8 WATER

8.1 INTRODUCTION

1 This chapter of the Environmental Impact Statement (EIS) evaluates the impacts on the water environment arising from the proposed development as set out in Chapter 6, **Volume 3B** of the EIS. The information contained within this chapter is concerned with the description of the hydrological character of the Cavan Monaghan Study Area (CMSA) as defined in Chapter 5**, Volume 3B** of the EIS.

2 The evaluation for the CMSA considers an area in excess of 500m either side of the line route.

3 The potential impacts on the surface water (rivers, lakes, etc.) conditions and on the environment are considered for both the construction and operational phases of the proposed development. Mitigation measures that will form part of the proposed development are described and any residual environmental impacts identified and their significance evaluated.

4 Chapter 6, **Volume 3B** of the EIS describes the full nature and extent of the proposed development including elements of the overhead line (OHL) design and the towers. It provides a factual description, on a section by section basis, of the entire line route. The principal construction works proposed as part of the development are set out in Chapter 7, **Volume 3B** of the EIS along with the outline Construction Environmental Management Plan (CEMP) in Appendix 7.1, **Volume 3B Appendices** of the EIS.

5 This chapter should be read in conjunction with **Chapters 6** and **7** of this volume of the EIS.

8.2 METHODOLOGY

6 This chapter has been prepared using the recommendations set out in the Environmental Protection Agency's (EPA) document *Guidelines on Information to be contained in Environmental Impact Statements* (March 2002). The guidelines and recommendations of the National Roads Authority (NRA) *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (*2009) were also considered in the preparation of this chapter.

7 The information contained in this chapter has been divided into sub-sections, so as to describe the various aspects pertaining to the water environment. In the preparation of this chapter the following sources of information were used in order to evaluate the regional and site specific context and character of the CMSA:

- EPA water quality monitoring data for watercourses in the area, www.epa.ie;

- EPA (2006). *Water Framework Directive* (WFD) *Monitoring Programme*;
- EPA (2005). *The Characterisation and Analysis of Ireland's River Basin Districts* (RBDs);
- *Neagh Bann International River Basin District* (2012) and *River Basin Management Plan* (2009-2015);
- *North Western International River Basin District* (2012) and *North Western River Basin Management Plan* (2009-2015);
- Inland Fisheries Ireland (IFI) *Sampling Fish for the Water Framework Directive (2008-2012);*
- EPA (2011). *Integrated Water Quality Report Monaghan & Louth*;
- Office of Public Works (OPW) flood mapping data, www.floodmaps.ie;
- OPW *Guidelines for Planning Authorities, The Planning System and Flood Risk Management (2009);*
- Natura Environmental Consultants in association with the National Roads Authority (NRA) (2005). *Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes*;
- *Guidelines for Planning Authorities, The Planning System and Flood Risk Management (2009);*
- CIRIA 532 (London, 2001). *Control of Water Pollution from Construction Sites,* Guidance for Consultants and Contractors;
- CIRIA 648 (London, 2006)*Control of Water Pollution from Linear Construction Projects;*
- Site visits of the CMSA; and
- Consultation with prescribed authorities.

8 The evaluation the CMSA is considered detailed and sufficient to adequately evaluate the hydrological setting.

9 All projects and developments that require an EIS are of a scale or nature that they have the potential to have an impact on the environment. With respect to the construction of a transmission line, the impact on the water environment is considered low in comparison to other linear projects such as road or pipeline developments.

10 In this chapter the potential impacts on the water environment resulting from the proposed development is evaluated and mitigation measures are proposed to reduce any significant impacts. Based on the mitigation measures proposed, the significance of the residual impact on the water environment is determined.

11 Criteria for evaluating impact level have been derived and are shown in **Table 8.1**. Terminology for impact significance and duration follows that set out in the EPA's *Guidelines on Information to be contained in Environmental Impact Statements* (March 2002). The magnitude of any effects considers the likely scale of the predicted change to the baseline conditions, resulting from the predicted effect and takes into account the duration of the effect i.e. temporary or permanent. Definitions of the significance and magnitude of any effects are provided in **Tables 8.1** and **8.2**.

Table 8.1: Significance Criteria and Examples

Importance	Criteria	Selected Examples
Very High	Attribute has a high quality and rarity on a regional or national scale.	Site protected under EU/ Irish legislation (SAC, cSAC, SPA, pSPA, NHA, pNHA)
High	Attribute has a high quality and rarity on a local scale.	Large rivers, important social or economic uses such as water supply or navigation. Good quality rivers (Q4 to Q5). May be designated as a local wildlife site.
Medium	Attribute has a medium quality and rarity on local scale.	May support a small / limited population of protected species. Limited social or economic uses. Regionally important aquifer. Inner source protection for locally important water source.
Low	Attribute has a low quality and rarity on a local scale.	No nature conservation designations. Low aquatic fauna and flora biodiversity and no protected species. Minimal economic or social uses.

Table 8.2: Magnitude Criteria and Examples

Magnitude	Criteria	Examples
Major Adverse Impact	Fundamental change to water quality or flow regime.	Calculated risk of serious pollution incident >2% annually.[26] Loss of protected area. Pollution of potable sources of water abstraction. Deterioration of water body leading to a failure to meet Good Status[27] under the WFD and reduction *in class (or prevents the successful implementation of mitigation measures for heavily* modified or artificial water bodies).
Moderate Adverse Impact	Measureable change to water quality or flow regime.	Loss in production of fishery. Discharge of a polluting substance to a watercourse but insufficient to change its water quality status (WFD class) in the long term. No reduction in WFD class, but effect may prevent improvement (if not already at Good Ecological Status) or the successful implementation of mitigation measures for heavily modified or artificial water bodies. Calculated risk of serious pollution incident >1% annually.[28]
Minor Adverse Impact	Minor change to water quality or flow regime.	Measurable changes in attribute but of limited size and / or proportion, which does not lead to a reduction in WFD status or failure to improve. Where the proposed development provides an opportunity to enhance the water environment but does not result in an improvement in class, status, output or other quality indicator.
Neutral or Negligible Impact	No measureable impacts on water quality or flow.	Calculated risk of serious pollution incident <0.5% annually. No effect on features, or key attributes of features, on the Protected Areas Register. Discharges to watercourse but no significant loss in quality, fishery productivity or biodiversity. No effect on WFD classification or water body target.

[26]NRA guidelines (2009.)
[27]Good Status as defined under the Water Framework Directive (2000/60/EC).
[28]NRA guidelines (2009).

12 Impact ratings may have negative, neutral or positive application where:

- Positive impact – A change which improves the quality of the environment;
- Neutral impact – A change which does not affect the quality of the environment; and
- Negative impact – A change which reduces the quality of the environment.

13 Terms relating to the duration of impacts are as described in the EPA's *Guidelines on Information to be contained in Environmental Impact Statements* (March 2002) as:

- Temporary Impact - lasting one year or less;
- Short term Impact - lasting one to seven years;
- Medium term Impact - lasting seven to fifteen years;
- Long term Impact - lasting fifteen to sixty years; and
- Permanent Impact - lasting over sixty years.

14 A qualitative approach was used in the evaluation, generally following the significance classification in **Table 8.3** and through professional judgement. The significance of a predicted impact is based on a combination of the sensitivity or importance of the attribute and the predicted magnitude of any effect. Effects are identified as beneficial, adverse or negligible, temporary or permanent and their significance as major, moderate, minor or not significant (negligible).

Table 8.3: Impact Assessment Criteria Matrix

Importance/ Sensitivity	**Magnitude**			
	Major Adverse	**Moderate Adverse**	**Minor Adverse**	**Negligible**
High/Very High	Major/ profound	Major	Moderate	Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Minor	Minor	Negligible	Negligible

15 In order for a potential impact to be realised, three factors must be present. There must be a source or a potential effect, a receptor which can be adversely affected, and, a pathway or connection which allows the source to impact the receptor. Only when all three factors are present can an effect be realised.

16 Baseline conditions have been established through a detailed desk study and consultation with relevant prescribed bodies, including the EPA, Monaghan and Cavan County Council and the Inland Fisheries Ireland (IFI). (Refer to Chapter 3, **Volume 3B** of the EIS for details on scoping and statutory consultation).

17 The scoping opinion received from An Bord Pleanála (refer to Appendix 1.3, **Volume 3B** of the EIS) identified the following issues as being relevant to this chapter of the EIS:

- Identification and assessment of the potential water quality impacts of excavation and construction activities proximate to or across watercourses along the route corridor, inclusive of the effects of nutrient release from site clearance or vegetation decomposition.
- An assessment of the potential hydrogeological impacts, including potential impacts on wetlands and drinking water sources.
- Submission of a construction method statement and management plan addressing potential impacts on water quality, including measures to protect water quality when diverting field drains or pumping groundwater which may impact on watercourses some distance away.

8.2.1 Legislative Context

18 The following legislation was considered as part of this impact evaluation:

- *Consolidated EIA Directive 2011/92/EU*;
- *Environmental Liability Directive* (2004/35/EC);
- *European Communities (Quality of Salmonid Waters) Regulations, 1988* [S.I. No. 293/1988]*;*
- *European Communities (Drinking Water) Regulations 2014* [S.I. No. 122/2014];
- *European Communities (Water Policy) Regulations 2003* [S.I. No. 722/2003];
- *European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2014* [S.I. No. 31 /2014];
- *Fisheries (Consolidation) Acts, 1959-2003*;
- The *Local Government (Water Pollution) Acts 1977-2007* provide for the prevention of water pollution in Ireland;

- *Wastewater Discharge (Authorisation) (Amendment) Regulations 2010* [S.I. No. 231/2010]; and
- *Water Framework Directive* (2000/60/EC).

8.2.2 Scope of Evaluation

19 This water impact evaluation focuses principally on the construction phase, as it is during this phase of the proposed development that there is the greatest potential for adverse effects to occur to surface water bodies. The evaluation has considered the construction methodology associated with the installation of each tower, together with any associated temporary infrastructure, including temporary access routes, stringing activities, guard poles and tree lopping.

20 Although the ecological sensitivity of watercourses has been considered in this chapter, **Chapter 6** of this volume of the EIS provides an evaluation of interrelationships with receptors of ecological sensitivity which includes information on European protected sites and habitats.

21 Determining the appropriate spatial study area is important to ensuring that this water quality impact evaluation is robust and accurately predicts the potential effects on surface water bodies. There is no formal published guidance on this matter and thus the zone within which there is the potential for significant effects has been determined based on the description of the development and the construction methodology outlined in Chapter 7, **Volume 3B** of the EIS and professional judgement.

22 Due to the nature of the hydrological environment, it is necessary to consider the upstream and downstream effects of the proposed development, with particular attention on the main surface water streams in the area.

8.2.3 Design Summary

23 Construction working areas and stringing areas are all relevant design details when determining the risk posed to any nearby water features. Wherever possible, temporary access routes, tower locations and stringing areas have been located away from watercourses, or the working area orientated to avoid watercourses. Where this is not possible, recommendations have been proposed to prevent pollutants running off into the watercourse.

24 Chapter 7, **Volume 3B** of the EIS details how the proposed development will be constructed and outlines the phasing of construction. The result of this phasing is that multiple towers may be constructed simultaneously close to the same watercourse, or within the same river

catchment. The construction of the OHL will be undertaken in five general stages, according to the following sequence, on a rolling programme of estimated durations:

- Stage 1 – Preparatory Site Work (1 – 7 days);
- Stage 2 – Tower Foundations; standard installation (3 – 6 days), pilling installation (5 – 10 days);
- Stage 3 – Tower Assembly and Erection and Preliminary Reinstatement (3 – 4 days);
- Stage 4 – Conductor / Insulator Installation (7 days); and
- Stage 5 – Final Reinstatement of Land (1 – 5 days).

25 All site works and related activities including temporary access routes, tower foundations, guarding locations, tree lopping and stringing will be conducted in an environmentally responsible manner, so as to minimise any adverse impacts to watercourses that may occur as a result of works associated with the construction phase. A CEMP will be prepared to ensure adequate protection of the water environment (incorporating all mitigation measures detailed in this chapter). An outline CEMP has been included in **Appendix 7.1, Volume 3B** of the EIS, and forms part of the application documentation.

26 Where possible, existing farm and field access routes will be used to avoid disruption to local landowners as outlined in Chapter 7, **Volume 3B** of the EIS. Where these pass close to watercourses or drainage ditches, mitigation will be required to ensure that the water body is protected from erosion or pollution. The principal concern regarding temporary access routes with respect to water quality, are the physical effects that may occur during any stream crossings that are required, and the potential for particulates and oils to runoff into watercourses. This evaluation adopts a precautionary approach, so where there is a risk, appropriate mitigation measures are provided.

8.3 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

27 The main potential impacts on the water environment occur during the construction phase. Details of the potential impacts are included in **Section 8.5**. Overall the construction programme is anticipated to last approximately three years. The proposed development entails the construction of towers with individual sites separated by 340m on average. In general the phases of construction can be broken down into the following: site preparation (including, where necessary, the placing of aluminium road panels or rubber matting for temporary access tracks, removal of fences and erection of temporary fencing), all works associated with modifications to existing 110kV electricity transmission OHLs, installation of tower foundations, erection of

towers, guard poles, tree lopping, stringing of conductors, commissioning of the line and reinstatement of land.

8.4 EXISTING ENVIRONMENT

28 The regional setting of the proposed development in relation to the surface water environment is shown in Figures 8.1 – 8.4, **Volume 3C Figures** of the EIS.

29 Baseline conditions have been established through a detailed desk study, field study and consultation with relevant prescribed bodies, including the EPA, Monaghan County Council, Cavan County Council and the IFI (refer to Chapter 3, **Volume 3B** of the EIS for details on scoping and statutory consultation). Where such information has been available, the desk study included the following:

- Review of Ordnance Survey Ireland (OSi 1:50,000 Discovery Mapping Series) maps to identify the locations of surface water bodies;
- Review and collation of EPA (www.epa.ie) and WFD (www.wfdireland.ie) quality data in relation to surface water close to the proposed development;
- Identification of surface waters containing salmonid and/or cyprinid fish species; and
- Identification of sensitive waters.

30 Site visits of the CMSA were carried out between March 2009 and July 2009, in April 2011 and between July and September 2013 by TOBIN Consulting Engineers (by suitably qualified scientists / engineers) in order to visually evaluate the water environment in the vicinity of the proposed development in the CMSA. The site visits comprised recording of drainage patterns, drainage ditches, recording of hydrological conditions and visual evaluations of watercourses and watercourse crossings.

8.4.1 Hydrology

31 The proposed line route traverses the Hydrometric Area 06 (River Dee/ River Glyde / River Fane and their tributaries), Hydrometric Area 36 (River Erne and its tributaries), and Hydrometric Area 03 (River Bann and its tributaries). A large number of small rivers and streams traverse the CMSA (see **Table 8.4**). No major rivers are crossed by the proposed line route (3rd order river or above). The Stream / River Order was obtained from the EPA website (www.epa.ie) and based on stream order classification (Strahler, 1952).

32 Towers 103 and 109 are located in the Clontibert River Catchment. The Clontibret River and its tributary, the River Moy flows in a north-westerly direction along the border between Northern

Ireland and Ireland. The Clontibret River discharges into the Cor River, which ultimately flows into the River Bann.

33 The headwater of the River Fane is located along the Armagh / Monaghan Border (Towers 109-130) and drains towards Lough Muckno. The River Fane flows to the south-east before eventually discharging to Dundalk Bay and the Irish Sea.

34 The Annalee River and its tributaries which are part of the River Erne catchment, flows through the central section of the proposed development.

35 The Dromore River and Annalee River flow in a westerly direction towards Butlers Bridge and Lough Erne before entering Donegal Bay at Ballyshannon.

36 The Dee / Glyde / Lagan River and their tributaries are crossed at the southern section of the proposed line route between Towers 185 and 237.

37 A number of smaller tributary streams and rivers are located adjacent to but removed from the proposed line route. There is a high drainage density throughout due to the low permeability soils and bedrock. Additionally, a number of lakes are located in the inter-drumlin hollows.

Table 8.4: Surface Water Features and Hydrometric Areas along the Alignment

Hydrometric Area	River	Tributaries	Towers	% of towers in each hydrometric area
Hydrometric Area 03	Neagh Bann – Clontibert River	River Moy	103-108	5
Hydrometric Area 06	Fane (and tributaries)	Fane River and Dunfelimy Stream	109-130	16
Hydrometric Area 06	Glyde River	Glyde Upper and River Lagan	190-194, 201-226	23
Hydrometric Area 06	Dee River	Dee Upper and Ervy Lough Stream	227-237	7
Hydrometric	River Erne –	Knappagh River	156-188	

Hydrometric Area	River	Tributaries	Towers	% of towers in each hydrometric area
Area 36	(and tributaries)	Annalee River	189, 195-200	49
		Dromore River	131-155	

8.4.2 Water Framework Directive Requirements

38 European Communities Directive 2000/60/EC, which established a framework for community action in the field of water policy (commonly known as the WFD), requires 'good status' for European waters by 2015. This is to be achieved through a system of river basin management planning and extensive monitoring. In 2004, a characterisation and analysis of all River Basin Districts (RBD) in Ireland was undertaken as required by article 5 of the WFD. In this characterisation study, the impacts of a range of pressures were evaluated including diffuse and point pollution, water abstraction and morphological pressures (e.g. water regulation structures). The purpose of this exercise was to identify water bodies at risk of failing to meet the objectives of the WFD by 2015, 2021 and 2027. Measures to address and alleviate these pressures are to be included in a formal programme of measures to be submitted to the European Commission.

Table 8.5: Selection of WFD Classifications for the Major Rivers along the Alignment

EPA River Name EPA River Code	River RBD Status	If not at good status, the reason for not achieving good status	RBD Surface Water Catchment Name	Good Status by
Ervy Lough Stream NB_06_733	Poor	Overall ecological status including macroinvertebrate status and Hydromorphology status	NB_Dee96_DeeTRIB_ErvyLoughStream	2021
Glyde Upper NB_06_484	Good	-	NB_Glyde95_Glyde3_Upper	2015

EPA River Name EPA River Code	**River RBD Status**	**If not at good status, the reason for not achieving good status**	**RBD Surface Water Catchment Name**	**Good Status by**
Glyde Magheracloone NB_06_246	Good	-	NB_Glyde95_GlydeTRIB_Magheracloone1_Lower	2015
Glyde Magheracloone NB_06_886	Poor	Overall ecological status	NB_Glyde95_GlydeTRIB_Magheracloone2_Upper	2021
Annalee Upper NW_36_1947	Moderate	Overall ecological status	NW_Erne123Annalee_Annalee5_Upper	2021
GlydeTRIB_Rahans 2 NB_06_158	Poor	Overall ecological status	NB_Glyde95_GlydeTRIB_Rahans2_Upper	2021
Knappagh NW_36_1559	Moderate	Overall ecological status	NW_Erne123Annalee_KnappaghTRIB_ShantonaghLough	2015
Knappagh Lower NW_36_1068	Poor	Overall ecological status including macroinvertebrate status	NW_Erne123Annalee_AnnaleeTRIB_Knappagh1_Lower	2021
Knappagh NW_36_684	Moderate	Overall ecological status	NW_Erne123Annalee_KnappaghTRIB_Aghmakerr	2015
Dromore NW_36_1691	Poor	Overall ecological status	NW_Erne123Annalee_DromoreTRIB_Corrybrannan	2021
Major Lough Stream NW_36_1050	Good	-	NW_Erne123Annalee_MajorLoughStreamTRIB_Toome	2015
Dromore NW_36_895	Good	-	NW_Erne123Annalee_DromoreTRIB_MajorLoughStream1_Lower	2015
Major Lough Stream NW_36_1334	Poor	Overall ecological status	NW_Erne123Annalee_MajorLoughStreamTRIB_Corfin	2021

EPA River Name EPA River Code	**River RBD Status**	**If not at good status, the reason for not achieving good status**	**RBD Surface Water Catchment Name**	**Good Status by**
Fane – Dunfelimy Stream NB_06_406	Bad	Overall ecological status and General physico-chemical status	NB_Fane94_FaneTRIB _DunfelimyStream	2021
Blackwater-Clontibret Stream NB_XB_03_9	Poor	Overall ecological status and General physico-chemical status	NB_Blackwater	2021

NOTE – Status: By 'Status' it is meant the condition of the water in the waterbody. It is defined by its chemical status and its ecological status, whichever is worse. Waters are ranked in one of 5 status classes: High, Good, Moderate, Poor, Bad. However, not all waterbodies have been monitored, and in such cases the status of a similar nearby waterbody has been used (extrapolated) to assign status.

39 In relation to protected areas under the WFD, it indicates the following:

- There are no 'Registered Protected Areas' (RPA) nutrient sensitive rivers along the proposed line route, with the exception of the River Proules, located 1km east of the construction material storage yard. Monalty Lough pNHA (Site Code 001608) is located in the River Proules catchment, 1km downgradient of the temporary construction material storage yard;
- There are no RPA habitat rivers along the proposed line route;
- There are no RPA nutrient sensitive lakes and estuaries along the proposed line route; and
- There are no RPA shellfish areas along the proposed line route.

40 Based on the available information, the majority of the Erne, Fane, Glyde and Dee catchments are 'at Risk of not achieving Good Status' in relation to Surface Water (1a status).

41 The Erne, Glyde, Fane and Dee catchments are located in predominantly agricultural land. The catchments are comprised primarily of pastureland with substantial areas of arable crops. The causes of the high number of 'At Risk' Category Rivers on the Dee, Glyde and Fane catchments are due to the following areas:

- Diffuse Pollution (i.e. Agriculture);
- Point Source Pollution (Wastewater);
- Morphological Pressures;
- Water Abstraction; and
- Tourism and Recreation.

42 Agriculture, Wastewater Treatment Plants (WWTP) and septic tanks are thought to contribute over 95% of the total polluting matter. Agricultural sources are the suspected causes in all cases with the exception of the River Glyde and River Proules/ Lough Monalty where WWTP point source pollution is suspected.

8.4.3 Surface Water Quality

43 The EPA monitors the quality of Ireland's surface waters and assesses the quality of watercourses in terms of four quality categories; 'unpolluted', 'slightly polluted', 'moderately polluted', and 'seriously polluted'. These water quality categories and the water quality

monitoring programme are described in the EPA publication *Water Quality in Ireland, 2001-2003* (2005).

44 The water quality assessments are largely based on biological surveys. Biological Quality Ratings or Biotic Indices (Q values) ranging from Q1 to Q5 are defined as part of the biological river quality classification system. The relationship of these indices to the water quality classes defined, are set out in **Table 8.6**.

Table 8.6: Relationship between Biotic Indices and Water Quality Classes

Biotic Index	Quality Status	Quality Class
Q5, 4 - 5, 4	Unpolluted	Class A
Q3 - 4	Slightly Polluted	Class B
Q3, 2 - 3	Moderately Polluted	Class C
Q2, 1 - 2, 1	Seriously Polluted	Class D

45 A review of monitoring station results suggests that, in general, the majority of the rivers along the alignment of the proposed development in the CMSA are slightly to moderately polluted.

46 Data from EPA monitoring stations indicates that the majority of the surface water in the Dromore River catchment is slightly to moderately polluted. Examples of monitoring station data closest to the proposed line route are included with water quality results from 1997 - 2013. Refer to Appendix 8.1, **Volume 3C Appendices** of the EIS.

47 The, majority of the Annalee River stations are classified as slightly polluted to unpolluted. Water quality in the River Fane is poor with the majority of stations classified as seriously polluted. Examples of these stations are included in **Table 8.7** with the water quality results from 1997-2013.

48 The River Glyde and its tributaries, had a higher proportion of unpolluted stretches of waterways when surveyed by the EPA in 2012, compared to the rivers in the northern part of the CMSA.

Table 8.7: Selection of Biotic Indices (1997-2013) for the Major Rivers along the Proposed Alignment

River	Monitoring Location	Biotic Index					
		1997/ 1998	2000/ 2001	2003/ 2004	2006/ 2007	2009/ 2010	2012/ 2013
River Glyde	Cormey Bridge	4-5	4-5	4	4	4	3-4
	Lagan Br	3	4	4	4-5	4-5	4
	Aclint Br	-	4	4	-	4	4
River Dee	Br u/s Ervy Lough	4	3-4	4	3-4	3-4	3-4
	Br to North of Every Crossroads	4	4	4	4	-	-
	Tom's Bridge	3	3-4	3	3	3-4	3
River Fane	South Br Dunfelimy	2-3	2-3	2-3	2/0	3	3
	2nd Br u/s Laragh L (Malin Road)	3	3	3	3	-	-
	Derrycreevy Br	3-4	3	3	3-4	3-4	3
	Clarebane Br	3	3-4	3	3	3	3
	Ballynacarry Br	4	4	3-4	3-4	4	4
Annalee River	2nd bridge u/s L Sillan	3-4	4-5	3-4*	4	3-4	4
	Annafarney Br	3	3	3	3	3	3
	Br nr Ann's Fort	4	3-4	4	4	4	4
Knappagh (tributary of the Annalee	Bridge u/s Bellatrain Lr	3	3*	4	3	3-4	3
	Lackan Br	3	3-4*	3-4*	-	3	3
	Br u/s Annalee River Confluence	3	3-4*	4	3-4	3-4	3-4
Dromore	Br NE of Corryloan L	4	4	4-5	4	4	4
	Br d/s Ballintra	3-4	3-4	3-4	4	4	4

River	Monitoring Location	Biotic Index					
		1997/ 1998	2000/ 2001	2003/ 2004	2006/ 2007	2009/ 2010	2012/ 2013
River	Br SW of Bartley's	3	3	4	3-4	3-4	1-2*
	Br SE of Edenaferkin	3-4	3	3-4	-	3-4	3-4
	Br in Ballybay	3-4	-	3	3-4	3-4	2-3
	Br d/s L Major	3	3	3-4	-	3	3
	Balladian Br	3	3	3	3	3	3
Clontibret Stream	Bridge in Clontibret	3	3	3	3	3	2-3
	Bridge SW of Clerran	-	-	3	3	-	3
	Bridge E of Killyneill Crossroads	4	3	3	3	3	3

(Source: EPA data (www.epa.ie))

49 Outlined below is an summary of the recent water quality data from the EPA website (www.epa.ie):

- *"The Fane River continued to be in a generally unsatisfactory ecological condition in its upper section in September 2012, with poor ecological condition recorded at South Bridge at Dunfelimy (0150), Derrycreevy Br (0200) and Ballynacarry Br (0400). The lower section of the Fane River retained its good ecological condition at Inniskeen Br (0650) and at Stephenstown Br (0900)."*

- *"The upper reaches of the Knappagh (0200 and 0400) were found to be in unsatisfactory ecological condition in July 2013, a situation virtually unchanged in over twenty years of surveying this Annalee River tributary. The influence of upstream lakes, particularly as stores of Phosphorus, coupled with agricultural and commercial activities in the catchment, are contributing to the eutrophication of the Knappagh River. In particular, a lack of pollution sensitive macroinvertebrate species, excessive weed and algal growth, excessive siltation and low dissolved oxygen (<70 % saturation) characterise the upstream sites (0200 at the bridge upstream of Bellatrain Lough; and 0400 at Lackan Bridge). Further downstream at station 0700 (just upstream of the Annalee river confluence) a welcome return to good ecological condition was recorded during the current survey"*

- *Once again the Dromore remains in generally unsatisfactory ecological condition in 2013. Only three (0015, 0036, 0900) of the eleven stations surveyed were in a satisfactory ecological condition. Signs of nutrient enrichment such as dominance of tolerant macroinvertebrate species, paucity of pollution sensitive macroinvertebrates, excessive weed and/or algal growth, depressed DO and excessive siltation were apparent at all sites surveyed largely due to the effects of sewage and agriculture on the lakes along the rivers course, and the further effects of these lake outflows on the biota of the river itself. A significant decrease in ecological condition was observed at 0075, where recent dredging and bank works had all but wiped the river of habitat, and deposition of silt was excessive. A similar decline was noted at the Bridge in Ballybay (0150) where high water temperatures in July contributed to significantly depressed dissolved oxygen levels (5.9mg/l; 68.7% saturation).*

- *"There was a noticeable overall welcome improvement in ecological quality in the Annalee in 2013, with only one out of eleven sites sampled classed as unsatisfactory. This site occurs immediately downstream of Lough Sillan (0150), with excessive macrophyte growth a feature."*

- *"Macroinvertebrate fauna indicated a general overall deterioration in the condition of the Glyde River since 2009. Despite satisfactory ecological conditions recorded at all sites assessed in 2009, currently only the middle reaches of the river (Lagan Br (0400), Aclint Br (0500) and Br W Mullacrew (0600)) merited good ecological condition in 2012. Disappointingly, the other five sites were downgraded to moderate ecological condition."*

- *"There has been no change in the ecological condition of the Clontibret Stream for over a decade, with moderate pollution noted again in July 2010. This once great brown trout stream continues to come under pressure from suspected agricultural and sewage sources."*

50 **Water Quality Summary** Most Rivers (with the exception of the River Glyde / Dee) along the proposed alignment are suffering from water quality problems, principally eutrophication from suspected agriculture sources and WWTP. The Fane River remained in a less than satisfactory condition due to widespread eutrophication, the most obvious symptom of which was the abnormally luxuriant growth of filamentous algae which can seriously upset the dissolved oxygen (DO) regime and stimulate the precipitation of calcium carbonate (marl) on the river bed thus obliterating essential niches for a variety of mayfly and stonefly indicator species. Most of the rivers in the Dromore catchment are moderately to slightly polluted.

8.4.3.1 Lakes

51 The proposed alignment is within the catchment of a number of lakes. Lakes are generally located in inter-drumlin hollows. A number of these lakes have wetland edges and are considered further in **Section 8.8**. The EPA carried out water quality monitoring on Irish lakes between 2007 and 2012. **Table 8.8** sets out the EPAs lake classification system.

Table 8.8: Trophic Classification System for Lakes

Lake Trophic Category	Target Trophic Status	Total Phosphorous Average Concentration (µg P/l)	Annual Max. Chlorophyll (mg/m^3)
Ultra-Oligotrophic	Ultra-Oligotrophic	≤ 5.0	< 2.5
Oligotrophic	Oligotrophic	> 5 ≤ 10	> 2.5 < 8
Mesotrophic	Mesotrophic	> 10 ≤ 20	≥ 8 < 25
Eutrophic	Mesotrophic	> 10 ≤ 20	≥ 8 < 25
Hypertrophic	Eutrophic	> 20 ≤ 50	≥ 25 < 75

52 The major lakes present in the CMSA include the following:

- Boraghy Lake (located approximately 200m north-west of Tower 163);
- Bocks Lough (located approximately 210m east of Tower 175);
- Lough Egish (H) (located approximately 600m south-east of Tower 161 and 162);
- Crinkill (Toome) Lough (south-east) (located approximately 500m north-east of Tower 146);
- Corlin Lough (located approximately 890m west of Tower 134);
- Lough Morne (located approximately 250m west of Tower 166); and
- Drumgristin, Coogan's and Ghost Lough (located approximately 220m east of Tower 130).

53 Of the lakes detailed above, the EPA carried out water quality monitoring at Lough Egish and Muckno Lough. The water quality of Lough Egish was found to be hypertrophic, which is classified by the EPA to be highly polluted and poor ecological status in 2011. The water quality of Muckno Lough was also found to be hypertrophic or highly polluted and poor ecological status in 2012. Historical data from Crinkill (Toome) Lough was found to be strongly eutrophic, which is also classified by the EPA as highly polluted. A number of minor and unnamed lakes/ ponds are also located along the proposed line route as follows:

- Tassan Lough (located approximately 300m south of Tower 115);
- Muff Lough (located approximately 265m south-east of Tower 226);
- Lough in Raferagh Townland (located approximately 100m west of Tower 198);
- Lough in Corvally Townland (located approximately 150m south, south-west of Tower 193 and approximately 150m north north-west of Tower 194); and
- Lough in Comertagh Townland (located approximately 200m south of Tower 201).

8.4.3.2 Protected Areas and Fisheries

54 There are no riverine SACs / cSACs along the proposed alignment within the CMSA. Consultation was held with the National Parks and Wildlife Service (NPWS) and IFI designations department regarding the proposed line route. The rivers along the proposed line route are potential salmonid streams. In general, the potential for Salmonids (Atlantic Salmon and Trout) is greatly reduced where the Q values drops below Q3 or Q3 - 4. Non-salmonids or coarse (cyprinid) fish (Rudd, bream etc.) dominate the fish community at 'poor'-quality (Q2 – 3) sites but decrease to <10% of the fish population at 'high'- quality (Q4 – 5 and Q5) sites. Salmonids dominate the community at high-quality sites and decrease to <20% at poor-quality sites as outlined in the EPA's *Investigation of the Relationship between Fish Stocks, Ecological Quality Ratings (Q-values), Environmental Factors and Degree of Eutrophication'* (2000).

8.4.3.3 Importance of Surface Water Features

55 The importance of the relevant surface water bodies within the CMSA has been evaluated by applying the criteria presented in the methodology in **Section 8.2** to the baseline information presented throughout this section. The level of importance for each water receptor within the CMSA and the justification for their classification is set out in **Table 8.9**.

Table 8.9: Importance of Surface Water Features

Surface Water Feature	Justification	Level of Importance
N/A	SACs, cSACs, SPAs, pSPAs NHAs, pNHAs	Very High
Tributaries of the Glyde River, Dromore River, Glyde River, Knappagh River, i.e. Major Lough Stream NW_36_1050; Dromore NW_36_895; GlydeMagheracloone *NB_06_246;* *Glyde Upper NB_06_484* *Toome Lake*	Q4 Rivers Q4-5 Rivers Q5 Rivers Surface water abstraction lakes	High

Surface Water Feature	Justification	Level of Importance
Tributaries of the Glyde River, Dromore River, Dee River, Glyde River, Knappagh River, Fane River, Clontibret River	2nd Order River, 1st Order River	Moderate
Streams	1st, 2nd and 3rd order streams	Low
Drainage Ditches and field drains	No data is available for these minor watercourses, some of which are ephemeral or have very limited flow. None are designated under the WFD, although they may contribute a small amount of flow to larger watercourses within the study area as identified above. In addition, although these minor watercourses may have some local importance in terms of land drainage and water supply for farm animals, during the site visit many were observed to be dry, heavily poached or eutrophic.	Negligible

8.4.3.4 Flooding Data

56 Substantial areas of the Glyde and Dee catchments have been artificially drained to improve agricultural land from the 1960s to 1980s. The Glyde catchment has been modified to prevent flooding, improve agricultural fields and allow for urban development. The River Dee and its tributaries have been artificially drained since the 1960s. Areas historically prone to flooding include areas of mapped alluvial sediments however OPW flood relief works have decreased the frequency of flood events.

57 The OPW 'Flood Mapping Database' was used in order to obtain information on historical flooding events in the CMSA. This information was used to establish the current baseline conditions in terms of what sections of the area are liable to flood. No significant recorded floods have taken place within the CMSA along the alignment of the proposed line route or at tower bases. Tower sites may be subject to pluvial inundation in wet weather. Additional sources of information including internet searches, historical maps, data from Catchment Flood Risk Assessment and Management Studies (CFRAMs) and flood risk assessments were also consulted. The construction material storage yard is not located in a flood prone area (Flood Zone C) based on the preliminary flood risk assessment (PFRA) maps.

58 Data on historical flooding are limited but the records indicate that flooding has occurred in the following areas:

- Flooding of the Bocks Lough and Tullyglass (low lying ground between Towers 176 and 177 and Bocks Lough to the north-east; and
- Flooding along Dromore River north of Ballintra Bridge (located approximately 0.2km to the west of Tower 140).

59 The proposed towers are not located on any major flood plain and will not interfere with either the water levels or flow of the Dromore River, Glyde River and its tributaries or Dee River.

8.5 POTENTIAL IMPACTS

8.5.1 Do Nothing

60 In the case of no development occurring, there would continue to be changes in water environment as a result of ongoing land management within the CMSA. It is most likely that the area would continue to be managed intensively for agriculture and commercial forestry. Possible changes in management could include further land drainage and land use change, all of which would have a potential impact on water quality of the CMSA. However, it is not expected that these changes in land use would be influenced by whether the proposed development proceeds or not.

8.5.2 Construction Phase

61 Further details on the proposed construction methodology which will directly influence potential construction impacts to the water environment are discussed in Chapter 7, **Volume 3B** of the EIS. Based on the nature of the proposed development and the baseline water data collected, the following activities warrant specific attention in the water impact evaluation and hence in the design of the proposed development:

- Felling of forestry;
- Placing of aluminium road panels or rubber matting for temporary access tracks, where necessary;
- Construction of tower foundations and towers;
- Works near watercourses;
- Construction materials;
- Stockpiling material; and
- Stringing of conductors.

62 These activities may impact on the water environment by having the potential to cause:

- Flow Alterations;
- Sediment Discharges; and

- Contaminant Discharges.

63 The installation of guard poles and tree lopping activities will not have a significant impact on the water environment based on methodologies outlined.

8.5.2.1 Flow Alterations

64 During construction, there is potential for increased runoff due to the introduction of temporary access tracks, soil disturbance, soil compaction and stockpiling of soils. This may increase the rate and volume of direct surface runoff. The potential environmental impact of this is to increase flow rates, leading to increases in channel erosion and sediment loading reaching watercourses. It may be necessary to divert sections of dry drains / drainage ditches or underground services where encountered, thereby increasing potential sediment runoff. If excavations for tower bases encounter groundwater, such inflows may need to be pumped, resulting in short term localised drawdown of the water table and discharges to the surface water channels.

65 A review of baseline information on historical flooding and flood risk has been presented in **Section 8.4**. The proposed line oversails a number of watercourses with floodplains and known areas of historical inundation, however the towers are located away from these floodplains and it is not predicted to have significant adverse effects on flooding. Tower foundations and temporary access routes are not predicted to significantly affect the capacity of floodplains through which they pass or the hydrological character of these areas. Additionally, the project meets the justification test, as set out in the OPW Guidelines for Planning Authorities (The Planning System and Flood Risk Management (2009)).

66 Temporary flooding, either pluvial or fluvial, at the bases of the towers will not have a detrimental effect on the operation of the proposed development. The proposed construction material storage yard was historically pluvially inundated, however the construction of the N2 has altered the flow in the vicinity of the site. Based on the present site layout the site is not a flood risk.

8.5.2.2 Sediment Discharge

67 Suspended solids can potentially impact on surface water quality by clogging the gills of fish, covering spawning sites, leading to loss of habitats on the riverbed, and stunt aquatic plant growth by limiting oxygen supplies, shelter and food sources.

68 Site preparation for OHL construction include the use of temporary access routes to the tower positions (refer to Chapter 7, **Volume 3B** of the EIS for further details) and may include minor civil works around the tower location including, *inter alia*:

- Clearing the site works area;
- Levelling of the tower foundation area (if required);
- Diversion of field drains where existing drainage is present at the location of a tower foundation;
- Delineation of any on site working area (e.g. erection of temporary fencing etc.);
- Diversion of any existing utilities (e.g. underground water pipes, cables etc.); and
- Erection of guarding positions.

69 Alterations to existing OHL structures will be required on the Lisdrum – Louth 110kV line and the Louth – Rathrussan 110 kV line, to ensure there are adequate electrical safety clearances maintained between the proposed 400 kV circuit and the existing 110 kV lines. No significant potential impacts arise from these construction works.

70 Additionally, felling of commercial forestry will be undertaken along the line route. During the elements of the construction works, potential exists for discharge of sediment from the works area, to adjacent watercourses. Tower foundations (per tower leg) typically range from 2m to 3.5m in depth to the invert level of the foundation and anywhere from 2 x 2 metres squared, to 9 x 9 metres squared in plan area depending on tower type. Details of foundation types are included in Chapter 7, **Volume 3B** of the EIS.

71 There is the potential for the release of sediments into watercourses as a consequence of the following activities:

- Soil stripping for tower foundations works area and other infrastructures;
- Felling of forestry, where necessary;
- Soil excavation for tower foundations;
- Run-off and erosion from soil stockpiles (prior to reinstatement); and
- Dewatering of excavations for tower foundations.

72 No significant areas of mature forestry are located on the CMSA line route.

73 The potential result of increased sediment (suspended solids) loading to watercourses is to degrade water quality of the receiving waters and change the substrate character. Potential impacts relates to the following sensitive locations where towers are located near rivers:

- Q4 Rivers – Major Lough Stream NW_36_1050; Tower 223 located approximately 0.25km to the river;
- Dromore NW_36_895; Towers 139-140 located over 0.15km to the river;
- GlydeMagheracloone NB_06_246; Towers 204 located approximately 130m to the stream;
- Glyde Upper NB_06_484; Towers 224 and 219 located approximately 20m to the stream;
- Toome Lake – Surface water abstraction; Towers 145-149 located approximately 0.5km to the lake, (Towers 145 – 154 are located in Toome Lake catchment); and
- Lough Egish – Surface water abstraction; Towers 161–163 located approximately >0.5km to the lake, (Towers 156 – 164 are located in Lough Egish catchment).

74 Chapter 6, **Volume 3B** of the EIS and **Chapter 13** of this volume of the EIS outline the approach to be taken to the widening of access points. Existing accesses could be temporarily enlarged to accommodate the larger types of construction vehicles. Widening of these crossings may require the increasing in length of existing bridges. Where temporary structures are required, IFI approval will be sought regarding the specification and timing of installation. Short sections of drainage ditches may need to be temporarily culverted with the potential for sediment discharge. It is not proposed to ford any streams or rivers as part of this proposed development.

75 Lough Monalty pNHA and the River Proules are located downgradient of the construction compound. The River Proules is a nutrient sensitive stream which is located approximately 0.6km to the east of the construction materials storage yard. The main pressures on the River Proules are nitrate and phosphates from suspected wastewater discharges and agriculture. It is not proposed to discharge wastewater from the site therefore the construction compound will not impact on the nutrient status of the River Proules.

8.5.2.3 Contaminant Discharges

76 During the construction of the proposed development, there is a risk of accidental fuel pollution incidences. The potential impact of accidental spillages is limited by the size of the machinery used and the limited scale of construction at any location. Potential sources include the following:

- Spillage or leakage of oils and fuels stored on site;

- Spillage or leakage of oils and fuels from construction machinery/ vehicles;
- Spillage of oil or fuel from refuelling machinery on site; and
- The use of concrete and cement for the tower foundation.

77 Concrete (specifically, the cement component) is highly alkaline and any direct spillage to a local watercourse could impact on water quality and flora and fauna in the short term. There is potential for runoff from concrete into drains and other watercourses close to the works area which are potentially linked to more ecologically important streams, rivers and lakes.

78 Stringing is a non- intrusive operation and the only risk to watercourses is from a spillage of plant oil or fuel. This will be limited by the size of the fuel tank of the largest plant / vehicles used on the site, thus there is a relatively low potential impact from these works.

79 A review of baseline information on historical flooding and flood risk has been presented in **Section 8.4**. The proposed alignment oversails a number of watercourses with floodplains and known areas of historical inundation, however the towers are located away from these floodplains and it is not predicted to have significant adverse effects on flooding. Tower foundations and temporary access routes are not predicted to significantly affect the capacity of floodplains through which they pass or the hydrological character of these areas.

80 Temporary flooding, either pluvial or fluvial, at the bases of the towers will not have a detrimental effect on the operation of the proposed development.

8.5.2.4 Summary Construction Impacts on Key Water Receptors

81 Key water receptors will largely be avoided by the proposed development. Potential impacts during the construction phase of the proposed development may arise from surface water runoff from tree felling activities and excavations works. Accidental spillage of material, such as fuel oil or solvents, has the potential to pollute water features. At the most sensitive locations, such accidental spillage could result in a temporary localised moderate adverse potential impact, as there is also an associated pollution risk. The temporary potential impact however can be managed with appropriate mitigation measures as outlined in this EIS. **Table 8.10** summarises the impact evaluation of the construction phase (pre mitigation).

Table 8.10: Summary of Construction Effects

Impact	Receptors	Evaluation of Impact prior to Mitigation		
		Duration of Effect	Magnitude of Effect	Potential Impact
Potential Impacts (unmitigated)	Construction compound	Short term	Negligible	Negligible
	Crossings of Q4 Rivers	Short term	Minor adverse	Localised Minor Adverse
	All other tower locations	Short term	Negligible	Negligible
	Forestry felling	Short term	Negligible	Negligible

8.5.3 Operational Phase

82 There will be no direct discharges to the water environment during the operational phase. No other potentially significant impacts are anticipated during the operational phase.

8.5.4 Decommissioning

83 The proposed development will become a permanent part of the transmission infrastructure. The expected lifespan of the development is in the region of 50 to 80 years. This will be achieved by routine maintenance and replacement of hardware as required. There are no plans for the decommissioning of the OHL. In the event that part of, or the entire proposed infrastructure is to be decommissioned, all towers, equipment and material to be decommissioned will be removed off site and the land reinstated. Impacts would be expected to be less than during the construction phase and would be of short term duration.

8.6 MITIGATION MEASURES

84 The design of the proposed development has taken account of the potential impacts of the proposed development and the risks to the surface water environment. Measures have been developed to mitigate the potential effects on the water environment. These measures seek to avoid or minimise potential effects in the main through the implementation of best practice construction methods and adherence to all relevant legislation. An outline CEMP has been included in **Appendix 7.1, Volume 3B** of the EIS, and forms part of the application documentation. All relevant mitigation measures set out in the EIS are included in the outline CEMP and will be incorporated into the final CEMP.

8.6.1 Construction Phase

85 In order to mitigate potential impacts during the construction phase, all works associated with the construction of the proposed development will be undertaken with due regard to the guidance contained within CIRIA Document C741 (2015) *Environmental Good Practice on Site*. In addition mitigation measures will be incorporated into the CEMP. As noted above, all relevant mitigation measures set out in the EIS are included in the outline CEMP and will be incorporated into the final CEMP.

86 All site works and related activities including temporary access routes, tower foundations and stringing will be conducted in an environmentally responsible manner so as to minimise any adverse impacts on water that may occur as a result of works associated with the construction phase. A CEMP will be employed to ensure adequate protection of the water environment. All personnel working on the proposed development will be responsible for the environmental control of their work and will perform their duties in accordance with the requirements and procedures of the CEMP. In terms of wastewater generated during the construction phase, welfare facilities on site will include self-contained chemical toilets. Foul drainage will be collected and treated off site by appropriate contractors in accordance with *Waste Management Acts 1996-2014*. Potable water will be delivered to the site during the construction period.

87 To minimise any impact on the underlying subsurface strata from material spillages, all oils and fuels used during construction will be stored on temporary proprietary bunded surface (i.e. contained bunded plastic surface). These will be moved to each tower location as construction progresses. Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place away from surface water gullies or drains. No refuelling will be allowed within 50m of a stream / river. Spill kits and hydrocarbon absorbent packs will be stored in this area and operators will be fully trained in the use of this equipment.

88 Any vehicles utilised during the operational phase will be maintained on a weekly basis and checked daily to ensure any damage or leakages are corrected. The potential impacts are limited by the size of the fuel tank of the largest plant / vehicles used on the site. Precautions will be taken to avoid spillages. These include:

- Use of secondary containment e.g. bunds around oil storage tanks;
- Use of drip trays around mobile plant;
- Supervising all deliveries and refuelling activities;
- Designating and using specific impermeable refuelling areas isolated from surface water drains; and

- Oil water separators will be used at construction compounds.

89 The surface water drainage system at the construction materials storage yard will take into account the recommendations of the CIRIA c648 *Control of Water Pollution from Linear Construction Projects*. Runoff from the construction materials storage yard will be limited to greenfield runoff rates. Runoff will pass through a silt trap, oil interceptor and settlement lagoon before being discharged to the surface water.

8.6.2 Felling of Forestry

90 While the quantity of commercial forestry is limited along the line route in the CMSA, (approximately 0.4ha), the clearance of forested areas should take place in accordance with the *Forestry and Water Quality Guidelines* (Department of the Marine and Natural Resources, 2000). In areas where tree felling is to be undertaken, the use of buffer zones and drainage ditches will be employed during felling, particularly on sloping ground, in order to mitigate the effects of increased surface runoff and associated sedimentation.

91 Consultation will be undertaken with IFI and the NPWS before commencing felling operations in areas of importance to fisheries and wildlife. Sediment traps will be installed prior to felling and maintained on a daily basis throughout felling operations. Trees will be felled away from the aquatic zone. Machine extraction will not occur in the riparian zone. In this regard, all relevant mitigation measures set out in the EIS are included in the outline CEMP and will be incorporated into the final CEMP.

92 On sites where risk of erosion is high (steep slopes and/ or adjacent to rivers), brash mats will be used to avoid soil damage, erosion and sedimentation. Brash mat renewal will take place when they become heavily used and worn. Provision should be made for brash mats along all off-road routes, to protect the soil from compaction and rutting. Felling will not occur during periods of high rainfall to prevent runoff. No refuelling or machinery maintenance will occur within 50m of an aquatic zone. Timber will be stored on dry areas away from the riparian zones. The forest felling effects of the overhead transmission line will be short term limited to the construction phase.

8.6.3 Works Near Watercourses

93 The line route has been designed in order to locate temporary access routes and tower locations away from sensitive rivers, where possible. It is not proposed to undertake any in stream works along the line route in the CMSA. Existing access routes, where present, will be utilised. No refuelling or machinery maintenance will occur within 50m of an aquatic zone. Excavated material will be stored on dry areas away from the riparian zones.

94 In general all site works have the potential to pollute watercourses. Sediment and pollution control measures will be undertaken in all work areas but, in particular, where towers are located near rivers. While there are no major streams along the line route a number of rivers and streams are crossed. Additionally surface water abstraction occurs at Lough Egish and Toome Lough. Stockpiles will be located away from the watercourses and drainage ditches. Stockpiles will be graded to a <1:4 profile. Topsoil and subsoils will be stored separately. Stockpiles of mineral soils and peat will be <2m and <1m respectively. Geotechnical supervision in combination with monitoring will ensure that peat is stored in suitable areas. Stockpile top surfaces shall be shaped and profiled to prevent erosion from runoff. Erosion protection mats will be applied to stockpile surfaces, as required.

Table 8.11: Distance from Towers to Sensitive Stream / Lakes

River/ Lough Name	Nearest Tower	Distance to River (m)
Major Lough Stream	223	250
Muff Lough	226	265
Glyde Upper	219 and 224	20
Magheracloone Lower	204	80
Bocks Lough	175 and 176	210
Lough Egish	161	>500
Toome Lough	146 147 148	>500

95 Silt barrier / silt curtains will be used where towers or works are undertaken near watercourses. Correct installation of silt fences is vital and will be supervised by the construction manager and ECoW. The silt barrier / silt curtain will be shaped and installed so that it will catch runoff, without the water flowing underneath or around the edge. The silt barrier will be located down gradient of the works and inspected on a regular basis as well as during and after rainfall events. For steep slopes, more than one silt curtain will be used. The edges of the silt curtain will be turned upslope to prevent water going around the edges. Grips, sumps, straw bales and

sediment traps can be installed to capture silt where applicable. Each of these should be maintained daily by the contractor to ensure that they remain effective and do not increase the likelihood of an incident occurring.[29] Rainfall can have a significant impact on the pollution of watercourses. Certain site activities including concrete pouring near watercourses will be postponed during heavy rainfall events (>5mm/hr) to prevent pollution entering watercourses.

96 Where groundwater dewatering is required the resultant water will be filtered before discharge. Dewatering if required will be limited in duration. Groundwater can be filtered using bunds/tanks filled with filter material. Single sized aggregates 5–10mm, geotextiles or straw bales can be used as a filter. Monitoring will be undertaken on the discharge water quality, so as to confirm the nature of the predicted residual impacts.

97 Precautions will be taken to avoid spillages. These include:

- Use of secondary containment, e.g. bunds around oil storage tanks;
- Use of drip trays around mobile plant;
- Supervising all deliveries and refuelling activities; and
- Designating and using specific impermeable refuelling areas isolated from surface water drains.

98 With regard to on site storage facilities and activities, any raw materials and fuels, will be stored within bunded areas, if appropriate, to guard against potential accidental spills or leakages. All equipment and machinery will have regular checking for leakages and quality of performance.

99 All site personnel will be trained and made aware of the appropriate action in the event of an emergency, such as the spillage of potentially polluting substances. Spill kits are retained to ensure that all spillages or leakages are dealt with immediately and staff will be trained in their proper use. Any servicing of vehicles will be confined to designated and suitably protected areas. In the extremely unlikely event of any pollution incident or spills, the incident will be reported to the appropriate regulator and the receiving watercourses remediated to its original condition.

8.6.4 Provision of Temporary Access Tracks and Tower Foundations

100 It is not envisaged that extensive provision of temporary access tracks (i.e. temporary rubber matting or aluminium road panels) will be required for the construction of the proposed

[29]CIRIA Document 650.

development. Towers in the CMSA will be generally located in agricultural fields with good trafficability. Low bearing pressure vehicles are primarily used, along with a Derrick pole to erect the metal structure. Over good quality land, the use of tracked machinery usually means that access to tower sites can be achieved with relative ease. Maximum use will be made of both existing farm entrances and also farm tracks or roads. Temporary access tracks will comprise of aluminium road panels or rubber matting (refer to Chapter 7, **Volume 3B** of the EIS).

101 At certain locations, where very poor soft ground is encountered, temporary rubber matting or aluminium road panels may have to be laid to facilitate access. Temporary access tracks will be no greater than 4m wide and routed away from drains where possible. In sensitive locations silt barriers will be used to prevent any runoff to local watercourses.

102 All temporary access tracks will be removed at the end of the construction phase and the land will be restored to its original condition. Further details are discussed in Chapter 7, **Volume 3B** of the EIS. The solution to maintaining low suspended solids is preventing silt / clay from entering the surface water at source. Preventative measures will ensure that input suspended solids concentrations will be minimised at source. This will be achieved by ensuring that all silt/ clay and topsoil is properly stored during the construction phase of the development and so a major source of fines, due to runoff will have been reduced.

103 Wash down and washout of concrete transporting vehicles will not be permitted at the location of construction. Such wash down and washout activities will take place at an appropriate facility offsite or at the location where concrete was sourced. For smaller machinery, local wash down areas on site will be created. These will take the form of a steel skip or tank. All approved washing areas will be documented with training provided for site workers.

104 Water quality monitoring will be undertaken prior to the commencement of construction to confirm baseline data and ensure there is no deterioration in water quality. This monitoring will be targeted on watercourses considered to be at a higher risk of pollution (i.e. towers where there are watercourses within 20m of the construction works). Water quality monitoring will include daily inspection of adjacent watercourses. Regular sampling for pH and conductivity will be undertaken with sampling for suspended solids and hydrocarbons if any change in the appearance is identified. Daily observations of watercourses close to construction works will be undertaken and detailed records of observations including photographs will be made. If pollution is suspected, samples will be collected upstream and downstream of this point, and sent to an appropriately accredited laboratory for analysis. All works will halt until the source has been identified, controlled and any remediation undertaken.

8.6.5 Stringing of Conductors

105 In general, it is not envisaged that temporary access tracks (i.e. rubber matting or aluminium road panels) will be required for the facilitation of stringing of the conductors. Low bearing pressure vehicles are primarily used for the stringing of the line. Mitigation measures will be incorporated for the proper use of fuel on site. In addition, the risk can be effectively controlled by good working practices and conditions and the implementation of an effective pollution prevention plan as detailed in the outline CEMP.

8.7 RESIDUAL IMPACTS

106 The nature of the proposed development dictates that the greatest potential impact for the water environment will be in the construction phase. With the implementation of the mitigation measures set out in this EIS, a negligible impact on the aquatic environment is predicted for the construction phase of the proposed development. With regard to the operational phase of the development, negligible impact on the local water environment is predicted.

8.8 INTERRELATIONSHIPS BETWEEN ENVIRONMENTAL FACTORS

107 Water has an important interrelationship with the soils and ecological environment, as a determinant of water chemistry, river flow regimes, water storage capacity and watercourse location. It also has an impact on water quality through the ability of bedrock and surface deposits to filter potential pollutants. Potential ecological impacts could occur through the mishandling of soils or through the deposition of excavated soils in ecologically sensitive areas.

108 These potential impacts and mitigation measures have been identified in **Chapters 6** and **7** of this volume of the EIS. This chapter should be read in conjunction with Chapters 6 and 7, **Volume 3B** of the EIS.

109 An evaluation was undertaken based on the identification of potential sources pathways and receptors along the line route. If all three elements (source, pathway and receptor) are present, there is a linkage and there is a potential impact to the receptor(s). In terms of water, there are no cSACs or groundwater dependent terrestrial ecosystems (GWDTE) in close proximity to the line route. Based on a review of the construction methodology, flora and fauna, and soils, geology and hydrogeology chapters, there are no significant cumulative impacts as a result of the proposed development. Intact peatlands and fens have been avoided and therefore there are no potential impacts on the ecohydrology of the peatland areas. A number of non-designated wetlands of varying value that occur in proximity to the alignment have been identified in **Chapter 6** of this volume of the EIS. These include Corlea Bog, Greaghlone Bog, Raferagh South, Corvally Lake, Bocks Lough, Tullyglass Woodland, Lough Nahinch (Cashel

Bog), Clarderry Bog, Tassan Grassland, Dromore wetlands, Shantonagh Area wetlands lakes, Lough Morne and lakes to the west and Lough Egish.

110 No towers are proposed to be located within non-designated sites of ecological importance as these sites have been avoided through careful selection of the final route. The alignment does oversail five non-designated sites of known ecological importance. Measures outlined in **Section 8.7** and the CEMP will mitigate any potential impact.

8.9 CONCLUSIONS

111 A number of small streams / river comprising of the tributaries to the River Dee, River Glyde, River Dromore, River Annalee, River Fane and the Clontibret River are located along the proposed line route. Additionally a number of lakes are located within the study area.

112 The construction phase of the proposed development could impact on the water environment through the use of temporary access routes and excavations required for the tower bases.

113 The nature of the transmission line development dictates that the greatest potential impact associated with the development will be in the construction phase. During construction the potential impacts to the underlying water environment from the proposed works could derive from accidental spillages of fuels.

114 The tower locations have been selected to avoid known areas of flood plains and river banks where possible.

115 A negligible impact is predicted on the water environment as a result of the construction phase of the proposed development.

116 With regard to the operational phase of the development, negligible impacts on the local water environment are predicted.