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 Meath Study Area (MSA) as defined in Chapter 5, **Volume 3B** of the EIS.

2 The evaluation for the MSA 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) *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 MSA:

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

- EPA (2006). *Water Framework Directive Monitoring Programme* (WFD);
- EPA (2005). *The Characterisation and Analysis of Ireland's River Basin Districts* (RBDs);
- *Eastern River Basin District* (2010) and *Eastern River Basin Management Plan* (2009-2015);
- *Neagh Bann International River Basin District* (2012) and *River Basin Management Plan (*2009-2015);
- Inland Fisheries Ireland (IFI) *Sampling Fish for the Water Framework Directive (2008-2012);*
- Office of Public Works (OPW) flood mapping data *www.floodmaps.ie*;
- OPW (2009). *Guidelines for Planning Authorities, The Planning System and Flood Risk Management;*
- JBA consulting (2011). *Strategic Flood Risk Assessment for County Meath*;
- Natura Environmental Consultants in association with the NRA (2005). *Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes;*
- OPW (2009). *Guidelines for Planning Authorities, The Planning System and Flood Risk Management;*
- 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 in the MSA*;* and
- Consultation with statutory and non-statutory organisations.

8 The evaluation of the MSA 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 to be 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, 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[33]. Loss of protected area. Pollution of potable sources of water abstraction. Deterioration of water body leading to a failure to meet Good Status[34] 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[35].
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.

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.

[33]NRA guidelines (2009).
[34]Good Status as defined under the Water Framework Directive (2000/60/EC).
[35]NRA guidelines (2009).

13 Terms relating to the duration of impacts are as described in the 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 of 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 desktop study and consultation with relevant prescribed bodies, including the EPA, Meath County Council and the Inland Fisheries Ireland. (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; and
- 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) Act, 1959-2003*;
- The *Local Government (Water Pollution) Acts 1977-2013* provide for the prevention of water pollution in Ireland;
- *Waste Water 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. The evaluation has also considered the construction associated with the existing Woodland Substation.

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 ecological sensitive receptors which includes information on European sites and protected 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, substation and tower foundations, guarding locations, tree looping 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 land owners as outlined in Chapter 7, **Volume 3B** of this 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.

27 It is not proposed to construct a new substation in the MSA. The existing substation at Woodland will be extended and utilised as part of the proposed development. There is a potential to generate wastewater during the operational phase at Woodland. However it is not proposed to discharge wastewater from Woodland Substation. Foul drainage will be collected and treated offsite during both the operational and construction stages.

8.3 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

28 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 3 years. The proposed development entails the construction of individual towers 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 110 kV transmission OHL, installation of tower foundations and works at the existing Woodland Substation, erection of towers, guard poles, tree looping and stringing of conductors and reinstatement of land.

8.4 EXISTING ENVIRONMENT

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

30 Baseline conditions have been established through a detailed desk study, field study and consultation with relevant prescribed bodies, including the EPA, Meath 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.

31 Site visits of the MSA 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 MSA. The site visits comprised recording of drainage patterns, drainage ditches, recording of hydrological conditions and visual evaluation of watercourses and watercourse crossings.

8.4.1 Hydrology

32 The River Boyne, River Blackwater and River Dee dominate the natural surface water of the MSA. The River Dee flows in an easterly direction from Nobber in County Meath to Ardee in County Louth. The River Dee along with its tributary, the Kilmainham River, forms a large element of the drainage network towards the northern section of the MSA. The River Kilmainham flows through the central section of the proposed development (between Towers 251 and 252) in a west north-west to east south-east direction towards Kilmainham.

33 The River Blackwater flows through the central section of the proposed development (between Towers 310 and 311) in a north-west to south-east direction from Kells, before entering the River Boyne at Navan. The Yellow River joins the Blackwater River approximately 4km north-west of Navan.

34 The River Boyne crosses the southern section of the proposed alignment between Towers 355 and 356. It flows in a south-west to north-east direction between the towns of Trim and Navan.

35 A number of small streams comprising of the Clady River, Bective River, Skane River, Derrypatrick River, Boycetown River and River Tolka are located in the southern section of the MSA.

36 North of Nobber in County Meath the drainage density decreases as the relief and the number of lakes increase. There is a high drainage density throughout the central and southern regions of the MSA.

37 **Table 8.4** lists the hydrometric areas and associated rivers with proposed tower numbers.

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

Hydrometric Area[36]	River	Tributaries	Towers	% of Route Towers in each hydrometric area
Hydrometric Area 06	River Dee (and tributaries)	Dee Upper	273-286	31
		Kilmainham	274-257 and 240-248	
		Ervey	237-239 and 256-249	
Hydrometric Area 07	River Boyne (and tributaries)	Boycetown/ Derrypatrick	374-397	65
		River Skane	370-372	
		River Boyne	373 and 354-369	

[36] Based on EPA data www.epa.ie

Hydrometric Area[36]	River	Tributaries	Towers	% of Route Towers in each hydrometric area
		Clady	333-349	
		Blackwater	303-332	
		Owenroe/ Moynalty tributaries	273-288	
		Yellow River	289-302	
Hydrometric Area 09	River Tolka (and tributaries)	River Tolka (and tributaries)	398-402	4

38 All existing towers (Towers 402 and 410) near Woodland Substation, which will be utilised as part of the proposed development, are located in the River Tolka catchment. Woodland Substation is also located in the Tolka Catchment.

8.4.2 Water Framework Directive Requirements

39 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**
Batterstown EA_09_549	Moderate	Overall ecological status	EA_Tolka167_TolkaTRIB_Batterstown	2027
Dunboyne EA_09_1487	Moderate	Overall ecological status	EA_Tolka167_TolkaTRIB_DunboyneStream	2027
Boycetown1 EA_07_909	Moderate	Overall ecological status including macroinvertebrate status	EA_Boyne159 Boycetown_Boycetown1	2015
Skane EA_07_174	Poor	Overall ecological status	EA_Boyne159Skane_SkaneTRIB_Lamberstown	2027
Boyne_Lower EA_07_1894_2	Moderate	Overall ecological status	EA_Boyne159Main_Boyne1_Lower_2	2021
Bective EA_07_335	Poor	Overall ecological status	EA_Boyne159Main_BoyneTRIB_Bective	2027
CladyLwr EA_07_312	Moderate	Overall ecological status including general physico -chemical status	EA_Boyne159Main_BoyneTRIB_Clady1_Lower	2021
Clady Mid EA_07_311	Moderate	Overall ecological status including general physico-chemical status	EA_Boyne159Main_BoyneTRIB_Clady2_Mid	2021
Blackwater EA_07_1536_3	Moderate	Overall ecological status including general physico-chemical status	EA_Boyne159BlackwaterKells_Blackwater1_Lower_3	2021
Yellow River EA_07_886	Poor	Overall ecological status	EA_Boyne159BlackwaterKells_YellowTRIB_Gibstown	2027
Moynalty EA_07_1356	Moderate	Overall ecological status	EA_Boyne159BlackwaterKells_MoynaltyTRIB_Drakestown1_Lower	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**
Moynalty EA_07_1725	Moderate	Overall ecological status	EA_Boyne159BlackwaterKells_MoynaltyTRIB_Drakestown2_Upper	2021
Dee_Upper NB_06_50	Moderate	Overall ecological status including macroinvertebrate status, general physico-chemical status and Diatoms/Phytobenthos status	NB_Dee96_Dee2_Upper	2021
Kilmainhamwood NB_06_610	Good	-	NB_Dee96_DeeTRIB_KilmainhamWoodStream	2015
Ervy Lough Stream NB_06_733	Poor	Overall ecological status including macroinvertebrate status and Hydromorphology status	NB_Dee96_DeeTRIB_ErvyLoughStream	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.

40 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 alignment;
- There are RPA habitat rivers (Boyne and its tributaries) along the proposed alignment;
- There are no RPA nutrient sensitive lakes and estuaries along the proposed alignment; and
- There are no RPA shell fish areas along the proposed alignment.

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

42 The Tolka, Boyne and Dee catchments are located in predominantly agricultural land. The catchments are comprised primarily of pastureland with substantial areas of arable crops.

43 The causes of the high number of 'At Risk' Category Rivers on the Tolka, Boyne and Dee catchments are due to the following areas:

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

44 Agriculture Wastewater Treatment Plants (WWTP) and septic tanks are thought to contribute over 90% of the total polluting matter to the Boyne catchment.

8.4.3 Surface Water Quality

45 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 W*ater Quality in Ireland, 2001-2003* (2005).

46 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

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

48 Overall, there are 15 No. EPA monitoring stations along the River Boyne with the majority of these stations classifying the surface water in the River Boyne as slightly to moderately polluted. Examples of these stations closest to the alignment are included with water quality results from 1997-2012. Refer to **Appendix 8.1, Volume 3D Appendices** of the EIS.

49 The EPA reports 13 No. monitoring stations along the River Blackwater. Similar to the River Boyne, the majority of these stations are classified as slightly polluted, although some are classified as unpolluted. Examples of these stations are included in **Table 8.7** with the water quality results from 1997-2012.

50 The rivers to the north of the MSA, the River Dee and its tributary, the Kilmainham River had a higher proportion of unpolluted stretches of waterways when surveyed by the EPA in 2012, compared to the rivers in the southern part of the MSA.

Table 8.7: Selection of Biotic Indices (1997-2012) for the Major Rivers along the Proposed Alignment

River	Monitoring Location	Biotic Index					
		1997	2000	2003	2006	2009	2012
River Boyne	u/s Knightsbrook River confluence 1400	4	3-4	3-4	4	3-4	-
	Bective Bridge 1500	3	3	3-4	3-4	3-4	-
	u/s Knightsbrook R confl (RHS)	3	3-4	3-4	4-	3-4	3-4
	Bective Bridge	3-4	3-4	3-4	3-4	3-4*	3-
	Broadboyne Bridge	3	3-4	3-4	3-4	3-4	4
Skane	Br. NE of Balgeeth	3	3	3-4	3-4	3*	3-4*
Moynalty	Fyanstown Bridge	4	3	3-4	4	4	3

River	Monitoring Location	Biotic Index					
		1997	2000	2003	2006	2009	2012
Yellow River	Br. u/s Blackwater River confluence	3	3	3	3	3	3
River Blackwater	Donaghpatrick Br.	4	3-4	4	4	4	3-4
	100m d/s New Bypass Bridge	-	3-4	3-4	-	3-4	3-4
Boycetown River	Br. N of Martinstown	3-4	3	3*	3-4	3-4*	3
	Scurlockstown Bridge	3-4	3	3*	4	3-4	3-4
Killary Water	Rosehill Bridge	3-4	3-4	3-4	-	-	-
Kilmainham River	Bridge North of Kilfannana	4	4	4	-	-	-
	Br. u/s Whitewood L	3-4	4	4	4	4	3-4
Dee River	Tom's Bridge	-	3	3-4	3	3-4	3

*Silt at this location

Source EPA www.epa.ie

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

- *"The Blackwater (Kells) River was in a generally unsatisfactory ecological condition at nine of the thirteen stations surveyed in 2012. A slight improvement to moderate ecological conditions was noted at station 0170 (Lear Br) downstream of Baileboro. The macroinvertebrate fauna indicated an unwelcome decline from good to moderate ecological conditions at Donaghpatrick Bridge (1500) downstream of Kells & the Moynalty River confluence. The dominance of pollution tolerant macroinvertebrate taxa continues to indicate unsatisfactory ecological conditions in the Baileboro area (0170) and downstream (0200, 0280, 0420), downstream of Lough Ramor (1000, 1100, 1200) and downstream of Kells (1500) and at Navan (1790)."*

- *"The Boycetown River was in an unsatisfactory ecological condition when surveyed in 2012. The complete lack of sensitive macroinvertebrate fauna indicated unsatisfactory poor ecological conditions at Derrypatrick Bridge (0100) and at Boycetown Bridge*

(0200). Excessive siltation was noted at both stations. Enriched conditions were also evident at Scurlockstown (0300) where the macroinvertebrate fauna indicated unsatisfactory moderate ecological conditions."

- *"The majority of the fifteen stations surveyed on the Boyne River remain in an unsatisfactory ecological condition in 2012. The macroinvertebrate fauna indicated satisfactory ecological conditions at six of the stations examined. An unwelcome decline in ecological status was noted at three stations. The macroinvertebrate fauna indicated a decline from good to moderate ecological conditions in the upper reaches at Boyne Bridge (0200) and at Scarriff Bridge (0900) and a decline from high to good ecological conditions at Inchamore Bridge (0800). A welcome improvement from moderate to good ecological conditions was noted downstream of Broadboyne Bridge (2010). Unsatisfactory ecological conditions continue downstream of Edenderry (0300), at Ashfield Bridge downstream of the Glash River confluence (0600), downstream of the Blackwater (Longwood) confluence (0900), at Trim and downstream (1200, 1400), at Bective Bridge downstream of the Knightsbrook and Boycetown confluences (1500), Kilcarn Old Bridge, downstream of the Clady and Skane river confluences (1700) and at Obelisk Bridge, upstream of Drogheda (2200)."*

- *"The dominance of pollution tolerant macroinvertebrate taxa and complete lack of pollution sensitive taxa indicated poor ecological conditions on the Clady (Meath) River in June 2012."*

- *"The absence of pollution sensitive macroinvertebrate taxa indicated continuing unsatisfactory ecological conditions on the lower reaches (1100) of the Yellow (Blackwater) River in September 2012."*

- *"The Moynalty River was in an unsatisfactory ecological condition when surveyed in 2012. Good ecological conditions persist in the upper reaches (0070) however some signs of enrichment were evident with enhanced macrophyte and algal growth. The paucity of sensitive macroinvertebrate fauna continues to indicate moderate ecological conditions at Annesbrooke Bridge (0100) and Rosehill Bridge (0200). The complete lack of pollution sensitive macroinvertebrate fauna indicated a decline from moderate to poor ecological conditions at Mullagh Bridge (0300). The complete lack of any sensitive macroinvertebrate species coupled with dominance of pollution tolerant leeches and worms indicated a significant decline to poor ecological conditions at Moynalty Bridge (0600), Carlanstown Bridge (0800) and at Fryanstown Bridge (0900)."*

- *"The macroinvertebrate communities at all three stations surveyed on the River Skane indicated continuing unsatisfactory ecological conditions in June 2012. Poor ecological conditions persist in the upper reaches at Athronan Bridge (0300) while a slight improvement to moderate ecological conditions was noted downstream of Kilmessan*

(0510) and at Dowdstown Bridge (0600)."

- *"A disappointing decline in ecological condition from good to moderate was recorded at both sites assessed on the Kilmainham River in September 2012."*

- *"The macroinvertebrate fauna indicated unsatisfactory conditions at all sites assessed on the River Dee in September 2012, with the exception of Rockfield Bridge (0360) where satisfactory ecological condition was recorded."* Source: Data taken from online EPA Water Quality data 1997-2013 and EPA website www.epa.ie.

52 A review of monitoring station results suggests that, in general, the majority of the rivers along the existing alignment (Towers 402 to 410) are moderately polluted.

Table 8.8: Selection of Biotic Indices (1996-2013) for the Major Rivers along the Alignment

River	Monitoring Location	Biotic Index						
		1996	1998	2002	2005	2007	2010	2013
Tolka	Br. at Black Bull	3	3	3-4	3-4	-	3	3
	Loughsallagh Br.	3	3-4	3-4	3-4	-	3	3
Dunboyne	Rusk Bridge	2	2	2-3	3	3	3	3-4

Source: EPA www.epa.ie

53 The Tolka River rises near Batterstown and flowing for 30km through an extremely built up area of the city before entering Dublin harbour at Fairview Park. The Dunboyne River and the Tolka are moderately polluted / poor ecological status at all locations. Surface water quality is under pressure due to sewer discharges and household detergents.

54 **Water Quality Summary** - Most rivers (with the exception of the Kilmainham River) along the proposed alignment are suffering from water quality problems, principally eutrophication from suspected agriculture sources and WWTP. Calcification and siltation are a problem on the River Boyne and a number of tributaries. The Boyne river remained in a slightly 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 Tolka Catchment are moderately to highly polluted.

8.4.3.1 Lakes

55 The proposed alignment is within the catchment of a number of lakes. No lakes are present within 0.5km of the proposed alignment within the MSA. The nearest lake to the alignment is Whitewood Lough. Whitewood Lough is located over 0.6km from Tower 241. The EPA carried out water quality monitoring on Irish lakes between 2007 and 2009, however Whitewood Lough was not monitored as part of the national monitoring programme.

8.4.3.2 Protected Areas and Fisheries

56 The River Boyne and Blackwater cSAC (site code 002299) is the only designated site for conservation which may potentially be impacted by the proposed development. A full description of the River Boyne and Blackwater cSAC (site code 002299) is detailed in the Natura Impact Statement (NIS) (refer to **Volume 5** of the application documentation). Consultation was undertaken with the National Parks and Wildlife Service (NPWS) and IFI (designations department) regarding the proposed development. No specific conservation management plan has been published for the site to date. The site is selected for species listed on Annex II of the European– Atlantic Salmon, otter and River Lamprey. In addition, Atlantic Salmon and Trout use the tributaries of the Boyne / Blackwater as spawning grounds. Parts of the river system have been arterially dredged. In 1969 an arterial dredging scheme was carried out. The dredging altered the character of the river completely and resulted in many cases in leaving very high banks. Ongoing maintenance dredging is carried out along stretches of the river system where the gradient is low.

8.4.3.3 Importance of Surface Water Features

57 The importance of the relevant surface water bodies within the MSA has been evaluated, 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 MSA 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
River Blackwater and River Boyne,	River Blackwater and River Boyne are designated as a salmonid rivers and cSACs. The River Boyne and Blackwater in stretches it is of Moderate Ecological Status. The River Boyne and Blackwater are 3rd Order Streams and above.	Very High
Kilmainhamwood River NB_06_610[37]	Q4 Rivers. Q4-5 and Q5 Rivers.	High
Moynalty, River Clady River, Boycetown River Bective River, Tributaries of the Tolka River Blackwater, Yellow River and Dee River	2nd Order River and 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

58 Substantial areas of the River Boyne and Dee catchments have been artificially drained from the 1960's to 1980's to drain agricultural lands and reduce local flood frequency. An estimated 656km of stream channels in the Boyne catchment have been modified to prevent flooding, improve agricultural fields and allow for urban development. During this period, one tributary, and a section of the River Boyne itself, on average, were drained annually, O'Connor (2006). The River Dee and its tributaries have been artificially drained since the 1950's. Areas historically prone to flooding include areas of mapped alluvial sediments however OPW flood relief works have decreased the frequency of flood events.

59 The OPW 'Flood Hazard Database' was used in order to obtain information on historical flooding events in the MSA. This information was used to establish the current baseline conditions in terms of what sections of the area are liable to flood. Additional sources of information including internet searches, historical maps, data from Catchment Flood Risk

[37]Numbered as per EPA numbering code for sub-catchments.

Assessment and Management Studies (CFRAMs) and flood risk assessments were also consulted. No incidents of flooding were noted at Woodland Substation. The substation is not located in a flood prone area (Flood Zone C) based on the preliminary flood risk assessment (PFRA) maps.

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

- Flooding of the River Boyne Banks at Bective (1km downgradient of line route);
- Flooding at Kilmainhamwood along Kilmainham River (1km to the east of the line route);
- Flooding at Culmullin Cross Roads (0.8km to the north-east of the line route); and
- Flooding along the Derrypatrick to Grange Road (0.7km to the north of the line route).

61 The proposed towers are not located on any major flood plain and will not interfere with either the water levels or flow of the Boyne River and its tributaries or Dee River, therefore, the impact will be negligible.

8.5 POTENTIAL IMPACTS

8.5.1 Do Nothing

62 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 MSA. 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 MSA. 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

63 Further details on the proposed construction methodology which will directly influence potential construction impacts to 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 scheme:

- Felling of forestry;

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

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

- Flow Alterations;
- Sediment Discharges; and
- Contaminant Discharges.

65 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

66 During construction there is potential for increased runoff due to the introduction of temporary access routes and 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.

67 A review of baseline information on historical flooding and flood risk has been presented in **Section 8.4**. The proposed development oversails a number of major 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)).

68 Temporary flooding, either pluvial or fluvial, at the base of the towers will not have a detrimental effect on the operation of the proposed development. Areas prone to flooding include areas of mapped alluvial sediments.

8.5.2.2 Sediment Charge

69 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.

70 The proposed substation extension will take place entirely within the existing Electricity Supply Board (ESB) lands. Excavation works will be undertaken to lower the ground level and install foundations. Sediment may be released during the excavation works. Disturbance of sediment may result in siltation of adjacent watercourses.

71 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.

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

73 Additionally, felling of commercial forestry will be undertaken along the line route. During elements of the construction works, the potential exists for discharge of sediment and nutrients from the works areas (including felling areas) adjacent to 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.

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

- Soil stripping for tower foundation work areas 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.

75 Areas of new forestry exist scattered throughout the alignment including several recently planted areas (2012 / 2013) predominantly in former grassland areas. Mature / Immature forestry is located in several areas outlined in **Table 8.10**. Given that there is a requirement for a maximum corridor of 74m in forest plantation areas, the total area of these habitats and impact during the construction phase is detailed in **Table 8.10**.

Table 8.10: Forestry potentially affected by Tree Felling along MSA route

Woodland Type / Evaluation	Location	Area Impacted – Hectares
Mature Deciduous Woodland	Between Towers 262 and 263 Brittas Estate (Towers 267 to 269) Between Towers 272 and 273 Between Towers 291 and 292 Between Towers 321 and 322 Between Towers 336 and 337	<0.1 1.1 <0.1 <0.1 <0.1 <0.1 Total – ~1.73 hectares
Immature Deciduous (plantation woodland)	Brittas Estate (Towers 267 to 269)	1.2 hectares
Mature Coniferous / Mixed plantation Woodland	Between Towers 246 and 247 Between Towers 247 and 248 Between Towers 296 and 299 Between Towers 300 and 301 Between Towers 330 and 332 Between Towers 391 and 392	10 hectares in total

76 It is considered that the vast majority of this material will consist of subsoil and naturally excavated soils and rock. The excavated material from tower excavations and substation is approximately 14,200m^3 and 3,500m^3 respectively.

77 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 relate to the following sensitive locations and where towers are located near rivers:

- River Blackwater (River Boyne and River Blackwater cSAC) – Towers 309, 310 and 311;
- River Boyne (River Boyne and River Blackwater cSAC) – Towers 355 and 366; and
- Q4 Rivers – Kilmainham River - NB_06_610 - Towers 251 and 252.

78 The nearest tower to the River Boyne is located in an agricultural field 60m from the river edge. The tower is located outside the Riparian Zone and the boundary of the cSAC. The nearest tower to the River Blackwater is located in an agricultural field 100m from the river edge and is located outside the Riparian Zone and the boundary of the cSAC. The nearest tower to the Kilmainham River is located in an agricultural field 60m from the river edge and is located outside the Riparian Zone.

79 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.

8.5.2.3 Contaminant Discharge

80 It is not proposed to discharge wastewater from Woodland Substation. The proposed development will utilise the existing substation facilities at Woodland thereby minimising the impact on the existing environment.

81 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 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.

82 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.

83 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.

84 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 major 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.

85 Temporary flooding, either pluvial or fluvial, at the base 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

86 Key water receptors will largely be avoided by the development. Potential impacts during the construction phase of the proposed OHL may arise from surface water runoff from tree felling activities and excavation works. Accidental spillage of material such as fuel oil 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 8.11** summarises the impact evaluation of the construction phase (pre-mitigation):

Table 8.11: Summary of Construction Effects

Impact	Receptors	Evaluation of Impact prior to Mitigation		
		Duration of Effect	**Magnitude of Effect**	**Potential Impact**
Potential Impacts (unmitigated)	Woodland Substation	Short term	Negligible	Negligible
	River Boyne and River Blackwater crossing River Kilmainham crossing	Short term	Minor adverse	Localised Minor / Moderate Adverse
	All other tower locations	Short term	Negligible	Negligible
	Forestry Felling	Short term	Minor adverse	Local Minor Adverse

8.5.3 Operational Phase

87 There will be no direct discharges to the water environment during the operational phase. It is not proposed to discharge wastewater from Woodland Substation. Potable water and wastewater facilities will be delivered to the Woodland Substation site, during the construction phase. No other potentially significant impacts are anticipated during the operational phase.

8.5.4 Decommissioning

88 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

89 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

90 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.

91 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, wastewater 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.

92 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.

93 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.

94 Implementing the design standards of the GDSDS, the surface water drainage system takes into account the recommendations of the GDSDS and utilises SuDs (sustainable urban drainage) devices where appropriate. Runoff from the hardstand areas at Woodland Substation will be limited to greenfield runoff rates. The surface cover at the Woodland Substation will be gravel covered and will not be hardstanding. French drains will be installed around the substation bay.

8.6.2 Felling of Forestry

95 Details of forestry areas are outlined in **Table 8.10**. While the quantity of commercial forestry is limited along the line route to <13 hectares, 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. Less than five hectares in each sub catchment will require felling.

96 Consultation will be undertaken with IFI and 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.

97 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 during construction phase.

8.6.3 Works near Watercourses

98 The line route has been designed in order to locate temporary access routes and tower locations away from sensitive rivers, where possible. In relation to the River Boyne and River Blackwater the towers are located a minimum of 60m and 100m respectively from these rivers. It is not proposed to undertake any in-stream works along the line route. 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.

99 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. 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 to be applied to stockpile surfaces, as required.

Table 8.12: Distance from Towers to Sensitive Stream / Lakes

River Name	Nearest Tower	Distance to River (m)[38]
Derrypatrick River	390 387	38 25
Boycetown River	377	55
Bective River	364	17
Boyne River	355 356	60 (6) 160 (160)
Clady River	347	12

[38] Distance where relevant to River Boyne and Blackwater cSAC in brackets.

River Name	Nearest Tower	Distance to River (m)[38]
Blackwater River	309 310 311	105 (84) 100 (88) 195 (191)
Moynalty River	297	20
Altmush Stream	261	30
Kilmainham River	251 252	90 60

100 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 downgradient 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[39]. Rainfall can have a significant impact on the pollution of watercourses. Certain site activities including concrete pouring near water courses will be postponed during heavy rainfall events (>5mm/hr) to prevent pollution entering watercourses.

101 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.

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

- Use of secondary containment e.g. bunds around oil storage tanks;

[39] CIRIA document 650.

- 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.

103 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.

104 All site personnel will be trained and 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 are 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 spill, the incident will be reported to the appropriate regulator and the receiving watercourse will be remediated to its original condition.

8.6.4 Provision of Temporary Access Tracks and Tower Foundations

105 It is not envisaged, that the provision of extensive temporary access tracks (i.e. temporary rubber matting or aluminium road panels) will be required for the construction of the proposed development. Low bearing pressure vehicles are primarily used along with using the 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).

106 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 direct runoff to local watercourses.

107 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 provided 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.

108 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.

109 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 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 taken 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

110 In general it is not envisaged that temporary access tracks (i.e. rubber matting or aluminium road panels) will be required for the stringing of 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 all as will be outlined in the CEMP.

8.7 RESIDUAL IMPACTS

111 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, a negligible impact on the local water environment is predicted.

8.8 INTERRELATIONSHIPS BETWEEN ENVIRONMENTAL FACTORS

112 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.

113 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, the Boyne and Blackwater cSAC and groundwater dependent terrestrial ecosystems (GWDTE) are crossed by the line route, however a negligible impact is predicted to occur as part of this proposed development at the crossing locations or at towers adjacent to the cSAC.

114 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 1, 6, and 7 of **Volume 3B** of the EIS.

8.9 CONCLUSIONS

115 The River Boyne, River Blackwater and River Dee dominate the natural surface water of the MSA. The River Dee flows in an easterly direction from Nobber in County Meath to Ardee in County Louth. The River Dee along with its tributary, the Kilmainham River, forms a large element of the drainage network towards the northern section of the MSA. The River Kilmainham flows through the central section of the proposed development. Sensitive receptors include the Boyne / Blackwater cSAC.

116 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.

117 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.

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

119 Negligible impacts are predicted on the water environment as a result of the construction phase of the proposed development.

120 With regard to the operational phase of the development, a negligible impact on the local water environment is predicted.