work due to runoff from the road surface. This runoff may contain elevated concentrations of suspended sediment, cementitious runoff and/or hydrocarbons.

Some minor groundwater/surface water seepages will likely occur in trench excavations and substation foundation excavations and this will create additional volumes of water to be treated by the runoff management system. Inflows will likely require management and treatment to reduce suspended sediments.

Construction activities along the underground electricity line only have the potential for short term effects due to the minor and transient nature of the works. The limits the potential for the project to alter the overall status of a SWB.

A summary of potential status change to SWBs arising from works along the underground electricity line during the construction phase of the project in the unmitigated scenario are outlined in Table F.

Table F: Potential Surface Water Quality Effects along the Underground Electricity Line During Construction Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Shannon (Upper)_110	IE_SH_26S021660	Poor	Poor
Ballybay_010	IE_SH_26B210730	Moderate	Moderate
Cross (Roscommon)_010	IE_SH_26C100060	Moderate	Moderate
Cross (Roscommon)_020	IE_SH_26C100200	Moderate	Moderate
Cross (Roscommon)_030	IE_SH_26C100300	Moderate	Moderate

4.2.1.3 Potential Groundwater Quality/Quantity Effects at the Electricity Substation Site

The accidental spillage of hydrocarbons, the release of effluent from wastewater treatment systems and the release of cement-based products have the potential to negatively impact on groundwater water quality at the electrical substation site.

The bedrock below the electricity substation site does not contain an abundance of karst flow systems:-

- A comprehensive site investigation dataset has been accrued within the site of the electricity substation and has not identified any significant karst features within the underlying bedrock;
- The data from the rotary core drilling shows that the bedrock is generally strong limestone or dolomitic limestone;
- Groundwater monitoring has revealed that groundwater levels are below the existing ground level (c. 3mbgl at RC02) on, and hence below the formation levels for the proposed infrastructure; and,
- No water strikes were recorded during the drilling of the rotary core boreholes.

Groundwater levels may be affected by any change in recharge within a groundwater catchment. A reduction in recharge, which would be accompanied by an increase in surface water drainage, would reduce the volume of water infiltrating to the bedrock aquifers and therefore lead to a reduction in local groundwater levels. The drainage management design of the project has been designed to ensure the volume of rainfall infiltrating through the subsoils to the groundwater aquifer will not change.

However, given the scale of the electricity substation site and the shallow nature of the works, in comparison to the overall size of the Funshinagh GWB there is no potential for the project to change the overall status of the entire GWB.

A summary of potential status change to the Funshinagh GWB arising from works at the electricity substation site during the construction phase of the project in the unmitigated scenario are outlined in Table G.

Table G: Potential Groundwater Effects at Electricity Substation Site during Construction Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Potential Status Change
Funshinagh	IE_SH_G_091	Good	Good

4.2.1.4 Potential Groundwater Quality/Quantity Effects along Underground Electricity Line

The underground electricity line is underlain by the Funshinagh GWB.

The works along the underground electricity line will be completed above the groundwater table. No impacts on groundwater levels or groundwater flow will occur due to the shallow depth of the works (1.2m deep trench) along an existing roads.

A summary of potential status change to the Funshinagh GWB arising from potential groundwater quantity/level effects along the underground electricity line during the construction phase of the project in the unmitigated scenario are outlined in Table H.

Table H: Potential Groundwater Effects Along Underground Electricity Connection during Construction Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Potential Status Change
Funshinagh	IE_SH_G_091	Good	Good

4.2.1.5 Potential Effects on Protected Areas

The surface water connections from the project site could transfer poor quality surface water that may affect the conservation objectives of these designated sites. The designated sites included in this assessment are:

- The Lough Ree SAC / pNHA (000440) and SPA (004064) is located c. 2km east of the electricity substation location;
- Castlesampson Esker SAC / pNHA (001625) is c. 3.8km south of the underground electricity line; and,
- The Ballynamona Bog and Corkip Lough SAC is located at a distance of c. 900m south of the southern end of the underground electricity line.

An assessment is required to consider the potential impacts of the project on this designated site.

4.2.2 Operational Phase (Unmitigated)

Activities during the operational phase of the project will be significantly reduced compared to the construction phase, with extremely limited sources for likely significant negative hydrological and hydrogeological effects.

4.2.2.1 Potential Surface Water Quantity Effects Downstream of Electricity Substation Site

During the operational phase, the likelihood of silt-laden runoff is much reduced compared to the construction phase. In addition, all permanent drainage controls will be in place and the disturbance of ground and excavation works will be complete. Some minor maintenance works may be completed, such as maintenance of the site entrance and access track. These works will be of a very minor scale and will be very infrequent. Likely sources of sediment

laden water would only arise from surface water runoff from small areas where new material is added during maintenance works.

During such maintenance works, there is a small risk associated with release of hydrocarbons from site vehicles, although it is not envisaged that any significant refuelling works will be undertaken on site during the operational phase.

The storage of oils or other hydrocarbons at the substation could leak during the operational phase and result in effects on water quality.

The release of wastewater could also affect local water quality.

A summary of potential status change to SWBs arising from increased runoff during the operational phase of the project in the unmitigated scenario are outlined in Table I.

Table I: Potential Surface Water Quantity Effects Downstream of Electrical Substation Site during Operational Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Shannon (Upper)_110	IE_SH_26S021660	Poor	Poor
Ballybay_010	IE_SH_26B210730	Moderate	Moderate

4.2.2.2 Potential Groundwater Quantity/Quality Effects at Electricity Substation Site

Progressive replacement of the vegetated surface with impermeable surfaces could result in an increase in the proportion of surface water runoff reaching the downstream surface water drainage network, if the drainage design included surface water runoff leaving the site. However, at the electricity substation site, the drainage design has been optimised to allow for all rainfall which may fall on impermeable surfaces (such as electricity substation building or concrete-surfaced access track within the substation compound) to recharge to ground as would normally occur at the site

The potential release of hydrocarbons and the release of wastewater would have the potential to impact groundwater quality.

A summary of potential status change to SWBs arising from surface water quality impacts during the operational phase of the project in the unmitigated scenario are outlined in Table J.

Table J: Potential Groundwater Quality/Quantity Effects during Operational Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Funshinagh	IE_SH_G_091	Good	Good

4.2.2.3 Potential Effects on Protected Areas

During the operational phase, the potential for effects on designated site is much reduced compared to the construction phase. In addition, all permanent drainage controls will be in place and the disturbance of ground and excavation works will be complete.

Therefore, the risk of any operational phase activities that may affect the conservation objectives of the protected areas is greatly reduced.

4.3 MITIGATION MEASURES

In order to mitigate against the potential negative effects on surface and groundwater quality, quantity and flow patterns, mitigation measures will be implemented during the construction and operational phases of the project. These are outlined below.

4.3.1 Construction Phase

4.3.1.1 Mitigation Measures for Earthworks Resulting in Suspended Solids Entrainment in Surface Water

A key mitigation adopted during the design phase is the avoidance of infrastructure close to turloughs and surface water features at the electricity substation site. All areas of the electricity substation site are located significantly away from surface watercourses. The closest surface water feature is a turlough located to the south of the site. This is a temporary surface water feature which is only present during certain months of the year, and does not exist between ~May–November, thus construction proposed between May-November will not affect the turlough.

The large setback distances between sensitive hydrological features and any element of the project means that adequate room is maintained for the proposed drainage design/mitigation measures (discussed below) to be properly installed and operate effectively. No works will be undertaken within any surface water feature which will:-

- Avoid physical damage to turloughs and watercourses and associated release of sediment;
- Avoid excavations within close proximity to turloughs and surface watercourses (again, absent at the electricity substation site);
- Avoid the entry of suspended sediment from earthworks into turloughs and watercourses; and,
- Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation via infiltration areas.

Mitigation by Design

The overall approach to the management of surface water runoff during the construction phase will be to collect and treat on-site and then divert to ground locally within the project site.

Management of surface water runoff and subsequent treatment prior to release off-site will be undertaken during construction work as follows:-

- Prior to the commencement of earthworks, silt fencing will be placed down-gradient of the construction areas, as required, until the full range of construction phase measures are installed;
- These will be embedded into the local soils to ensure all site water is captured and filtered;
- Clean water drains will include check dams to control flow rates and avoid erosion or scouring of the drain;
- Water from the clean drains will be discharged by a buffered outfall or level spreader at greenfield runoff rates;
- Water will be discharge from the clean drains over natural grassland which will provide filtration;
- All surface water runoff from works areas, excavations, stockpiles at the electricity substation site will be intercepted by downslope drains which will also include check dams;

- These dirty water drains will direct water to settlement ponds for treatment and attenuation;
- The treated water will then be discharged via a buffered outfall or level spreader, at greenfield rates, over natural grassland which will provide additional filtration and treatment;
- The precise design, sizing and sitting of the drainage infrastructure will be confirmed as part of the post-consent detailed design process, however the design will be reflective of predicted rainfall levels with an appropriate allowance for climate change
- Daily monitoring of the excavation/earthworks, the water treatment and pumping system and the discharge areas will be completed by a suitably qualified person during the construction phase. All necessary preventative measures will be implemented to ensure no entrained sediment, or deleterious matter will enter the main drainage channel;
- If high levels of silt or other contamination is noted in the pumped water or the treatment systems, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied;
- Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses; and,
- The fluvial glacial deposits (i.e. sand and gravels) located under the glacial tills in part of the site will act as a natural filter.

Underground Electricity Line

The majority of the underground electricity line is >50m from any nearby watercourse. The only section within 50m of a watercourse is at the crossing over the Cross (Roscommon) River. This is an existing crossing along a public road and it is proposed to limit any works in this area including the stockpiling of excavated soils and subsoils.

No in-stream works are required at the crossing location; however, due to the proximity of the river to the construction works, there is a potential for surface water quality impacts during trench excavation work. Mitigation measures which are outlined above will be implemented to ensure that silt laden or contaminated surface water runoff from the excavation work does not discharge directly to the watercourse.

Furthermore, working near watercourses along the underground electricity line during or after intense or prolonged rainfall events will be avoided.

Specific mitigation measures relating to the directional drilling at the crossing location are detailed separately below.

4.3.1.2 Mitigation Measures to Protect Against Release of Hydrocarbons

Mitigation measures to avoid the release of hydrocarbons at the project site are as follows:

- No refuelling or maintenance of construction vehicles or plant at the electricity substation site will take place outside of the dedicated bunded refuelling area. Any off-site refuelling (i.e. along the route of the underground electricity line) will occur at a controlled fuelling station located on an area of impermeable hardstanding;
- Each vehicle will carry fuel absorbent material and pads in the event of any accidental spillages;
- Onsite refuelling will be carried out by trained personnel only;
- Fuels stored on site will be minimised. Fuel storage areas within the temporary construction compound will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor;
- Drainage water from temporary construction compounds will be collected and drained via silt traps and hydrocarbon interceptors prior to recharge to ground;
- The plant used during construction will be regularly inspected for leaks and fitness for purpose; and,

- An emergency plan for the construction phase to deal with accidental spillages is contained within Construction and Environmental Management Plan (see Annex 3.4). Spill kits will be available to deal with and accidental spillage in and outside the re-fuelling area.

4.3.1.3 Mitigation Measures to Prevent Release of Wastewater

Measures to avoid contamination of surface and ground waters by wastewaters will comprise:-

- Self-contained chemical toilets with an integrated waste holding tank will be installed at the temporary construction compound, maintained by the providing contractor, and removed from site on completion of the construction works;
- Water supply, for use in site offices and for other sanitation purposes, will be brought to site and removed after use and disposed of at a suitable off-site treatment location; and,
- No water will be sourced on the site, nor will any wastewater be discharged to the site.

4.3.1.4 Mitigation Measures to Prevent Release of Cement-Based Products

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;
- Where possible pre-cast elements for concrete works will be used;
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds located within the temporary construction compound;
- Weather forecasting will be used to plan dry days for pouring concrete; and,
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event;No in-stream excavation works are proposed and therefore there will be no impact on the Cross (Roscommon) River at the proposed crossing along the underground electricity line;
- Any guidance/mitigation measures required by the OPW or Inland Fisheries Ireland will be incorporated into the detailed project design proposals;
- As a further precaution, near stream construction work, will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document *Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites* i.e., May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum surface water flows (note within the electricity substation site there are no watercourses, and all rainwater will percolate to ground). This will minimise the risk of entrainment of suspended sediment in drainage water, and transport via this pathway to surface watercourses (any deviation from this will be completed in consultation with the IFI);
- During the near stream construction work (along the underground electricity line) double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and,
- No new stream crossings or culverts will be required. No Section 50 Applications are required for this project.

4.3.1.5 Mitigation Measures for Directional Drilling along the Underground Electricity Line

The following mitigation measures are proposed:-

- Although no in-stream works are proposed, the drilling works will only be done over a dry period between July and September (as required by IFI for in-stream works) to avoid the salmon spawning season and to have more favourable (dryer) ground conditions;
- The crossing works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance;
- There will be no storage of material/equipment or overnight parking of machinery inside a 15m buffer zone which will be imposed around the Cross (Roscommon) River;
- Before any ground works are undertaken, double silt fencing will be placed upslope of the watercourse channel along the 15m buffer zone boundary;
- Additional silt fencing or straw bales (pinned down firmly with stakes) will be placed across any natural surface depressions/channels that slope towards the watercourse;
- Silt fencing will be embedded into the local soils to ensure all site water is captured and filtered;
- The area around the bentonite batching, pumping and recycling plant will be bunded using terram (as it will clog) and sandbags in order to contain any spillages;
- Drilling fluid returns will be contained within a sealed tank/sump to prevent migration from the works area;
- Spills of drilling fluid will be clean up immediately and stored in an adequately sized skip before been taken off-site;
- If rainfall events occur during the works, there will be a requirement to collect and treat small volumes of surface water from areas of disturbed ground (i.e. soil and subsoil exposures created during site preparation works);
- This will be completed using a shallow swale and sump down slope of the disturbed ground; and water will be pumped to a proposed percolation area at least 50m from the watercourse;
- The discharge of water onto vegetated ground at the percolation area will be via a silt bag which will filter any remaining sediment from the pumped water. The entire percolation area will be enclosed by a perimeter of double silt fencing;
- Any sediment laden water from the works area will not be discharged directly to a watercourse or drain;
- Works shall not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted;
- Daily monitoring of the compound works area, the water treatment and pumping system and the percolation area will be completed by a suitably qualified person during the construction phase. All necessary preventative measures will be implemented to ensure no entrained sediment, or deleterious matter is discharged to the watercourse;
- If high levels of silt or other contamination is noted in the pumped water or the treatment systems, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied;
- On completion of the works, the ground surface disturbed during the site preparation works and at the entry and exit pits will be carefully reinstated;
- The silt fencing upslope of the river will be left in place and maintained until the works area has been fully reinstated;
- There will be no batching or storage of cement allowed at the watercourse crossing;
- There will be no refuelling allowed within 100m of the watercourse crossing; and,
- All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing.

A Fracture Blow-out (Frac-out) Prevention and Contingency Plan will be prepared by the drilling contractor prior to construction and will include the following measures:-

- The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used);
- The area around the drilling fluid batching, pumping and recycling plants will be bunded using terram and/or sandbags to contain any potential spillage;
- A double row of silt fencing will be placed between the works area and the adjacent river;

- Spills of drilling fluid will be cleaned up immediately and transported off-site for disposal at a licensed facility;
- Adequately sized skips will be used where temporary storage of arisings are required;
- The drilling process/pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse;
- This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped;
- Any frac-out material will be contained and removed off-site;
- The drilling location will be reviewed, before re-commencing with a higher viscosity drilling fluid mix; and,
- If the risk of further frac-out is high, a new drilling alignment will be sought at the crossing location.

4.3.1.6 Mitigation Measures to Protect Groundwater Flows and Levels due to Alteration of Recharge Rates

The critical driver of groundwater levels and the likelihood of affecting them is through groundwater recharge. The drainage design of the project has been designed to mimic the existing hydrological regime within the site, whereby surface water pathways are generally short and rainfall readily percolates to ground. The drainage design incorporates check dams to reduce velocities, and outflow from the drains being dispersed over a wide area of vegetation.

The net effect of the drainage design will be that all rainfall falling within the electricity substation site will remain on the site and infiltrate to ground and will not exit the site as runoff to surface watercourses.

Having regard to the characteristics of the underground electricity line, no mitigation measures are required in relation to the maintenance of recharge rates.

4.3.1.7 Mitigation Measures to Protect Groundwater Levels due to Excavation Works

Mitigation Measures / Impact Assessment

Whilst the electricity substation site is mapped to be underlain by a Regionally Important Karstified Aquifer, there is little likelihood of effects for the following reasons:-

- The shallow nature of the proposed excavations (c. 0-2m);
- The lack of any shallow groundwater inflows in the trial pits;
- No bedrock excavations are proposed;
- The local bedrock comprises generally hard limestone and dolomitic limestone and has been shown to be generally unproductive during site investigations;
- No regional groundwater flow regime, i.e. large volumes of groundwater flow, will be encountered at these elevations (as proven by the site investigation drilling);
- Shallow groundwater inflows, should they occur, will largely be fed by recent rainfall, and possibly by limited seepage from localised permeable subsoils;
- Any shallow groundwater seepage (within the subsoils) will be small in comparison to the expected surface water flows following any heavy rainfall events; and,
- The management of surface water will form the largest proportion of water to be managed and treated, although where permeable subsoils are encountered, rainfall may infiltrate to ground rather than ponding at any excavation.

Direct rainfall and surface water runoff will be the main inflows that will require water volume and water quality management. For the avoidance of doubt, we would generally define dewatering as a requirement to permanently drawdown the local groundwater table by means of over pumping, e.g. as would be required for the operation of a bedrock quarry in a valley floor.

Therefore, it is assessed that no mitigation measures are necessary regarding groundwater levels.

Meanwhile, the underground electricity line trench depth will be approximately 1.2m in depth, the excavation will be temporary and transient, and the trench will be backfilled with imported aggregates and resurfaced with bituminous material. Therefore, there will be no net loss of permeability. As a result, and given the shallow depth, it is assessed that no mitigation measures are required regarding groundwater levels.

4.3.1.8 Mitigation Measures for Protected Areas

Mitigation Measures / Impact Assessment
Mitigation measures have been outlined within Sections 4.3.1.1 to 4.3.1.7 which will ensure the protection of groundwater quality and quantity leaving the project site. These mitigation measures include:-

- Site specific drainage design ensuring all water recharges to ground and mimics the existing hydrological regime;
- Protection of groundwater from cement-based materials; and,
- Protection of groundwater from the potential release of silt and hydrocarbons.
- Furthermore, mitigation for the protection of surface water quality along the underground electricity line associated with the directional drilling is detailed at Section 4.3.1.5.

Lough Ree SAC/SPA/pNHA
It is assessed that there will be no likely significant effect on Lough Ree SAC/SPA/pNHA for the following reasons:-

- The small scale and shallow nature of the proposed works;
- The lack of any direct hydrological connection between the project site and Lough Ree (the only potential connection is via groundwater flowpaths);
- The separation distance between the electricity substation site and Lough Ree (c. 2.3km);
- The scale of the project in comparison with the scale and volume of water within the Funshinagh GWB within which groundwater flows towards Lough Ree – the likelihood of significant effects is limited due to dilution;
- The scale of the project in comparison with the scale and volume of water within Lough Ree and the River Shannon – the likelihood of significant effects is limited due to dilution; and,
- Nevertheless, mitigation measures for the protection of surface and groundwater water quality will be implemented during the construction phase of the project to ensure that there is no deterioration in local water quality.

Ballynamona Bog and Corkip Lough SAC
It is assessed that there will be no likely significant effect on Ballynamona Bog and Corkip Lough SAC for the following reasons:-

- The small scale, shallow and transient nature of the proposed works along the underground electricity line;
- The works will be located in the carriageway of the existing road network;
- The trench excavations will be shallow and above the groundwater table;
- No groundwater dewatering is proposed along the underground electricity line;
- The lack of any direct hydrological connection between the underground electricity line and this SAC;
- The separation distance between the underground electricity line and the SAC (c. 900m);

- The scale of the proposed works along the underground electricity line in comparison with the scale and volume of water within the Funshinagh GWB within which supplies groundwater to Corkip Lough; and,
- Nevertheless, mitigation measures for the protection of surface and groundwater water quality will be implemented during the construction phase of the project to ensure that there is no likelihood of a deterioration in local water quality.

Castlesampson Esker SAC (turlough)
Please note the sand and gravel element of the SAC is not groundwater dependent, and therefore will not be impacted directly or indirectly by the project. The text below relates to potential to impact on the turlough qualifying interest of the SAC.

It is assessed that there will be no likely significant effect on Castlesampson Esker SAC for the following reasons:-

- The small scale, shallow and transient nature of the proposed works along the underground electricity line;
- The trench excavations will be shallow and above the groundwater table;
- No dewatering is proposed along the underground electricity line;
- The lack of any direct hydrological connection between the underground electricity line and this SAC);
- The separation distance between the underground electricity line and the SAC (c. 3.8km);
- The scale of the proposed works along the underground electricity line in comparison with the scale and volume of water within the Funshinagh GWB within which supplies groundwater to the turlough; and,
- Nevertheless, mitigation measures for the protection of surface and groundwater water quality will be implemented during the construction phase of the project to ensure that there is no likelihood of a deterioration in local water quality.

4.3.2 Operational Phase

4.3.2.1 Increased Site Runoff and Hydromorphology Effects

The drainage design for the electricity substation site provides for the release of any surface water captured to be recharged back to ground, with a very nominal spatial diversion of the water (10's of metres). In doing so, all rainfall which falls on the site will continue to infiltrate to ground. There will be no net increase in runoff from the electricity substation site.

The operational phase drainage system will be installed and constructed in conjunction with the road and hardstanding construction work as described below:-

- The surface of the vast majority of access tracks (other than a short section within the substation compound) will be permeable and will allow for incident rainfall to percolate to ground, thus avoiding significant run-off generation;
- The use of permeable materials will avoid changes to the natural drainage regime at the electricity substation site;
- Interceptor drains will be installed up-gradient of all proposed infrastructure to collect clean local drainage water, in order to minimise the amount of rainfall reaching areas where suspended sediment could become entrained. Collected drainage water will then be directed to areas where it can be slowly re-distributed over the ground surface and infiltrate through the soil and subsoils;
- Swales/road side drains will be used to collect drainage from access tracks, likely to have entrained suspended sediment, and channel it to settlement ponds for sediment settling; and,
- Check dams will be used along sections of access track drains to attenuate flows and intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock..

The stormwater management plan was designed so that storm water will be attenuated with discharge being limited to greenfield rates with storm-water storage facilities and SuDS elements incorporated to allow for a reduction of run-off volumes where possible.

- The stormwater drainage management plan include the provision of an attenuation system designed to cater for a 1 in 100-year storm event.
- This system will temporarily store stormwater and gradually release it back into the local drainage system at greenfield runoff rates.
- The proposed attenuation system reduces the risk of downstream flooding.

4.3.2.2 Mitigation Measures to Prevent Contaminated Runoff/Recharge

- A stormwater piped network will be built during the construction phase and will be used in the operational phase to collect all stormwater from the impermeable areas of the electrical substation site. Runoff from the tracks and other hardstand areas will continue to be directed towards the settlement ponds which will be left in place after the construction phase. Check dams will also be left in place in the drainage channels. This infrastructure will ensure that runoff is both attenuated and treated prior to release across the existing vegetation and recharging to ground;
- Onsite re-fuelling of machinery will not be carried out during the operational phase of the development. All plant/machinery will be refuelled offsite;
- Fuels stored on site will be minimised and any diesel or fuel oils/hydrocarbons stored on-site will be bunded within the control building. The bund capacity will be sufficient to contain 110% of the storage tank's maximum capacity;
- The electrical control building will be bunded appropriately to the volume of oils likely to be stored, and to prevent leakage of any associated chemicals and to groundwater or surface water. A storm drainage system and an appropriate oil interceptor will be installed at the compound of the electricity substation to avoid any discharges from the site of hydrocarbons;
- Any plant used during the operational phase will be regularly inspected for leaks and fitness for purpose;
- Spill kits will be available to deal with accidental spillages;
- A hydrocarbon interceptor will be located upstream of the stormwater attenuation system; and,
- Wastewater arising from the control building will be stored in a sealed sub-surface tank and will be removed from the site as required by a local licenced waste collector.

4.3.2.3 Mitigation Measures for Protected Areas

The mitigation measures to protect against poor quality runoff/recharge during the operational phase of the project are detailed above.

Mitigation measures for oils and fuels during the operational phase of the project are the same as those outlined in Section 4.3.1.2 above.

It can be concluded that with best practice methods adhered to during the operation phase of the project, the potential for the project to impact upon the qualifying interests of the local designated sites is not significant.

4.3.3 Decommissioning Phase

As set out at Chapter 3 of the EIAR, the project will form part of the national electricity network and decommissioning of the substation is not proposed. Therefore, decommissioning phase effects will not occur.

4.3.4 Potential Effects with the Implementation of Mitigation

In all instances, the mitigation measures described in Section 4.3 are sufficient to meet the WFD Objectives. The assessment of WFD elements for the WFD waterbodies is summarised in Table K below.

Table K: Summary of WFD Status for Unmitigated and Mitigated Scenarios

SWB	WFD Code	Current Status	Assessed Status - Unmitigated	Assessed Status with Mitigation Measures
Shannon[Upper]_SC_090				
Shannon (Upper)_110	IE_SH_26S021660	Poor	Poor	Poor
Ballybay_010	IE_SH_26B210730	Moderate	Moderate	Moderate
Shannon[Upper]_SC_100				
Cross (Roscommon)_010	IE_SH_26C100060	Moderate	Moderate	Moderate
Cross (Roscommon)_020	IE_SH_26C100200	Moderate	Moderate	Moderate
Cross (Roscommon)_030	IE_SH_26C100300	Moderate	Moderate	Moderate
Groundwater Bodies				
Funshinagh	IE_SH_G_091	Good	Good	Good

5. REPORT CONCLUSION

WFD status for SWBs (Surface Water Bodies) and GWBs (Groundwater Bodies) hydraulically linked to the project site are defined in Section 2 above.

The project does not involve any abstraction of groundwater or alteration of drainage patterns. Therefore, the quantitative status (i.e., the available quantity (volume) of groundwater and surface water locally) to the receiving waters will remain unaltered during the construction and operational phase of the project development.

There is no direct discharge from the project site to downstream receiving waters. Mitigation for the protection of surface and groundwater water during the construction and operational phases of the project will ensure the qualitative status of the receiving waters will not be altered by the project.

There will be no change in GWB or SWB status in the underlying GWB or downstream SWBs resulting from the project. There will be no change in quantitative (volume) or qualitative (chemical) status, and the underlying GWB and downstream SWBs are protected from any potential deterioration.

As such, the project:

- will not cause a deterioration in the status of all surface and groundwater bodies assessed;
- will not jeopardise the objectives to achieve 'Good' surface water/groundwater status;
- does not jeopardise the attainment of 'Good' surface water/groundwater chemical status;
- does not jeopardise the attainment of 'Good' surface water/groundwater quantity status;
- does not permanently exclude or compromise the achievement of the objectives of the WFD in other waterbodies within the same river basin district;
- is compliant with the requirements of the Water Framework Directive (2000/60/EC); and,
- is consistent with other Community Environmental Legislation including the EIA Directive (2014/52/EU), the Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC) (Note that a full list of legislation complied with in relation to hydrology and hydrogeology is included in Section 7.1.4 of EIAR Chapter 7).

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