

Appendix B.6(d)(2)

**Letter Cavan County Council – Non requirement for
EIA**

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19th May, 2016.

Mr. Steve Tonry,
Enervise Limited,
Enterprise Centre,
Quarry Lane,
Boyle,
Co. Roscommon.

Re/ Your letter submitted and received by the Planning Authority on 13th May 2016.

Dear Mr. Tonry,

I refer to your letter referred to above in relation the requirement of a number of applications for an EIS in the assessment by the Planning Authority of same. The applications relate to **Reg. No. 00/1384** –Permission granted to Sean Quinn to retain & complete modified bldg. which includes main office block comprising of administrative offices, control room and laboratory, facilities block comprising of canteen, locker, toilet facilities, workshop & stores, power distribution centre etc.

This development was initially approved under Reg. No. 97/682 and was initially approved as a laboratory, central control room and power distribution centre. This building was ancillary to the approval of the cement manufacturing plant which was subject to an EIS and approval by An Bord Pleanála. The application was approved to modify this building and alter the uses. This alteration did not impact on the previous effects on the environment contained in the EIS and therefore no EIS was required for this application. I am satisfied that an EIS was not required by or under the Planning and Development Act 2000 for this development.

Reg. No. 03/213 permission granted to Quinn Group Ltd. construct a Cement bagging facility and storage warehouse for cement bags at its cement manufacturing facility.

I have noted the application in question. The use approved was for bagging of cement and storage of same. It is noted in the planning assessment of the application in question that the planner has noted that no new environmental issues arise from the approval of the proposed development. I am satisfied that this development did not require an Environmental Impact Assessment by or under the Planning and Development Act 2000.

Reg. No. 08/98 permission granted to Quinn Cement Ltd to construct a ferrous sulphate dosing tank on the grounds of Quinn Cement. The purpose of the proposed structure is to add ferrous sulphate to the grinding stage of the cement manufacturing process so as to maintain compliance with legal instrument 2003/53/EC. The proposed development is located off the main Ballyconnell to Derrylin Road and access to the structure will be through the existing Cement Works Entrance.

Over/.....

Tá fáilte romhat gnó a dhéanamh as Gaeilge
Cavan County Council ... Working with Diversity in Mind



This application was for a silo development that enabled ferrous sulphate to be added to the process and which assists the grinding. I have examined the application and noted the structure proposed and the planners report contained in the application. I am satisfied that this development did not require an environmental impact assessment by or under the Planning and Development Act 2000.

Should you require any further information or any further assistance in this matter please contact me.

Yours faithfully,


Marce Galligan
Acting Senior Planner,
Cavan County Council.

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Appendix B.6(e) Letter Cavan County Council - Section 5 Declaration

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CAVAN COUNTY COUNCIL

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CENTRAL ADMINISTRATION DEPARTMENT

Cavan

An Cabhán

22nd February, 2006

The Quinn Group,
Derrylin,
Co. Fermanagh,
Northern Ireland,
BT92 9AU

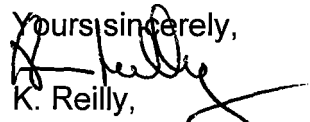
For the Attention of Steve Tonyr

Dear Sirs,

I refer to your submission received by the Planning Authority on the 27th January, 2006 seeking a declaration under Section 5 of the Planning & Development Act, 2000 as regards whether the increase in production of cement at your Cement Manufacturing Facility at Scotchstown, Ballyconnell, Co. Cavan, constituted development as defined in the Act.

I enclose herewith the decision of Cavan County Council on the declaration. The net effect of the declaration is that the factory is permitted to produce up to and including 1.4m tonnes of cement per year.

Yours sincerely,


K. Reilly,
Senior Executive Officer.

CAVAN COUNTY COUNCIL

PLANNING AND DEVELOPMENT ACTS, 2000 TO 2002

WHEREAS a question has arisen as to whether the increase in production in cement at the cement manufacturing facility at Scotchtown, Ballyconnell, Co. Cavan, which plant was constructed pursuant to permission granted for the facility under Planning Register Numbers 97/682 and 00/1384 does not constitute development as is accepted and practiced within the operation of the planning code and in particular as defined by Section 3 of the Planning and Development Act 2000.

AND WHEREAS the Quinn Group, Derrylin, Co. Fermanagh, have requested a Declaration on the question from Cavan County Council

AND WHEREAS Cavan County Council, in considering this referral, had regard to -

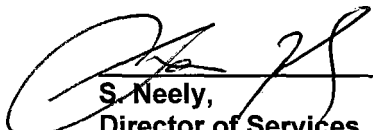
- a) Sections 2, 3 and 4 of the Planning and Development Act 2000
- b) the context within which permission was granted for the facility under Planning Register Number 97/682
- c) the impact of increased production on the proper planning and sustainable development of the area

AND WHEREAS Cavan County Council has concluded that –

the increase in production of cement at the cement manufacturing facility at Scotchtown, Ballyconnell, Co. Cavan, which plant was constructed pursuant to permission granted for the facility under Planning Register Numbers 97/682 and 00/1384 does not constitute development

NOW THEREFORE Cavan County Council in exercise of the powers conferred on it by Section 5 (2) (a) of the Planning and Development Act 2000 hereby decides –

that the increase in production of cement at this facility is not development.



S. Neely,
Director of Services,
Cavan County Council.

Dated this 22nd day of February 2006.

Appendix B.6(f) Natura Impact Statement

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Proposal to increase the range and quantity of alternative fuels and alternative raw materials at Ballyconnell cement plant, Co.Cavan.

Natura Impact Statement



Report for:
Enervise Limited.

Report By:
Woodrow Sustainable Solutions Ltd
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Ballisodare,
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May 2016



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DOCUMENT CONTROL

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STATEMENT OF AUTHORITY

Eoin Connolly, pgDip, MA. Eoin is an Ecologist with Woodrow Sustainable Solutions. He has a pg Dip in Ecological Assessment and has completed an MSc in Ecological Assessment. He has led and worked on a number of assessments including ecological impact assessment and Natura Impact Assessments / Appropriate Assessments.

Eoin Connolly – qualifications:

PgDip - Ecological Assessment

M.A - Ethics, Culture and Global Change

Will Woodrow, MSc. CEcol, MCIEEM. Will is a Director and principal consultant with Woodrow Sustainable Solutions. He has considerable experience in impact assessment of projects including over ten years' specific experience in Article 6 assessments under the EU Habitats Directive and Ecological Impact Assessments. He is a full Member of the Chartered Institute of Ecology and Environmental Management and a Chartered Ecologist.

Will Woodrow – qualifications:

HND – Conservation Management

MSc – European Environmental Policy and Regulation

MSc (Arch) – Advanced Environmental and Energy Studies

1. INTRODUCTION

1.1 Background

Woodrow Sustainable Solutions Ltd was commissioned by Enervise Ltd to undertake a Natura Impact Statement for the proposal to increase the range and quantity of alternative fuels and alternative raw materials at the Ballyconnell cement plant located in Ballyconnell, Co.Cavan. This report aims to assess the potential ecological impact of the planned proposal on Natura 2000 sites.

Woodrow Sustainable Solutions undertook ecological surveys of the site in order to inform this Screening for Appropriate Assessment. This Statement provides the information necessary to fulfil the requirements of Article 6 of the EU Habitats Directive 1992 and Regulation 42 of the (Birds and Natural Habitats) Regulations 2011 in determining the potential impacts on Natura 2000 sites of the proposal.

1.2 Legislative Background

The European Directive 92/43/EEC (The Habitats Directive) was transposed into Irish law by the European Communities (Natural Habitats) Regulations 1997 and European Communities (Birds and Natural Habitats) Regulations 2011 (the Habitats Regulations). Regulation 42 of the 2011 Regulations requires that any proposal likely to have a significant effect on a European Site, alone or in combination with other operations or activities, needs to be assessed with respect to its potential impact on the site's conservation objectives (an Appropriate Assessment).

1.3 Structure/ layout of the report

The sections, paragraphs and tables of this report relate in sequence to the process of assessing the potential impact of the project in the context of sequential requirements of Article 6 of the EU Habitats Directive.

1.4 Main Sources of Information

The following are the main sources of information used in this report:

- Department of Environment, Heritage and Local Government (2009). Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities;
- European Community Habitats Directive (92/43/EEC) – The Habitats Directive;
- European Communities (Natural Habitats) Regulations 1997;
- European Commission Environment DG (2001). Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC;
- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitats Directive 92/43/EEC;
- National Parks and Wildlife Services online MapViewer;
- National Parks and Wildlife Services data (downloaded GIS datafiles);
- Department of the Environment; Northern Ireland.

2 METHODOLOGY

2.1 Air emissions risk assessment for Natura 2000 sites

In the UK, a risk based approach is used to assess the potential effects of emissions on Natura 2000 sites arising from 'plans and projects', as required under Article 6(3) of the Habitats Directive. The assessment uses a staged approach and includes tests based on those in the Habitats Directive (Article 6(3) and 6(4) (Russell, et al. 2011). This approach is considered suitably robust for use in Ireland and is particularly relevant where there is potential for cross-border effects in the UK.

The risk assessment is carried out in a number of stages, which mirror the tests in the Habitats Directive:

- **Stage 1** – “Relevance screening” (distance based);
- **Stage 2** – “Likely significant effect” test (modelling of process contribution to critical level/ load);
- **Stage 3** – Appropriate Assessment - “No adverse effect” test;
- **Stage 4** – Determination.

2.1.1 Screening for protected conservation areas

First, a distance screen is applied to filter out any plans/projects that by virtue of their nature or location could not conceivably have an effect on the interest features of a Natura 2000 site. For Special Protection Areas, Special Areas of Conservation and Ramsar sites the recommended screening distance is 10km (within 15 km if you operate a large electric power station or refinery). If it is deemed that the plan/project is not 'relevant' to any Natura 2000 sites the subsequent stages are not required (Environment Agency and Department for Environment, Food and Rural Affairs, 2016)

When there are SPAs, SACs and Ramsar sites within the specified distance the second stage is intended to identify those proposed plans and projects that may produce emissions with significant effects on those SPAs, SACs and Ramsar sites within the prescribed distance and as such will require further assessment (an 'appropriate assessment').

A likely significant effect in this context is any effect that may affect the conservation objectives of the features for which the site was designated. The plan or project is assessed for 'likely significant effect' either alone or in combination with other plans or projects, and in the context of the prevailing environmental conditions. Prevailing environmental conditions include background/ diffuse pollution contributions to the site and the residual effects of plans and projects that have been completed/implemented (Environment Agency and Department for Environment, Food and Rural Affairs, 2016).

If the emissions from the plan or project that affect SPAs, SACs, Ramsar sites or SSSIs meet both of the following criteria, they are considered insignificant – and no further assessment is required:

- the short-term PC is less than 10% of the short-term environmental standard for protected conservation areas

- the long-term PC is less than 1% of the long-term environmental standard for protected conservation areas

If these requirements are not met the PEC should be calculated (process contribution + background) and checked against the standard for protected conservation areas:

- If long-term PC is greater than 1% and your PEC is less than 70% of the long-term environmental standard, the emissions are insignificant – you don't need to assess them any further.
- If PEC is greater than 70% of the long-term environmental standard, you need to do detailed modelling.

2.1.2 In-Combination effects

Natura 2000 or Ramsar sites which are identified to be within the zone of influence of the proposal will be subject to an exclusion zone of 10km within which the potential impact of other plans or project will be considered.

All plans/projects within the exclusion zone of the designated site that have already been permitted are considered to be included within the background figures for air emissions. Those that are still not permitted are added to the PC of the application in question (JNCC, 2014).

For all plans and projects that are not intensive livestock if the combined PCs are above 1% and the PEC is also above 70% of the minimum critical load then the in-combination effect is considered significant. For the livestock sector, the principle is the same except that if the combined PC is above 20% and if the PEC is also above 70% of the ammonia critical level or nitrogen critical load then the in combination effect is considered significant (Whitfield, C. & McIntosh, N., 2014).

2.1.3 No adverse effects test

If a likely significant effect is determined, an appropriate assessment is made of the implications for the Natura 2000 site, in view of that site's conservation objectives (Stage 3). Its purpose is to ascertain whether or not the proposal will have 'no adverse effect on the integrity of the Natura 2000 site'. At this stage a detailed atmospheric dispersion model is generally used to estimate the 'process contribution' (potential NH₃ concentrations and nitrogen deposition resulting from the installation) at the given Natura 2000 site. This is compared with the relevant environmental benchmarks (critical levels and loads) to assess the potential impacts on the designated features making up a given Natura 2000 site. At this stage, further consideration is given to the modelling assumptions, location of designated features, sensitivity of the features, uncertainties within the assessment etc. (Russell, et al. 2011).

2.1.3.1 Nitrogen Deposition

In all cases if the PEC is equal to or below 100% of the relevant nitrogen critical load then a conclusion of no adverse effect is made. If the PEC is above the critical load and the new process contribution causes an additional 'small' increase a decision will have to be made based on the individual circumstances, taking account of the information outlined above. If the

PC is large then it is not possible to conclude 'no adverse effect' (Whitfield, C. & McIntosh, N., 2014).

Specific thresholds have only been set for the intensive livestock sector. Where background/PEC is greater than the critical level or load, currently thresholds of between 10 and 20% (for PC alone and in combination) are used (depending on the circumstance). This is currently under review (Whitfield, C. & McIntosh, N., 2014).

2.1.3.2 Acid deposition

There is no specific guidance available in either the Republic of Ireland or the UK in relation to what constitutes an adverse effect on a Natura 2000 site in terms of acid deposition. Consequently, a determination of adverse effects on a Natura 2000 site due to acid deposition is considered in relation to the conservation interests of the Natura 2000 site in question and the best available information regarding the potential impacts of acid deposition on those conservation interests. A judgement will then be made on whether these impacts affect the conservation objectives for the given Natura 2000 site.

3 DESCRIPTION AND FEATURES OF THE PROJECT AND AREA

3.1 Location

The site is located some 1.7 km north of Ballyconnell, Co. Cavan, north of the N87, Grid Reference IG 227500E, 320500N. It is also located less than 400m from the Northern Ireland border. Figure 1 shows the location of the cement plant and Figure 2 shows an overview of the site.

3.2 Area description

The Ballyconnell cement plant is currently in operation. The cement plant currently consists of a number of buildings including a workshop, a bagging plant, a number of office blocks and associated car parks, cement processing units, coal storage facilities, waste storage bays, and a number of silos. There is little or no vegetation throughout much of the compound. Scrub has colonised fallow areas of grass and bare ground surrounding the cement plant, and there are some small areas of amenity grassland along the eastern side of the compound adjacent to the office buildings, bagging plant, and car parking facilities. A small area of immature planted woodland occurs on the western side of the cement plant adjacent to the existing cement mill and clinker shed.

3.3 Description of the proposed developments

It is proposed to improve the sustainability of the cement plant, through the use of an increased range of waste derived alternative raw materials and fuels with the long term aim of displacing almost all fossil fuels at the plant. In order to facilitate the use of the aforementioned alternative fuels certain changes are required to the plant. These changes include: Bunded Liquid Fuel tanks and associated feeding system, Meat & Bonemeal silos and associated feeding system, Lime silos and associated feeding system, Extension to existing Storage bays and associated feeding system, a new induced draft fan, and the replacement of the existing calciner.

The proposed modifications to the plant have the potential to result in changes to emissions from the existing cement plant, and hence a dispersion model has been undertaken by Redmore Environmental Ltd, taking account of proposed changes.

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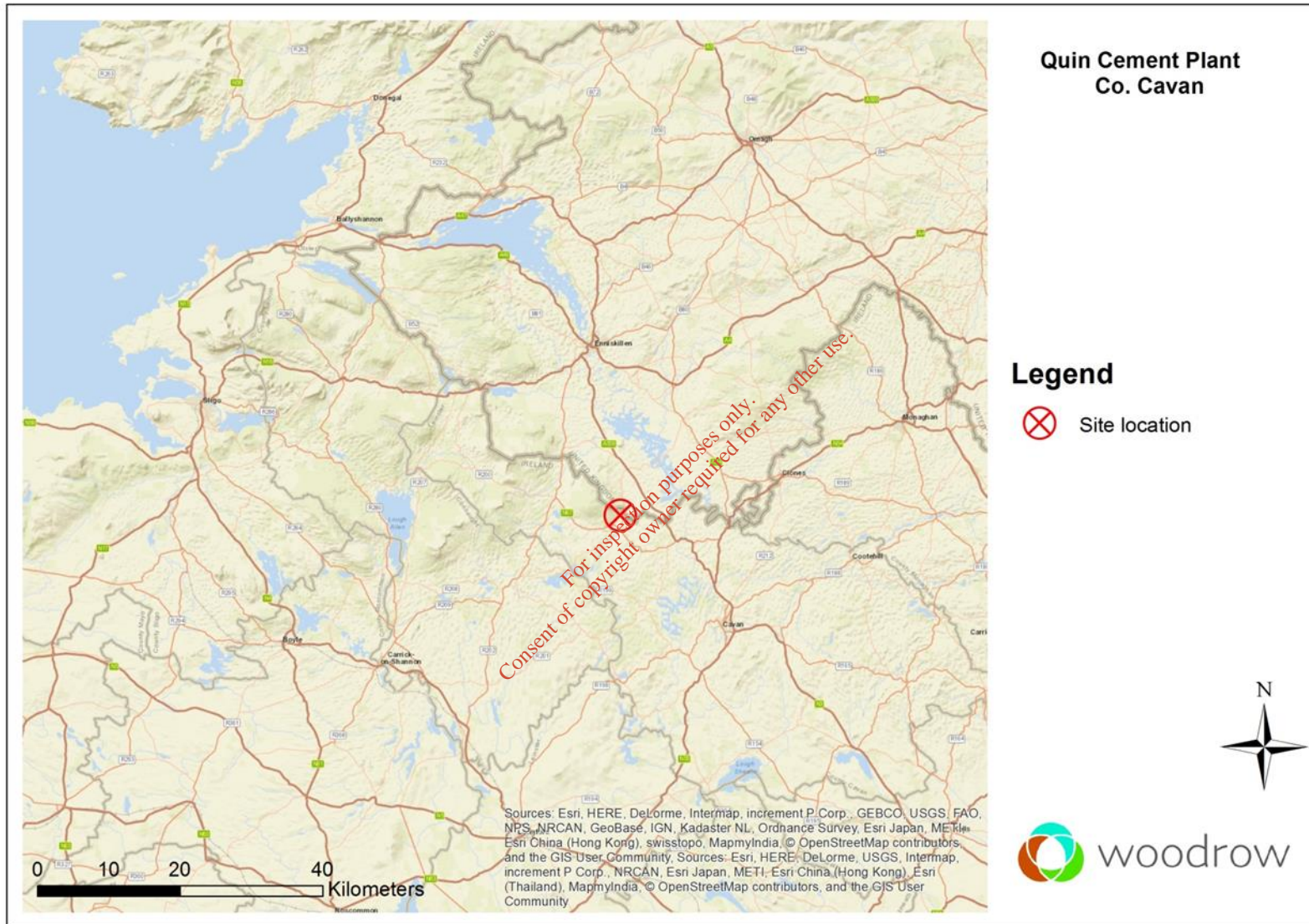


Figure 1 – Geographical location of Quinn Cement Plant, Co.Cavan.

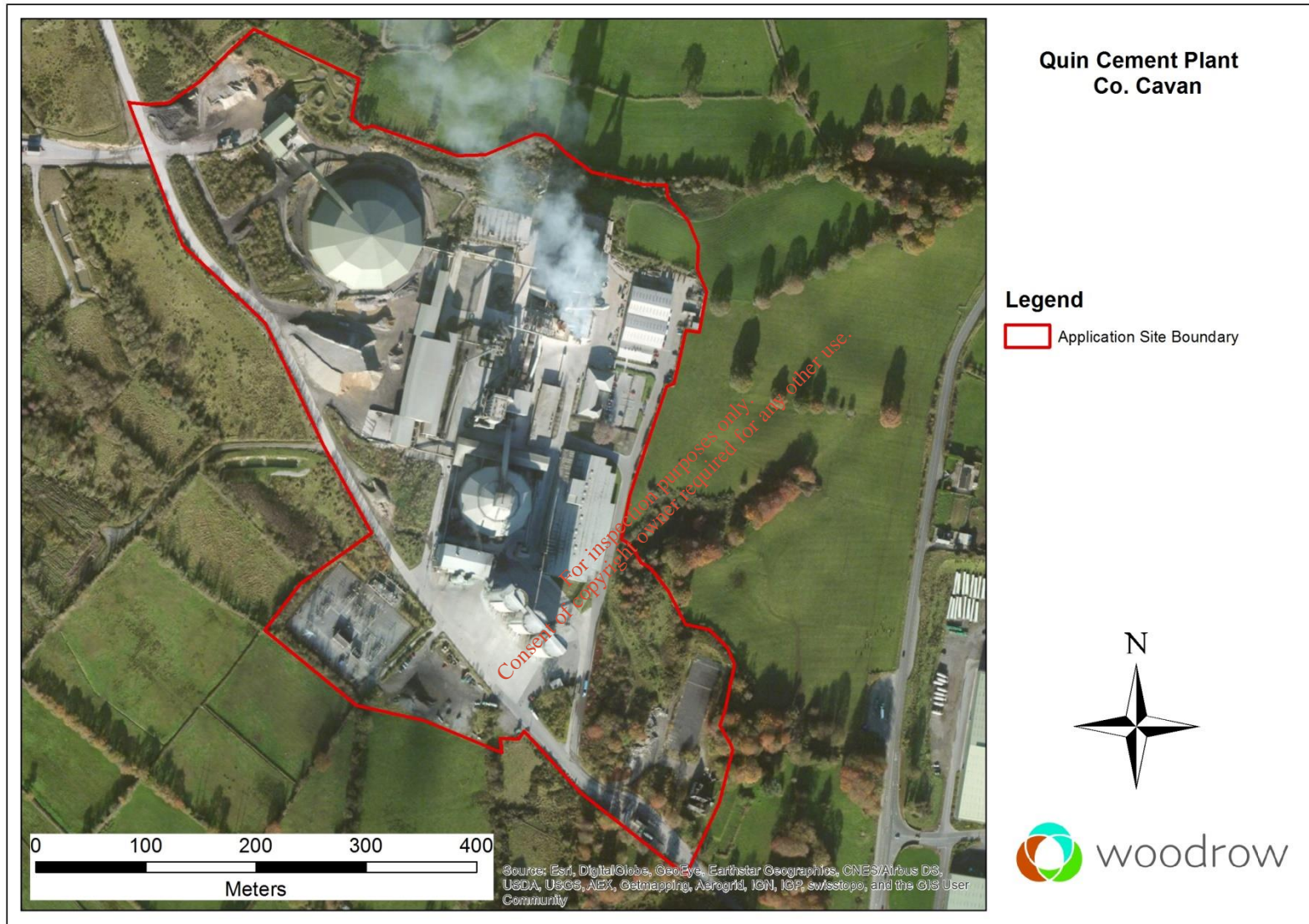


Figure 2 – Overview of the Quinn Cement Plant, Co. Cavan

4. POTENTIAL IMPACT OF PROPOSAL ON NATURA 2000 SITES

The following sections provide information on surrounding Natura 2000 designated sites. These can then be assessed based on factors such as proximity to proposal, qualifying features and their conservation status. A screening matrix is then provided on potential impacts and significant effect of the planned proposal on these designated sites.

Within each section, the site's conservation objectives are laid out, the potential for the proposal to affect them is considered and a conclusion on potential for the proposal to have a significant effect on the features (and therefore the Natura 2000 site) is made. In the absence of management plans for sites, likely impacts and threats on features have been taken from existing documents such as the *Draft Habitats Directive Assessment of the Draft Regional Planning Guidelines 2010-2022* (Border Regional Authority 2010) and from professional judgement.

4.1 Zone of influence

In many cases a standard 15km distance from a proposal is used as a potential zone of influence within which Natura 2000 sites should be screened for potential impact. There is no obvious basis for this, with potential impacts on sites being dependent on the nature of impacts arising, sensitivity of receptors and causal links and conduits. In many cases the potential zone of influence is considerably less than 15 km (for example noise and airborne pollution) while the potential zone of influence could be greater than 15km, for example if there is a direct water connection.

The proposed alterations to the cement plant do not occur within a Natura 2000 site. The main identifiable ecological pathway to surrounding Natura 2000 sites, which can be discerned from the description given for the proposed works, is airborne emission which is likely to occur as result of the proposed changes to the cement plant. Consequently guidelines in relation to the assessment of the potential effects of air emissions on protected conservation areas apply (www.gov.uk, 2016) (see Section 2.1). Potential hydrological connectivity is also covered within this report.

The guidelines recommend a 10km threshold from a plan or project inside of which Natura 2000 sites and Ramsar sites should be considered. Therefore, the potential zone of influence of 10km around the development is considered for air emissions.

Natura 2000 sites within the 10km potential zone of influence are shown in **Table 1**. **Figure 3** is a pictorial representation of the Natura 2000 sites within a 10km and a 15km boundary from the Quinn cement plant.

Table 1 – Distance of Natura 2000 sites within 10km of the cement plant

Natura 2000 site	Main features of interest	Distance from proposal
Moninea Bog SAC (NI)	Active raised bog [7110]	2.3km
Lough Oughter and Associated Loughs SAC (ROI)	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [3150] Bog woodland [91D0] Lutra lutra (Otter) [1355]	2.7km
Lough Erne SAC (NI) (Also designated a Ramsar site)	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [3150] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0] Lutra lutra (Otter) [1355]	5.4km
Upper Lough Erne SPA (NI) (Also designated a Ramsar site)	Whooper Swan (<i>Cygnus cygnus</i>) [A038]	5.5km
Cladagh (Swanlinbar) River SAC (NI)	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260] Freshwater pearl mussel <i>Margaritifera margaritifera</i> [1029]	9.7km

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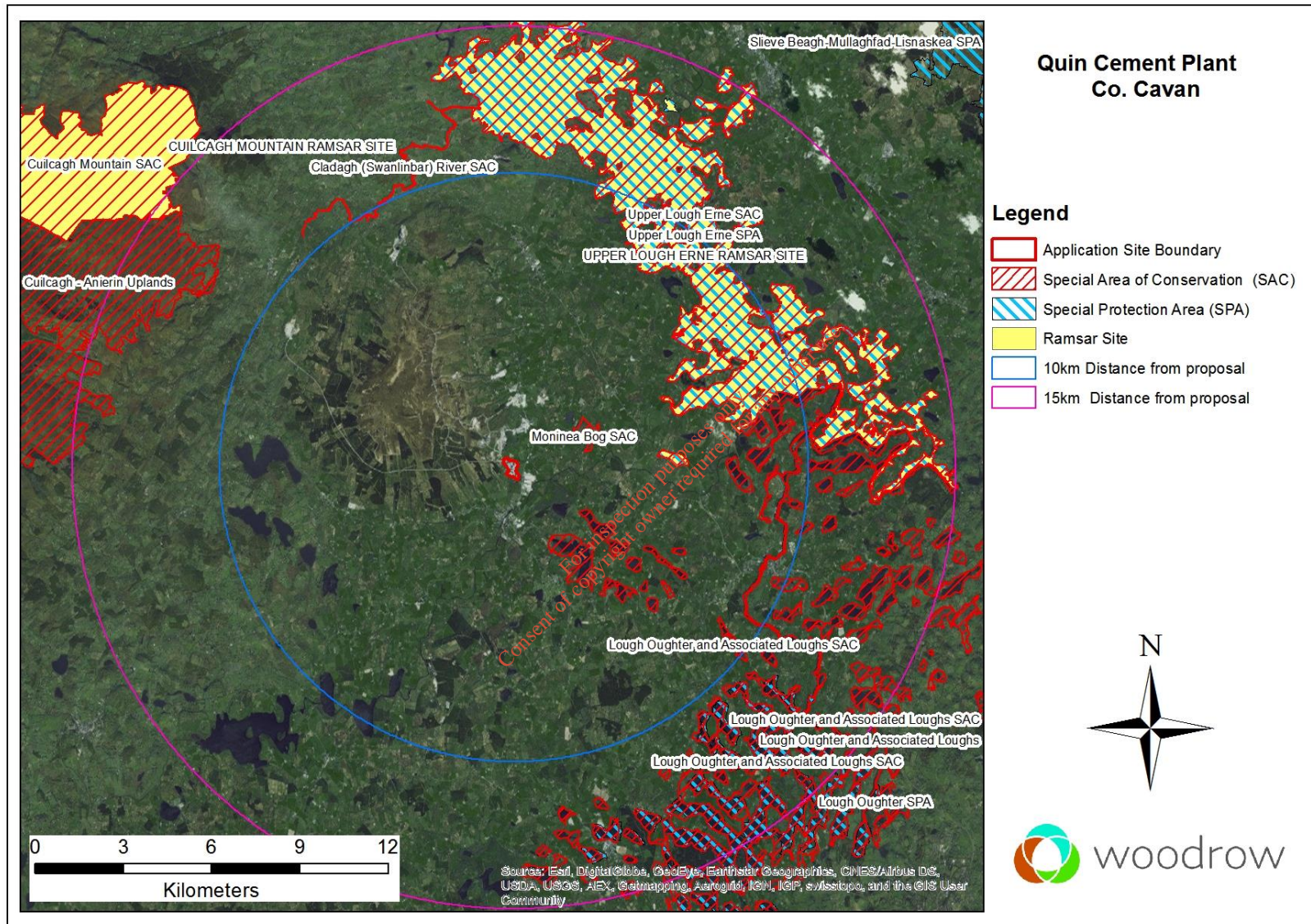


Figure 3 – Natura 2000 and Ramsar sites within 10km (airborne emissions potential zone of influence) and 15km of the proposal

4.2 Natura 2000 sites within the potential zone of influence of the proposal

Potential impacts on sites are dependent on the nature of impacts arising, sensitivity of receptors and causal links and conduits. Therefore in many cases, the potential zone of influence is limited (for example noise and airborne pollution).

4.2.1 Airborne pollution - Air Dispersion Model

An Air Dispersion Model for the cement plant has been prepared by Redmore Environmental Ltd. This model has provided the following outputs at relevant receptors;

- Annual mean NOX Concentration (ug/m3)
- Annual Mean SO2 Concentration (ug/m3)
- Annual Mean NH3 Concentration (ug/m3)
- Annual Nitrogen Deposition (kgN/ha/yr)
- Annual Acid deposition (Kgeq/ha/yr)

Tables 2 to 6 display the results of the air dispersion model for the above outputs at each relevant receptor (i.e. those Natura 2000 sites within 10km of the proposed development). Tables 2 to 6 also states the process contribution (PC) for each output and the relevant air quality standards for all modelled outputs.

Table 2 Predicted Annual Mean NOx Concentrations

Receptor	Predicted Annual Mean NO _x Concentration (µg/m ³)		Proportion of EQS (%)	
	PC	PEC	PC	PEC
Moninea Bog	0.40	5.99	1.33	19.97
Lough Oughter and Associated Loughs	0.24	5.83	0.80	19.43
Lough Erne	0.22	5.81	0.72	19.36
Upper Lough Erne	0.22	5.81	0.72	19.36
Cladagh (Swanlinbar) River	0.21	5.10	0.70	17.00

Table 3 Predicted Annual Mean SO2 Concentration (µg/m3)

Receptor	Predicted Annual Mean SO ₂ Concentration (µg/m ³)		Proportion of EQS (%)	
	PC	PEC	PC	PEC
Moninea Bog	0.40	3.29	2.00	16.45
Lough Oughter and Associated Loughs	0.24	3.13	1.20	15.65
Lough Erne	0.22	3.11	1.09	15.54
Upper Lough Erne	0.22	3.11	1.09	15.54
Cladagh (Swanlinbar) River	0.21	1.32	1.05	6.60

Table 4 Predicted Annual Mean NH₃ Concentration (µg/m³)

Receptor		Predicted Annual Mean NH ₃ Concentration (µg/m ³)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
E1	Moninea Bog	0.040	1.780	4.00	178.00
E2	Lough Oughter and Associated Loughs	0.024	1.764	0.80	58.80
E3	Lough Erne	0.022	1.762	0.72	58.72
E4	Upper Lough Erne	0.022	1.762	0.72	58.72
E5	Cladagh (Swanlinbar) River	0.021	2.021	0.70	67.37

Table 5 Annual Nitrogen Deposition Rate (kgN/ha/yr)

Receptor	Predicted Annual Nitrogen Deposition Rate (kgN/ha/yr)		Proportion of EQS (%)			
	PC	PEC	Low EQS		High EQS	
			PC	PEC	PC	PEC
Moninea Bog	0.27	13.29	5.31	265.71	2.65	132.85
Lough Oughter and Associated Loughs	0.16	13.18	3.18	263.58	1.59	131.79
Lough Erne	0.23	22.49	2.32	224.92	1.54	149.94
Upper Lough Erne	0.23	22.49	2.32	224.92	1.54	149.94
Cladagh (Swanlinbar) River	0.14	15.68	-	-	-	-

Table 6 Predicted Annual Acid Deposition Rate (keq/ha/yr)

Receptor	Predicted Annual Acid Deposition Rate (keq/ha/yr)		Proportion of EQS (%)	
	S	N	PC	PEC
Moninea Bog	0.0472	0.0177	8.6	179.6
Lough Oughter and Associated Loughs	0.0283	0.0106	-	-
Lough Erne	0.0512	0.0152	0.6	16.2
Upper Lough Erne	0.0512	0.0152	0.6	16.2
Cladagh (Swanlinbar) River	0.0249	0.0093	-	-

As shown in Tables 2 above the predicted annual mean NO_x concentrations were below the EQS of 30µg/m³ at all Natura 2000 and Ramsar sites within the 10km exclusion zone. Similarly, Table 3 shows that the predicted annual mean SO₂ concentrations were below the EQS of 20µg/m³ at all Natura 2000 and Ramsar sites within the 10km exclusion zone.

Table 4 shows the predicted annual mean NH₃ concentrations were below the EQS at all Natura 2000 and Ramsar sites within the 10km exclusion zone with the exception of Moninea Bog SAC. This exceedance is partly due to the background concentration of 1.74µg/m³, which exceeds the EQS as a base condition.

Also, as shown in Table 5, the predicted annual nitrogen deposition rates were above the lower EQSs at all Natura 2000 and Ramsar sites within the 10km exclusion zone. Again, this

is partly due to the background deposition rates, which exceed both the lower EQS of 5 kgN/ha/yr and the higher EQS of 10 kgN/ha/yr at all sites within the 10km exclusion zone.

Table 6 shows that the predicted annual acid deposition rates were below the EQSs at all Natura 2000 and Ramsar sites within the exclusion zone with the exception of Moninea Bog SAC. Again, this exceedance is partly due to the background deposition rates, which exceed the EQSs as a base condition.

Annual mean NO_x and SO₂ concentrations are well below the relevant air quality standards at all designated sites within the potential zone of influence. Annual mean NH₃ concentrations exceed the lower critical level (1 µg/m³) for ammonia concentrations at Moninea Bog SAC. This is partly due to the high baseline level of 1.74µg/m³. The process contribution from the cement plant is 0.04µg/m³, or 4% of the lower critical level (1 µg/m³) for ammonia concentrations.

It is evident from the above results that ammonia air concentration, nitrogen deposition and acid deposition will be the key parameters involved in assessing the potential ecological impacts of the cement plant on designated sites and their conservation interests. The critical load value for nitrogen deposition is the value below which significant effects on the integrity of an ecosystem are not expected.

Table 7 shows the critical loads for nitrogen deposition and the critical levels for NH₃ air concentrations for each qualifying interest of those SACs and Ramsar sites identified as being within the zone of influence.

Table 7 Critical Loads of Nitrogen Deposition and Critical Level for Ammonia Concentrations for the Annex I habitats in SACs and Ramsar Sites within 10km.

Natura 2000 Sites	Distance from proposal	Habitat Type	Critical Load - Annual Nitrogen Deposition (kgN/ha/yr)	Critical Level - Annual Mean NH ₃ Concentration (ug/m ³)
Moninea Bog SAC (NI)	2.3km	Active raised bog [7110]	5	1
Lough Oughter and Associated Loughs SAC (ROI)	2.7km	Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation [3150]	-	3
		Bog woodland [91D0]	5	1
Upper Lough Erne SAC (NI)	5.4km	Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation [3150]	-	-
		Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]	10	3
		Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0]	10	3

Upper Lough Erne Ramsar Site (NI)	5.5km	Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation [3150]	-	-
		Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]	10	3
		Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0]	10	3
Cladagh (Swanlinbar) River SAC (NI)	9.7km	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]	-	-

All values have been taken from the Air Pollution Information System (APIS) website - <http://www.apis.ac.uk/indicative-critical-load-values>

Values in red are a precautionary value and may be subject to change. They have also been derived from similar habitats types for which the unit is known.

4.2.2 Hydrological connectivity

The existing cement plant has hydrological connectivity to the Woodford River in the form of a discharge licence. This connects to the Upper Lough Erne SAC and Lough Oughter and Associated Loughs SAC some 10.2km downstream of the discharge point. Hydrological connectivity is shown in Figure 4.

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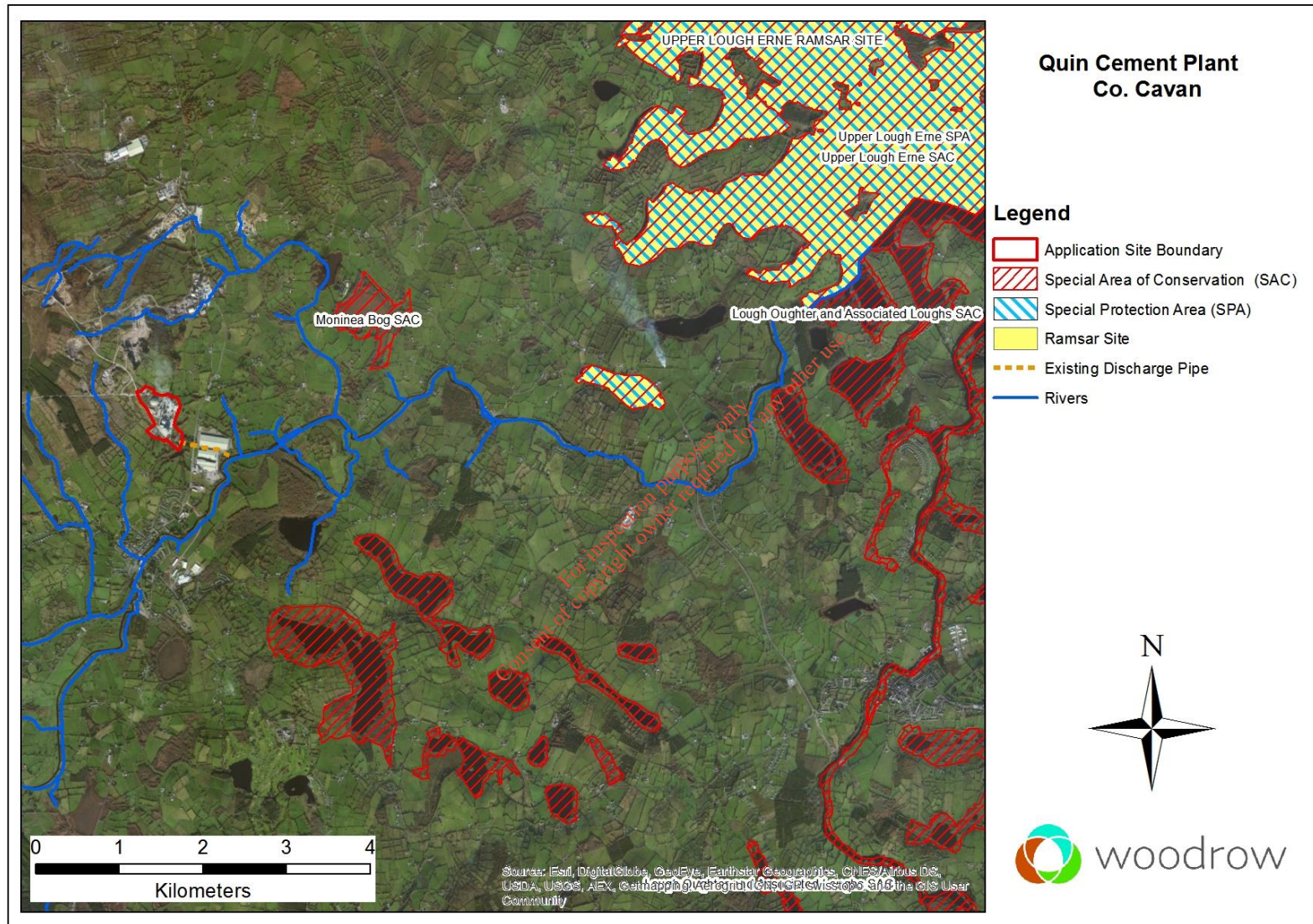


Figure 4 – Hydrological connectivity to Natura 2000 sites

4.2.1 Description of Natura 2000 sites within the potential zone of influence

4.2.1.1 Moninea Bog SAC

Moninea Bog SAC is the closest Natura 2000 site to the proposed works and lies approximately 2.3km to the north-east of the proposed development area. Its location in respect to the proposed development is illustrated in Figure 3.

Moninea Bog SAC is designated primarily because it supports the habitat **Active raised bog (7110)** which is listed under Annex 1 of the Habitats Directive. Moreover, the active raised bog habitat is identified by the Habitats Directive as being a Priority Habitat. The Active raised bog (7110) habitat is by definition a nutrient poor habitat and therefore considered sensitive to changes in the deposition of nitrogen which may result from emissions at the cement plant. The Moninea Bog SAC is, therefore, considered to be within the potential zone of influence of the proposal.

Table 8 Qualifying Features of Moninea Bog Special Area of Conservation (SAC)

Qualifying Habitats / interest	Extent and Character
Active Raised Bog [7110]	The habitat cover of the site, as taken from the sites standard data form, is 35.58 HA which represents 79% of the SAC.

Conservation Objectives for Moninea Bog SAC

To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- Active Raised Bog [7110]

4.2.1.2 Lough Oughter and Associated Loughs SAC

The Lough Oughter and Associated Loughs SAC is a large site which encompasses a maze of waterways, islands, small lakes and peninsulas including approximately 90 inter-drumlin lakes and 14 basins in the course of the Erne River. As a whole it is the best inland example of a flooded drumlin landscape in Ireland and has many rich and varied biological communities. Many of the species of wetland plants, some considered quite commonplace in Lough Oughter and its associated loughs, are infrequent elsewhere (NPWS, 2014).

The lakes and basins are shallow, and the water well mixed and nutrient rich (eutrophic). Around much of the shoreline there are well developed swamp and marsh communities. Where a general lack of grazing pressure or a particular slope has allowed it, deciduous woodland has re-established itself behind the reedbeds. Common constituents include; Willow *Salix sp.* Alder *Alnus glutinosa*, Downy Birch *Betula pubescens*, Hazel *Corylus avellana* and Hawthorn *Crataegus monogyna*. Along submerged margins Alder and Willow are most commonly found with a flooded understorey typically containing Reed Canary-grass, Meadow Sweet, Yellow Iris and in places Tufted-sedge and Greater Tussock sedge (*Carex paniculata*). Downy Birch occurs along lake edges and also forms stands of wet woodland on cutover bog with varying degrees of wet and dry peat. In some areas of wet bog with good Sphagnum cover, bog woodland has developed. This habitat is characterised by the presence of Downy

Birch on areas of high Sphagnum cover, other species include Purple Moor grass and Bottle Sedge (NPWS, 2014).

The site supports a substantial population of water birds including internationally important numbers of Whooper Swan *Cygnus cygnus* and nationally important numbers of Tufted Duck *Aythya fuligula* and Cormorant *Phalacrocorax carbo*, as well as important numbers of species such as Greenland White-fronted Goose *Anser albifrons flavirostris*, Great Crested Grebe *Podiceps cristatus*, Wigeon *Anas Penelope*, Teal *Anas crecca* and Pochard *Aythya farina*.

Otter, a species listed on Annex II of the E.U. Habitats Directive, also occurs at the site (NPWS, 2014).

Table 9 Qualifying Features of Lough Oughter and Associated Loughs Special Area of Conservation (SAC)

Qualifying Habitats / interest	Extent and Character
Natural Eutrophic Lakes	<p>This habitat is recorded in 88 10km grid squares in Ireland. The habitat covers approximately 73% of the SAC and its representation is classified as 'B' which is 'Good'</p> <p>Conservation Status</p> <p>The overall conservation status of this habitat is considered to be Inadequate (NPWS, 2013).</p>
Bog Woodland	<p>This habitat is recorded in 30 10km grid squares in Ireland. The habitat covers approximately 8% of the SAC and its representation at the site is classified as 'C' which is average.</p> <p>Conservation Status</p> <p>The overall conservation status of this habitat is considered to be Favourable (NPWS, 2013).</p>
Otter	<p>The conservation value is to be considered 'A' (Excellent).</p> <p>The population is described as 'C', meaning it accounts for between 0% and 2% of the national population.</p> <p>The isolation is described as 'C', meaning the population is not isolated within the extended distribution range.</p> <p>Conservation Status</p> <p>The overall conservation status of this habitat is considered to be Favourable (NPWS, 2013).</p>

Conservation Objectives for Lough Oughter and Associated Loughs SAC:

To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.

4.2.1.3 Upper Lough Erne SAC

Upper Lough Erne in Northern Ireland is a very large natural eutrophic lake situated in a drumlin landscape and has a predominantly limestone catchment. The site is an example of a

northern or western eutrophic lake of glacial origin. The lake has a very long shoreline and numerous associated satellite lakes, many of which are included in the site.

Upper Lough Erne represents one of the largest areas of semi-natural woodland remaining in Northern Ireland. Drier soils support mature stands of old sessile oak woods, which are particularly well-developed to the south of the lough. The woodlands consist of a canopy dominated by oak *Quercus petraea*, with occasional ash *Fraxinus excelsior* and birch *Betula pubescens*. Hazel *Corylus avellana* and holly *Ilex aquifolium* often form a distinct shrub layer. The ground flora is very variable and consists of a wide variety of species, including bluebell *Hyacinthoides non-scripta*, sanicle *Sanicula europaea*, goldilocks buttercup *Ranunculus auricomus*, great wood-rush *Luzula sylvatica*, and an abundance of the scarce thin-spiked wood-sedge *Carex strigosa*.

Upper Lough Erne is the most extensive area of alluvial forests in Northern Ireland. The woodland occurs in scattered stands around the edges of the lough, where the shoreline is ungrazed or only very lightly grazed. Fluctuating water levels and variations in exposure, substrate and management have resulted in the formation of a wide range of wet woodland communities. These are generally characterised by a canopy in which species such as willow *Salix spp.* and alder *Alnus glutinosa* are dominant, with more notable species such as aspen *Populus tremula*, guelder-rose *Viburnum opulus* and buckthorn *Rhamnus cathartica* scattered throughout. The ground flora is often similar to that of the swamp and fen zone, with a rich variety of sedges and herbs. In places, there are well-developed transitions to drier woodland types, including 91A0 old sessile oak woods with *Ilex* and *Blechnum*.

Table 10 Qualifying Features of the Upper Lough Erne SAC

Qualifying Habitats / interest	Extent and Character
Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [3150]	The habitat covers approximately 67% of the SAC and its representation is classified as 'A' which is 'Excellent' Conservation Status The overall conservation status of this habitat is considered to be bad (JNCC, 2013).
Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]	The habitat covers approximately 4.5% of the SAC and its representation is classified as 'A' which is 'Excellent' Conservation Status The overall conservation status of this habitat is considered to be I Bad (JNCC, 2013).
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) * Priority feature [91E0]	The habitat covers approximately 2.2% of the SAC and its representation is classified as 'A' which is 'Excellent' Conservation Status The overall conservation status of this habitat is considered to be bad (JNCC, 2013).

Conservation Objectives for the Upper Lough Erne SAC:

To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.

4.2.1.4 Cladagh (Swanlinbar) River SAC

The Cladagh (Swanlinbar) River SAC in Northern Ireland is centred on the river that rises on Cuilcagh Mountain and flows through County Cavan before crossing into County Fermanagh in Northern Ireland and flowing into Upper Lough Erne.

The site includes a variety of habitats including the river itself, bogs, marshes and fens and deciduous woodland.

Table 11 Qualifying Features of the Cladagh (Swanlinbar) River SAC

Qualifying interest	Habitats /	Extent and Character
Watercourses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]		<p>The habitat covers approximately 54% of the SAC and its representation is classified as 'C' which is 'Significant'</p> <p>Conservation Status</p> <p>The overall conservation status of this habitat is considered to be Good (JNCC, 2015).</p>
Freshwater pearl mussel Margaritifera margaritifera [1029]		<p>The conservation value is to be considered 'C' (Average or reduced)).</p> <p>The population is described as 'C', meaning it accounts for between 0% and 2% of the national population.</p> <p>The isolation is described as 'C', meaning the population is not isolated within the extended distribution range.</p> <p>The site is considered to hold one of the most important populations of freshwater pearl mussel in the UK</p>

Conservation Objectives for the Cladagh (Swanlinbar) River SAC:

To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.

4.2.1.5 Upper Lough Erne SPA

The Upper Lough Erne SPA in Northern Ireland covers the same area as the Upper Lough Erne SAC as detailed in section 4.2.1.3.

The site is designated as an SPA for wintering whooper swan, holding a 5 year peak mean of up to 352 individuals, which is at least 3.5% of the all-Ireland wintering population.

Conservation Objectives for the Upper Lough Erne SPA:

To maintain or restore the favourable conservation condition of the Annex I species for which the SPA has been selected.

4.3 Assessment of likely impacts affecting Natura 2000 sites within the zone of influence

4.3.1 Moninea Bog SAC

4.3.1.1 Nitrogen Deposition

The critical Load for nitrogen deposition (kgN/ha/yr) for the Active raised bog (7110) habitat is 5 kgN/ha/yr (APIS, 2016). The air dispersion model produced in respect of the proposed alterations to the Ballyconnell cement plant suggest that the level of nitrogen deposition at the Moninea Bog SAC would be 13.29 kgN/ha/yr including the contribution from the Ballyconnell cement plant. This level is significantly above the critical load for nitrogen deposition for this habitat (5 kgN/ha/yr).

The critical load refers to the value of nitrogen deposition below which significant effects on the integrity an ecosystem are not expected. Therefore, the air dispersion model suggests that there is potential for significant effects on the conservation interests of the Moninea Bog SAC. However, this does not necessarily conclude the requirement for an Appropriate Assessment. Following the guidance provided for the assessment of air emission in relation to protected conservation sites thresholds are used to assess the Process Contribution (PC) and then the PEC (Process + Environment Contribution).

The process contribution (PC) of the cement plant for nitrogen deposition at the Moninea bog SAC is 0.27 kgN/ha/yr. As discussed in Section 2.1.1 if the long-term PC is less than 1% of the long-term environmental standard the potential impact may be considered insignificant. In this case the long-term PC is 0.27 kgN/ha/yr which is greater than the 1% of the critical loading for nitrogen deposition for this habitat 0.05 kgN/ha/yr.

As discussed in Section 2.1.1 where the predicted long term contribution from the industrial process is greater than 1 % of the relevant long term benchmark, consideration also needs to be given to the predicted environmental contribution (PEC). Where the PEC (process contribution + background) is less than 70 % of the relevant long term benchmark then a conclusion of no likely significant effect can be reached, even if the process contribution is greater than 1 %. In this case the PEC is 13.29 kgN/ha/yr. This figure is greater than the long term benchmark and as such the potential for effects must be considered significant.

4.3.1.2 Ammonia Concentrations

The critical level for ammonia concentration (ug/m³) for the Active raised bog (7110) corresponds to the lower level of 1 ug/m³ (the critical level for lichens and bryophytes and ecosystems which depend for their integrity on these groups). The air dispersion model produced in respect of the proposed alterations to the Ballyconnell cement plant suggest that the level of ammonia concentration at the Moninea Bog SAC would be 1.78 ug/m³ including the potential contribution from the Ballyconnell cement plant. This level is significantly above the critical level specified for this habitat type - 1 ug/m³.

The critical level refers to the level above which effects can be expected. Therefore, the air dispersion model suggests that there is the potential for significant effects on the conservation interests of the Moninea Bog SAC. However, this does not necessarily conclude a requirement for an Appropriate Assessment. Following the guidance for the assessment of air emission in

relation to protected conservation sites thresholds are used to assess the Process Contribution (PC) and then the PEC (Process + Environment Contribution).

The process contribution (PC) of the proposed alterations to the cement plant for ammonia concentration at the Moninea bog SAC is $0.04\mu\text{g}/\text{m}^3$. As discussed in Section 2.1 if the long-term PC is less than 1% of the long-term environmental standard the potential impact may be considered insignificant. In this case the long-term PC is $0.04\mu\text{g}/\text{m}^3$ which is greater than the 1% threshold of $0.01\mu\text{g}/\text{m}^3$.

As discussed in Section 2.1.1 where the predicted long term contribution from the industrial process is greater than 1 % of the relevant long term benchmark, consideration also needs to be given to the predicted environmental contribution (PEC). Where the PEC (process contribution + background) is less than 70 % of the relevant long term benchmark then a conclusion of no likely significant effect can be reached, even if the process contribution is greater than 1 %. In this case the PEC is $1.78\mu\text{g}/\text{m}^3$. This figure is greater than the long term benchmark and as such the potential for effects must be considered significant.

4.3.1.2 Acid Deposition

The rate of acid deposition at Moninea Bog is calculated as S $0.0472\text{ keq}/\text{ha}/\text{yr}$ and N $0.0177\text{ keq}/\text{ha}/\text{yr}$. These calculations are equivalent to a PEC which is approximately 179.6% of the relevant critical load at this receptor. The PC is calculated as 8.6 % of the relevant critical load for Moninea Bog SAC. As this is greater than 1 % threshold of significance these figures suggest a potentially significant effect on Moninea Bog SAC from acid deposition as a result of emissions from the Ballyconnell cement plant.

4.3.2 Lough Oughter and Associated Loughs SAC

4.3.2.1 Nitrogen Deposition

The air dispersion model produced in respect of the proposed alterations to the Ballyconnell cement plant suggest that the level of nitrogen deposition at the Lough Oughter and Associated Loughs SAC would be $13.18\text{ kgN}/\text{ha}/\text{yr}$ including the process contribution from the proposed alterations to the Ballyconnell cement plant. This level is significantly above the critical load for nitrogen deposition for the Annex I habitat Bog Woodland (91E0)(APIS, 2016).

The critical load refers to the value of nitrogen deposition below which significant effects on the integrity an ecosystem are not expected. Therefore, the air dispersion model suggests that there is potential for significant effects on the conservation interests, namely Bog Woodland, of the Lough Oughter and Associated Loughs SAC.

The process contribution (PC) of the proposed alterations to the cement plant for nitrogen deposition at Lough Oughter and Associated Loughs SAC is $0.16\text{ kgN}/\text{ha}/\text{yr}$. As discussed in Section 2.1.1 if the long-term PC is less than 1% of the long-term environmental standard the potential impact may be considered insignificant. In this case the long-term PC is $0.16\text{ kgN}/\text{ha}/\text{yr}$ which is greater than the 1% of the critical loading for nitrogen deposition for this habitat $0.05\text{ kgN}/\text{ha}/\text{yr}$.

As discussed in Section 2.1.1 where the predicted long term contribution from the industrial process is greater than 1 % of the relevant long term benchmark, consideration also needs to be given to the predicted environmental contribution (PEC). Where the PEC (process contribution + background) is less than 70 % of the relevant long term benchmark then a conclusion of no likely significant effect can be reached, even if the process contribution is greater than 1 %. In this case the PEC is 13.18 kgN/ha/yr which is 263.58% of the relevant critical load and as such the potential for effects must be considered significant.

4.3.2.2 Acid Deposition

Of the Annex I habitats for which the Lough Oughter and Associated Loughs SAC is designated only Bog Woodland (91E0) is considered sensitive to acid deposition.

Bog woodland only covers 11% of the designation and this area and is located approximately 13.7km south-east of the cement plant site. Due to the distance between the two positions this feature was not considered further in relation to acid deposition.

4.3.2.3 Water quality

A full Hydrogeological and Hydrological Assessment for the proposed alterations to the cement plant has been prepared by BCL Consultant Hydrogeologists Ltd.

Although the Mucklagh Stream crosses the site boundary in the south west corner of the site and drains the land to the south and west of the Site the stream receives no runoff from Site. Runoff from within the application site boundary is directed into large covered settlement tanks located immediately in the south eastern corner of the site boundary. This is to ensure that the suspended solids content of the water is reduced to the recommended acceptable limit (less than 35 mg/l) prior to being discharged into the Woodford River located approximately 560m to the south east of the application site. The settlement tanks include flow balancing capacity (to control the rate of discharge during storm events) and oil interceptor facilities (BCL, 2016).

The Applicant is proposing to use the water from the settlement tanks for the cement manufacturing process, which would reduce the discharge rate to the Woodford River (BCL, 2016). The proposed changes are likely to result in a positive impact on the water quality in the Woodford River and consequently the Lough Oughter and Associated Loughs SAC.

4.3.3 Upper Lough Erne SAC / Lough Erne Ramsar

4.3.3.1 Nitrogen Deposition

The air dispersion model produced in respect of the proposed alterations to the Ballyconnell cement plant suggest that the level of nitrogen deposition at the Upper Lough Erne SAC would be 22.49 kgN/ha/yr including the process contribution from the proposed alterations to the Ballyconnell cement plant. This level is significantly above the critical load for nitrogen deposition for the Annex I habitats Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* [91E0] and Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] which is 10 kgN/ha/yr (APIS, 2016).

The critical load refers to the value of nitrogen deposition below which significant effects on the integrity an ecosystem are not expected. Therefore, the air dispersion model suggests that there is potential for significant effects on the conservation interests of the Upper Lough Erne SAC / Ramsar site. However, this does not necessarily conclude a requirement for an Appropriate Assessment. Following the guidance provided for the assessment of air emission in relation to protected conservation sites thresholds are used to assess the Process Contribution (PC) and then the PEC (Process + Environment Contribution).

The process contribution (PC) of the proposed alterations to the cement plant for nitrogen deposition at the Upper Lough Erne SAC is 0.23 kgN/ha/yr. As discussed in Section 2.1 if the long-term PC is less than 1% of the long-term environmental standard the potential impact may be considered insignificant. In this case the long-term PC is 0.23 kgN/ha/yr is greater than 1% of the critical loading for nitrogen deposition for those habitats for which the site is designated.

As discussed in Section 2.1.1 where the predicted long term contribution from the industrial process is greater than 1 % of the relevant long term benchmark, consideration also needs to be given to the predicted environmental contribution (PEC). Also, where the PEC (process contribution + background) is less than 70 % of the relevant long term benchmark then a conclusion of no likely significant effect can be reached, even if the process contribution is greater than 1 %. In this case the PEC is 22.40 kgN/ha/yr which is 149.94% of the relevant long term benchmark and as such the potential for effects must be considered significant.

4.3.3.2 Water quality

As detailed above in section 4.3.2.3, a full Hydrogeological and Hydrological Assessment for the proposed alterations to the cement plant has been prepared by BCL Consultant Hydrogeologists Ltd.

The Applicant is proposing to use the water from the settlement tanks for the cement manufacturing process, which would reduce the discharge rate to the Woodford River (BCL, 2016). The proposed changes are likely to result in a positive impact on the water quality in the Woodford River and consequently the Upper Lough Erne SAC.

4.3.4 Cladagh (Swanlinbar) River SAC

There are no receptors (in terms of Annex I habitats) for which the Cladagh (Swanlinbar) River SAC is designated that are allocated a critical load on the www.apis.ac.uk website for any of the potential pollutants covered in the air quality assessment. The Air Quality Assessment (Redmore Environmental 2016) concluded that potential impacts on the Cladagh (Swanlinbar) River SAC were not considered significant for any of the modelled parameters.

4.3.5 Lough Erne SPA

In terms of potential impact on the Upper Lough Erne SPA and, specifically whooper swan, it is considered that the only reasonable potential pathway is hydrological (water quality).

4.3.5.1 Water quality

As detailed above in section 4.3.2.3, a full Hydrogeological and Hydrological Assessment for the proposed alterations to the cement plant has been prepared by BCL Consultant Hydrogeologists Ltd.

The Applicant is proposing to use the water from the settlement tanks for the cement manufacturing process, which would reduce the discharge rate to the Woodford River (BCL, 2016). The proposed changes are likely to result in a positive impact on the water quality in the Woodford River and consequently the Upper Lough Erne SAC.

5. CONSIDERATION OF 'IN-COMBINATION' IMPACTS

Article 6 of the EU Habitats Directive and Regulation 15 of the European Communities (Natural Habitats) Regulations state that any plan or project that may, either alone or in combination with other plans or projects, significantly affects a Natura 2000 site should be the subject of an Appropriate Assessment. The assessment of in-combination impacts is therefore an important part of the screening process.

In-combination impacts can be an issue when proposals have a small impact on Natura 2000 sites as a result of factors such as disturbance or pollution. If other proposals also have a further small impact, the combined result can be a significant impact on the Natura site.

The only potential impacts on Natura 2000 or Ramsar sites likely to originate from the alterations to the cement plant will result from:

- Changes to the concentrations of Ammonia.
- Changes to Nitrogen deposition.
- Changes to acid deposition.

Other potential impacts are considered either absent or *de minimis*. The issues, therefore, are the potential cumulative impacts of ammonia air concentrations, the potential cumulative impact of nitrogen deposition and the potential cumulative impact of acid deposition.

Other potential sources of industrial emissions (i.e. those sources which require an IE licence in the ROI or a PPC permit in the UK) which may contribute to these impacts are shown in Figure 5.

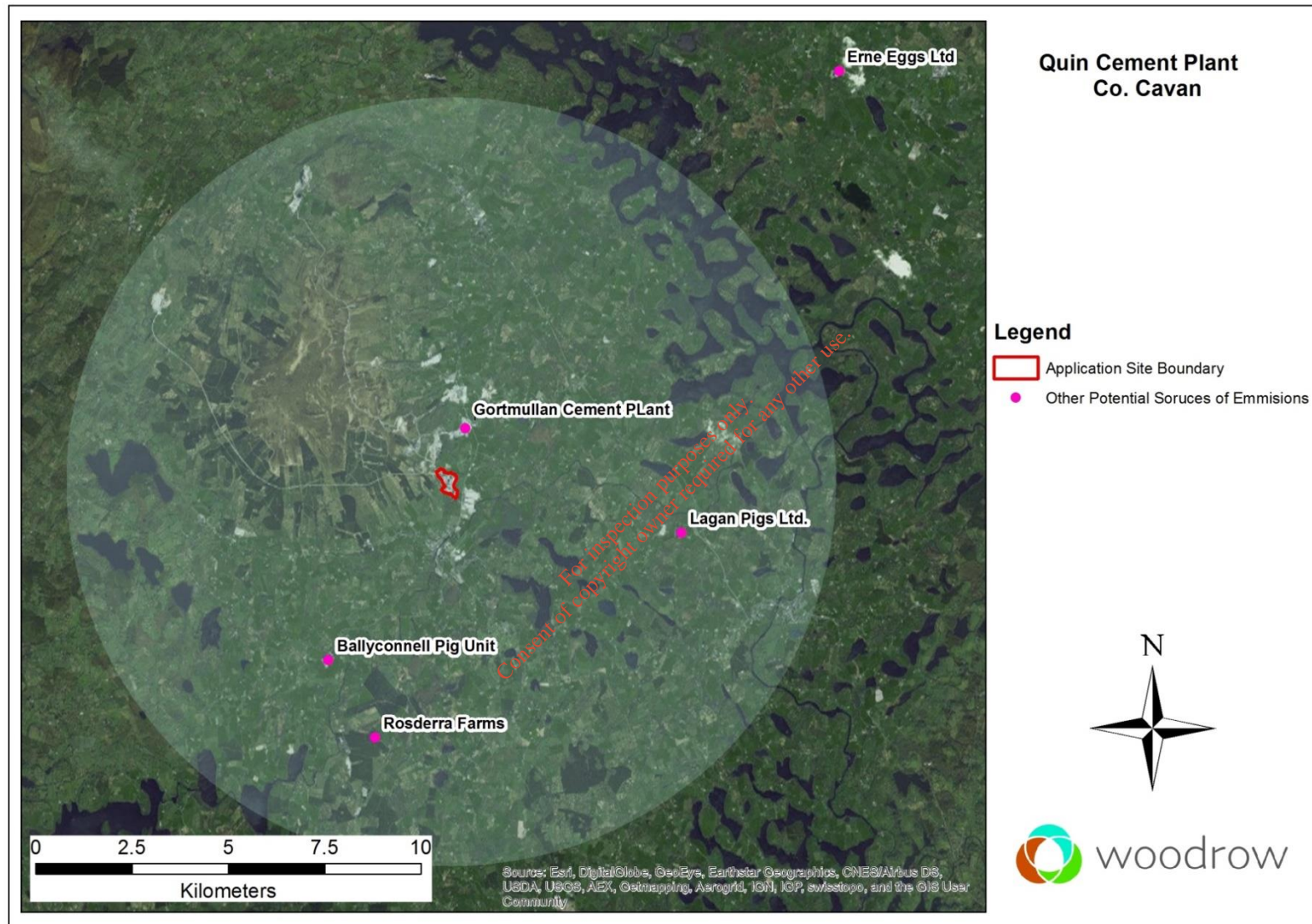


Figure 5 - Other potential sources of industrial emissions within the zone of influence of the cement plant emissions

5.1 Proposed Developments within the air emissions zone of influence

The Gortmullan cement plant, which is currently not in operation, is considered in combination with the existing proposal. Other potential sources of emissions, as identified in Figure 5, are considered to be already contributing to existing background concentrations.

A dispersion model of atmospheric emissions from both the Ballyconnell and Gortmullan cement plants was undertaken by Redmore Environmental Ltd (Redmore, 2016).

Table 12 Cumulative Assessment - Predicted Annual Mean NO_x Concentrations

Receptor	Predicted Annual Mean NO _x Concentration (µg/m ³)		Proportion of EQS (%)	
	PC	PEC	PC	PEC
Moninea Bog	1.52	7.11	5.07	23.71
Lough Oughter and Associated Loughs	0.52	6.11	1.73	20.36
Lough Erne	0.54	6.13	1.82	20.45
Upper Lough Erne	0.54	6.13	1.82	20.45
Cladagh (Swanlinbar) River	0.40	5.29	1.33	17.63

Table 13 Cumulative Assessment - Predicted Annual Mean SO₂ Concentrations

Receptor	Predicted Annual Mean SO ₂ Concentration (µg/m ³)		Proportion of EQS (%)	
	PC	PEC	PC	PEC
Moninea Bog	0.90	3.79	4.49	18.94
Lough Oughter and Associated Loughs	0.36	3.25	1.81	16.26
Lough Erne	0.36	3.25	1.81	16.26
Upper Lough Erne	0.36	3.25	1.81	16.26
Cladagh (Swanlinbar) River	0.29	1.40	1.47	7.02

Table 14 Cumulative Assessment - Predicted Annual Mean NH₃ Concentrations

Receptor	Predicted Annual Mean NH ₃ Concentration (µg/m ³)		Proportion of EQS (%)	
	PC	PEC	PC	PEC
Moninea Bog	0.102	1.842	10.23	184.23
Lough Oughter and Associated Loughs	0.039	1.779	1.31	59.31
Lough Erne	0.040	1.780	1.33	59.33
Upper Lough Erne	0.040	1.780	1.33	59.33
Cladagh (Swanlinbar) River	0.032	2.032	1.05	67.72

Table 15 Cumulative Assessment - Predicted Annual Nitrogen Deposition Rates

Receptor	Predicted Annual Nitrogen Deposition Rate (kgN/ha/yr)		Proportion of EQS (%)			
	PC	PEC	Low EQS		High EQS	
			PC	PEC	PC	PEC
Moninea Bog	0.75	13.77	15.02	275.42	7.51	137.71
Lough Oughter and Associated Loughs	0.28	13.30	5.58	265.98	2.79	132.99
Lough Erne	0.47	22.73	4.68	227.28	3.12	151.52
Upper Lough Erne	0.47	22.73	4.68	227.28	3.12	151.52
Cladagh (Swanlinbar) River	0.22	15.76	-	-	-	-

Table 16 Cumulative Assessment - Predicted Annual Acid Deposition Rates

Receptor	Predicted Annual Acid Deposition Rate (keq/ha/yr)		Proportion of EQS (%)	
	S	N	PC	PEC
Moninea Bog	0.1061	0.0488	21.6	192.5
Lough Oughter and Associated Loughs	0.0427	0.0183	-	-
Lough Erne	0.0856	0.0300	1.0	16.6
Upper Lough Erne	0.0856	0.0300	1.0	16.6
Cladagh (Swanlinbar) River	0.0347	0.0145	-	-

The annual mean NO_x concentrations remain well below the relevant EQS of 30µg/m³ at all Natura 2000 and Ramsar sites within the zone of influence. Similarly, the annual mean SO₂ concentrations were below the EQS of 20µg/m³ at all sites within the initial zone of influence.

The 'in combination' effects increase the potential for significant impacts in relation to ammonia air concentrations, nitrogen deposition and acid deposition at Moninea Bog SAC.

The 'in combination' effects increase the potential for significant impacts in relation to nitrogen deposition at Lough Oughter and Associated Loughs SAC. Similarly the potential for impacts in relation to acid deposition at both the Upper Lough Erne SAC and Upper Lough Erne Ramsar site are also increased in the cumulative assessment.

6 ASSESSMENT OF SIGNIFICANCE - SCREENING MATRIX

Having laid out the site features and known threats above for Natura 2000 sites within the zone of influence that could be impacted by the proposal, the Significance of Impact Matrix (Table 17) provides an analysis of the potential for the proposal to result in a significant adverse effect on the Natura 2000 site taking account of the known threats to the site listed above. It is important to note at this stage that a potential significant effect can only be ruled out if there is considered to be no risk; any uncertainty must result in potential significant effect being assumed.

Table 17 Significance of Impact Matrix for Natura 2000 sites potentially affected by Ballyconnell Cement Plant

Interest feature	Conservation objective	Impact type	Potential Cause	Potential Significant Effect?
Moninea Bog SAC				
Active raised bog	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	Ammonia Air Concentrations	Emissions from the cement plant	Possible significant effect
		Nitrogen Deposition		Possible significant effect
		Acid Deposition		Possible significant effect
Lough Oughter and Associated Loughs SAC				
Bog Woodland	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	Nitrogen Deposition	Emissions from the cement plant	Possible significant effect
Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation		Acid Deposition		Possible significant effect
		Nitrogen Deposition		No potential significant effect
		Acid Deposition		No potential significant effect
		Water quality change	Changes to discharge from the site	No potential significant effect
Upper Lough Erne SAC / Ramsar site				
Natural eutrophic lakes with Magnopotamion or Hydrocharition	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	Nitrogen Deposition	Emissions from the cement plant	No potential significant effect
Old sessile oak woods with Ilex and Blechnum in the British Isles		Nitrogen Deposition		Possible significant effect
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)		Nitrogen Deposition		No potential significant effect

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Interest feature	Conservation objective	Impact type	Potential Cause	Potential Significant Effect? for
Natural eutrophic lakes with Magnopotamion or Hydrocharition		Water quality change	Changes to discharge from the site	No potential significant effect
Cladagh (Swanlinbar) River SAC				
Watercourses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.	Air quality impacts	Emissions from the cement plant	No potential significant effect
Freshwater pearl mussel Margaritifera margaritifera		Air quality impacts		No potential significant effect
Upper Lough Erne SPA				
Whooper swan	To maintain or restore the favourable conservation condition of the Annex I species for which the SPA has been selected.	Water quality change	Changes to discharge from the site	No potential significant effect

Explanation of terms used in Significance of Impact Matrix.

Likely Significant Effect: Where a plan or project is likely to undermine any of the site's conservation objectives;

Possible Significant Effect: Where a plan or project has an indicated potential to undermine any of the site's conservation objectives, but where doubt exists about the risk of a significant effect in the current context. Nevertheless where doubt exists about the risk of a significant effect, use of the precautionary principle requires this effect to be considered appropriately within the screening process.

No Potential Significant Effect: Where there is considered to be no likelihood of any potential for a plan or project to undermine any of the site's conservation objectives.

6.1 Screening statement and conclusions

According to NPWS (2009), the Appropriate Assessment Stage 1: Screening exercise can result in one of three conditions:

- An Appropriate Assessment is not required i.e. where the plan/proposal is associated with the management of the site;
- There is no potential for significant effects i.e. Appropriate Assessment is not required;
- Significant effects are certain, likely or uncertain i.e. the project must either proceed to Stage 2: Appropriate Assessment or be rejected.

As displayed in the screening matrix (Table 16) it has been concluded that the potential for significant effects on three Natura 2000 sites cannot be ruled out at this stage. These are:

- **Moninea Bog SAC:**

The proposed alterations to the Ballyconnell cement plant has, both alone and in combination with the Gortmullan cement plant, the potential to cause significant effects on the Moninea Bog SAC due to projected increases in ammonia air concentrations, nitrogen deposition and acid deposition at this Natura 2000 site. The projected increases of these parameters exceed the relevant environmental quality standards at Moninea Bog SAC while the projected process contribution of the Ballyconnell cement plant exceeds the 1% threshold of these standards above which a potential effect must be considered significant.

- **Lough Oughter and Associated Loughs SAC:**

The proposed alterations to the Ballyconnell cement plant has, both alone and in combination with the Gortmullan cement plant, the potential to cause significant effects on the Lough Oughter and Associated Loughs SAC due to projected increases in nitrogen deposition at this Natura 2000 site. The projected increase of this parameter exceeds the relevant environmental quality standards at the Lough Oughter and Associated Loughs SAC while the projected process contribution of the Ballyconnell cement plant exceeds the 1% threshold of this standards above which a potential effect must be considered significant.

- **Upper Lough Erne SAC / Ramsar site**

The proposed alterations to the Ballyconnell cement plant has, both alone and in combination with the Gortmullan cement plant, the potential to cause significant effects on the Upper Lough Erne SAC/Ramsar site due to projected increases in nitrogen deposition at this Natura 2000 site. The projected increase of this parameter exceed the relevant environmental quality standard at the Upper Lough Erne SAC/Ramsar while the projected process contribution of the Ballyconnell cement plant exceeds the 1% threshold of the critical load for nitrogen deposition above which a potential effect must be considered significant.

STAGE 2: APPROPRIATE ASSESSMENT

7 ASSESSMENT OF POTENTIAL IMPACTS

The screening assessment concluded that potential significant effects on Moninea Bog SAC, Lough Oughter and Associated Loughs SAC and the Upper Lough Erne SAC/Ramsar site could not be ruled out at the screening stage. Table 18 shows the Designated Sites at which there is potential for significant effects and the causes for this potential.

Table 18 Designated Sites at which potential for significant effects could not be ruled out at screening stage and the causes for this potential

Designated Site	Potential Causes of Significant Effects
Moninea Bog SAC	Ammonia Air Concentrations
	Nitrogen Deposition
	Acid Deposition
Lough Oughter and Associated Loughs SAC	Nitrogen Deposition
Upper Lough Erne SAC / Ramsar site	Nitrogen Deposition

Subsequent to the findings of the Screening assessment it is necessary to undertake an Appropriate Assessment. The purpose of this assessment is to ascertain whether or not the proposal will have an adverse effect on the integrity of these Natura 2000 sites.

In relation to the assessment of the potential impacts of air emissions on the integrity of a Natura 2000 site further consideration is given to the assumptions of the air dispersion model, sensitivity of the features, uncertainties within the assessment etc. (Russell, et al. 2011)

7.1 Potential Impacts on Moninea Bog SAC

7.1.1 Conservation Interests of Moninea Bog SAC

The site is designated for the Annex I priority habitat Active raised bog (7110) which covers over 35ha at the site. The site also contains the associated Annex I habitats Degraded raised bog (7120) and Depressions on peat substrates of the *Rhynchosporion* (7150) (JNCC, 2014).

No specific conservation objectives have been published to date for Moninea Bog SAC. The general conservation objectives for Natura 2000 sites, therefore, apply;

To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- Active Raised Bog [7110]

7.1.2 Potential Impacts of Nitrogen Deposition

Following the air emissions risk assessment guidelines provided by the Environment Agency in relation to the screening process it has been established that emissions from the cement plant will result in potential significant negative changes to the following two parameters at Moninea Bog SAC;

- Ammonia air concentrations
- Nitrogen Deposition

These two parameters are in effect two different measurements for the same impact. Ammonia is one of the key pollutants that contribute to nitrogen deposition. Nitrogen deposition (measured in Kg/ha/y) is the combined measurement of two types of Nitrogen deposition, dry deposition which includes Ammonia (NH₃) and Nitrogen Oxide (NO_x), and wet deposition, which includes Ammonium (NH₄⁺) and Nitrate (NO₃⁻) (APIS, 2016). Because ammonia deposits as a gas, Critical levels have been derived to protect ecosystems, although, once deposited NH₃ gas represents part of the N load to that ecosystem (APIS, 2016).

Ammonia exposure is known to predispose sensitive plants to stress much faster than wet N deposition. Bog ecosystems, which consist primarily of plant species sensitive to nitrogen deposition, are therefore particularly vulnerable to ammonia deposition. Ammonia is an alkaline gas and bogs, which comprise largely of Sphagnum moss and peat, provide a large, wet and acidic sink for ammonia. Furthermore, many bog species have very high surface areas to mass which increases their capacity for uptake (Phoenix et al, 2012).

7.1.2.1 Historical Impacts of Nitrogen Deposition

2007 Assessment of Ammonia Impacts on Moninea Bog SAC

A report undertaken in 2007 documents the condition of Moninea Bog in relation to a local source of atmospheric ammonia pollution (Sutton, 2007). At the time of this report Garvary Lodge poultry farm was located immediately to the north west of Moninea Bog SAC and was considered to emit significant quantities of ammonia due to the large number of poultry that were kept at this farm (approximately 125,000 hens). The report did not document the exact magnitude of the emissions but focused instead on the impacts that these emissions had on the designated site (Sutton, 2007).

During the Report undertaken in 2007 the effects of ammonia on Moninea Bog were assessed using the following methods;

- Visual Assessment
 - Observations on the health of plant species known to be sensitive to ammonia (Lichens, Bryophytes, other ground flora);
 - The presence or absence of plant species known to be sensitive to ammonia;
 - The presence or absence of plant species known to favour high inputs of nitrogen or high ammonia concentrations;
 - The overall visual structure of the bog canopy and surface flora and the adjacent woodland canopy and surface flora.
- The collection of specimens for the analysis of nitrogen bioassays as bio indicators of atmospheric nitrogen deposition (and a comparison with specimens from a reference location over 40km away – an area of low nitrogen deposition)
- Measurements of atmospheric ammonia across Moninea Bog

Visual Assessment Results

The results from the visual assessment of the Moninea Bog SAC concluded that both the woodland adjacent to the open bog and the raised bog itself were significantly impacted by ammonia deposition. The most obvious impacts of excessive ammonia deposition was the loss of bog mosses (*Sphagnum sp.*) and Lichens (*Cladonia portenosia* and *C. uncialis*). The report states that within 200m downwind of Garvary Lodge poultry farm more than 90% of these species were eradicated or injured and within 400m downwind of the poultry farm this figure was 50%. The report states that the area least impacted by ammonia deposition was in the southern section of the bog furthest from Garvary Lodge poultry farm with between 10% and 20% of those species stated above being absent or injured. It was noted, however, that this area was subject to impact from grazing livestock (Sutton, 2007).

In addition to the observation made on bog mosses and lichens, observations on the relative abundance of vascular plants were consistent with ammonia deposition. Purple-moor grass *Molinea caerulea* and Common Cottongrass *Eriophorum angustifolium*, which benefit from increased ammonia deposition, were considered to be abundant across the site.

The results of the visual assessment undertaken in 2007 suggest the impacts on Moninea Bog SAC were at the time directly attributable to ammonia deposition resulting from emissions at the adjacent Garvary Lodge poultry farm. This is evident from the progressive deterioration in indicator species on approach to the farm and the waning of this impact with an increasing distance from the farm.

Chemical Bioassays

The results of the chemical bioassays taken in 2007 confirmed the relationship between severity of impacts related to ammonia deposition and proximity to Garvary Lodge poultry farm. The foliar nitrogen and ammonium values for samples taken at Moninea Bog decreases in relation to distance from Garvary Lodge poultry farm. All samples taken at the site had higher foliar nitrogen and ammonium values for samples taken at a clean reference site located approximately 41km North West of the bog.

Atmospheric Ammonia Monitoring

Similarly the results of the atmospheric ammonia modelling undertaken from 7th of February to the 30th of April 2007 confirm the relationship between Garvary Lodge poultry farm and the severity of ammonia deposition impacts at Moninea Bog SAC. 7 sampling locations were established on Moninea Bog with one established on a 'clean' reference site. Concentration of ammonia decreased exponentially with distance from the Garvary Lodge poultry farm. At the edge of the bog closest to the poultry farm ammonia concentrations recorded were in the range of 6.3 – 11.1 ug/m³ over the course of the three test periods while the smallest ammonia concentrations were recorded at the site furthest away from the farm 1.1 – 3.9 ug/m³.

2015 Condition Assessment Report of Moninea Bog SAC

As part of responsibility under Article 17 the Habitats Directive each member state is required to submit reports on the conservation status of those species and habitats targeted by the Directive. Condition assessments have been undertaken at Moninea Bog SAC by the NIEA for the purposes of this reporting in 2000, 2004, 2007, 2008 and 2015.

The following parameters have been assessed during the condition assessments; Extent, Structure, Vegetation Composition – Positive indicators, Vegetation composition – Indicators of Negative change, and Indicators of local distinctiveness. These parameters have been assessed using a number of different attributes. The failure of a single primary attribute results in an overall assessment of unfavourable condition.

The first Condition Assessment carried out on Moninea Bog in December 2000 assessed the bog as being in unfavourable conservation status. A modified Condition Assessment was then undertaken at the bog in October 2004 and again Moninea Bog was found to be in unfavourable conservation status due to the failure of set targets for the primary attribute Sphagnum moss cover. The 2007 results suggested deterioration in the condition of the bog since 2004, with four primary attributes failing; levels of bare peat were too high, grazing levels by cattle were too high and evidence of burning was recorded at the bog (NIEA, 2015). The 2015 Condition Assessment also found the bog to be in unfavourable conservation status. However, it has only failed on one primary attribute, which suggests an improvement in the condition of Moninea Bog SAC since 2007. Indication of grazing pressure, namely poaching, was recorded at 20% of the plots recorded and therefore could not be considered rare resulting in a failure of the indicators of negative change on vegetation composition (NIEA, 2015).

Table 19 summarises the results of a number of attributes used to assess Moninea Bog SAC during the 5 Condition Assessments undertaken between 2000 and 2015. Notably records for Sphagnum cover at Moninea Bog SAC have risen from 22% to 57.75% between 2007 and 2015 indicating a strong recovery of this key attribute during this time. Dwarf shrub height has also improved from an average height of 11 cm in 2007 to 17.15 cm in 2015. This decrease in ericoid cover from 2000/2004 appears to have coincided with an increase in graminoids, including Carex species. It is considered that this may be indicative of higher levels of grazing and higher levels of nutrients at the site, however, it is also noted that burning can produce similar impacts. The reduction of the cover of bare peat is also an indication of recovery at the site since to 2007 (NIEA, 2015).

Table 19 Summary Condition Assessment Results 2000, 2004, 2007, 2008 and 2015 (NIEA, 2015)

Attribute	Dec 2000	Oct 2004	Feb 2007	May 2008	June 2015
% Open Water	Not recorded	1	3	0.1	2.73
% <i>Sphagnum</i> Cover	25	19	22	32.25	57.75
% Thick <i>Sphagna</i>	6.8	4	4	10.65	9.75
% Thin <i>Sphagna</i>	18.2	14	16	19.95	45.20
% Aquatic <i>Sphagna</i>	0	0	2	1.65	2.8
% Ericoid Cover	54.25	56	43	45.25	43.75
% Living <i>Calluna</i>	35	32	25	25.5	21.25
% Dead <i>Calluna</i>	3.85	2	0	0	2.5
% <i>Erica tetralix</i>	15.4	22	18	19.75	20
% Graminoids	16.3	20	30	35.85	39.75
% <i>Narthecium</i>	12.75	24	20	19.85	29.72
% <i>Cladonia portentosa</i>	0.7	1	1	0.55	0.1
Dwarf Shrub Ht. (cm)	14.2	23	11	17.55	17.15
Permanent Pools	No	No	No	No	No
% Bare Peat	2.4	3	7	2.55	0.95
% <i>Rhynchospora alba</i>	Not recorded	2	10	4.85	2.45
Plots where poaching/dung was recorded as present (%)	65	5	55	50	20
% Trees/shrubs Cover	0	0	0	0.25	1.1

Threats/Pressures to Moninea Bog SAC

While the data recorded in 2015 suggests a recovery has occurred at the site since 2007 it is noted that it is difficult to assign causes to this recovery as a number of different threats and pressures have been responsible for degradation to the site in the past (NIEA, 2015), although it is known that the adjacent poultry house has been closed within the last 5 years. Peat cutting and burning have significantly contributed to the degraded condition of Moninea Bog SAC in the past and as it is suggested that these activities have now largely ceased. This will have contributed to recovery in the condition of the bog. While the impacts of grazing pressure have also contributed to the degradation of the bog the fall in the cover of bare peat between 2007 and 2015 may indicate that grazing pressure has reduced over this period (NIEA, 2015).

The lowest Sphagnum cover recorded at the site in 2015 was recorded in the north western corner of the bog adjacent to Garvary Lodge poultry farm. Similarly bare peat cover was high in this area of the bog, and all *Calluna vulgaris* and *Erica cineria* appear to be completely dead. Scrub encroachment was also recorded in this area of the bog during the 2015 Condition Assessment (NIEA, 2015).

7.1.4 Potential Impacts of Acid Deposition

Following the air emissions risk assessment guidelines provided by the Environment Agency in relation to the screening process it has been established that the emissions from the cement

plant have the potential to cause increased levels of acid deposition at Moninea Bog SAC. The results of the air dispersion model indicate that the predicted levels at Moninea Bog SAC will exceed the relevant critical load for acid deposition in bog habitats and that the PC of the proposed alterations to the Ballyconnell cement plant will be in excess of 1% of the relevant critical load and must therefore be considered significant.

Acid deposition results from increased atmospheric concentrations of sulphur dioxide (SO₂) and nitrogen. It can result in changes in vegetation composition affecting bryophytes, lichens and the species diversity of higher plant communities. Particularly significant for bog habitats such as the Annex I habitat Active raised bog (7110) is the potential for the loss of Sphagnum species which are the drivers of bog growth (APIS, 2016).

Regarding the Moninea Bog SAC and the potential impacts of Acid deposition it is stated on the APIS website that '*Leaching will cause a decrease in soil base saturation, increasing the availability of Al³⁺ ions, mobilisation of Al³⁺ may cause toxicity to plants and mycorrhiza, may have direct effect on lower plants (bryophytes and lichens)*' (APIS, 2016).

However, there is some debate within scientific literature regarding the nature and extent of impacts of anthropogenic acidity in relation to the natural acidity of these ecosystems (Wilson et al, 1995). Peat is a naturally acidic soil and acts as a major sink for NH₄⁺ and, to a lesser extent, SO₄. Also since the existing H⁺ pool in peats is so large, it may take years for sustained acid inputs to influence acidity, making assessment difficult (Black et. al 2010).

7.2 Potential Impacts on Lough Oughter and Associated Loughs SAC

7.2.1 Conservation Interests of the Lough Oughter and Associated Loughs SAC

The site is designated for the following Annex I habitats and Annex II species;

- Natural Eutrophic Lakes (3150)
- Bog Woodland (91D0)
- Otter *Lutra lutra* (1355)

7.2.3 Potential Impacts of Nitrogen Deposition

The Screening for Appropriate Assessment has identified that there is potential exceedance of the critical loads for Nitrogen deposition at the following habitat;

- Bog Woodland (91D0)

There is no specific guidance regarding the impacts of Nitrogen deposition on the Annex I Bog Woodland and, in the absence of this, the rich bryophyte nature of the habitat was acknowledged and the same critical threshold applied as for bog habitats.

7.3 Potential Impacts on Upper Lough Erne SAC

7.3.1 Qualifying Interests of the Upper Lough Erne SAC

The site is designated for the following Annex I habitats and species;

- Natural Eutrophic Lakes (3150)
- Old sessile oak woods with Ilex and Blechnum in the British Isles (91A0)
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) (91E0)
- Otter *Lutra lutra* (1355)

7.3.3 Potential Impacts of Nitrogen Deposition

The Screening for Appropriate Assessment has identified that there is potential exceedance of the critical loads for Nitrogen deposition at the following habitat;

- Old sessile oak woods with Ilex and Blechnum in the British Isles (91A0)

The APIS website states that exceedances of the critical load for nitrogen deposition for this habitat can cause a decrease in mycorrhiza, loss of epiphytic lichens and bryophytes and changes in ground vegetation (APIS, 2016).

7.4 Key Assumptions of Air Emissions Impact Assessment

The key assumptions of the air emissions impact assessment undertaken for the Screening for Appropriate Assessment process are discussed below. This includes a discussion and quantification of the uncertainties involved in the establishment of critical loads for nitrogen and acid deposition. This follows with a discussion of assumptions of the initial air dispersion model used during the Screening for Appropriate Assessment and the results of a sensitivity analysis conducted by Redmore Environmental Ltd.

7.4.1 Location of Conservation Interests of Natura 2000 sites

Where a Natura 2000 site fell within the area of influence of the cement plant, the potential impact on its conservation features was assessed on the assumption that those features sensitive to air pollution occurred at the nearest point. At this stage of the assessment it is appropriate to examine that assumption, notably since a number of the Natura 2000 sites are significant in extent. They are considered in turn below.

7.4.1.1 Location of Sensitive Receptors at Moninea Bog SAC

Moninea Bog SAC is designated for the Annex I habitat Active raised bog (7110). As Moninea Bog SAC is small (<1km²) it is likely that its primary qualifying interest, the Annex I habitat Active raised bog (7110) occurs within the specified zone of influence of the proposed developments at the Ballyconnell cement plant.

7.4.1.2 Location of Sensitive habitats at Lough Oughter and Associated Loughs SAC

The Annex I habitat Bog woodland (91D0) is identified as the only habitat for which the Lough Oughter and Associated loughs SAC is designated which is sensitive to nitrogen deposition and acid deposition.

The NPWS provide a dataset which maps the location and extent of the Bog woodland for the reporting period 2007 – 2012 (obtained as a download from www.NPWS.e). Figure 6 illustrates the distance between the proposed development and the nearest area of Bog woodland (91D0) which has been mapped during this reporting period. This map shows that the nearest known area of the Annex I priority habitat, Bog woodland (91D0) is outside of the exclusion zone used during the screening stage to determine a zone of influence for the proposed alteration to the cement plant. Consequently, this area of Bog woodland is not within the zone of influence of the proposal and therefore is unlikely to be impacted by the proposal.

7.4.1.3 Location of Sensitive Receptors at Upper Lough Erne SAC/Ramsar site

The following Annex I habitats for which the Upper Lough Erne SAC is designated have been identified as being sensitive to nitrogen deposition;

- Old sessile oak woods with Ilex and Blechnum in the British Isles (91A0)

Information on the distribution of woodland NVC types is available from the JNCC (JNCC website). Figure 6 below illustrates the distribution of woodland types recorded in this dataset in relation to the proposed zone of influence for this development. Woodland which corresponds to the Annex I habitat Old sessile Oak woods with Ilex and Blechnum in the British Isles (91A0) occurs within 10 km zone of influence.

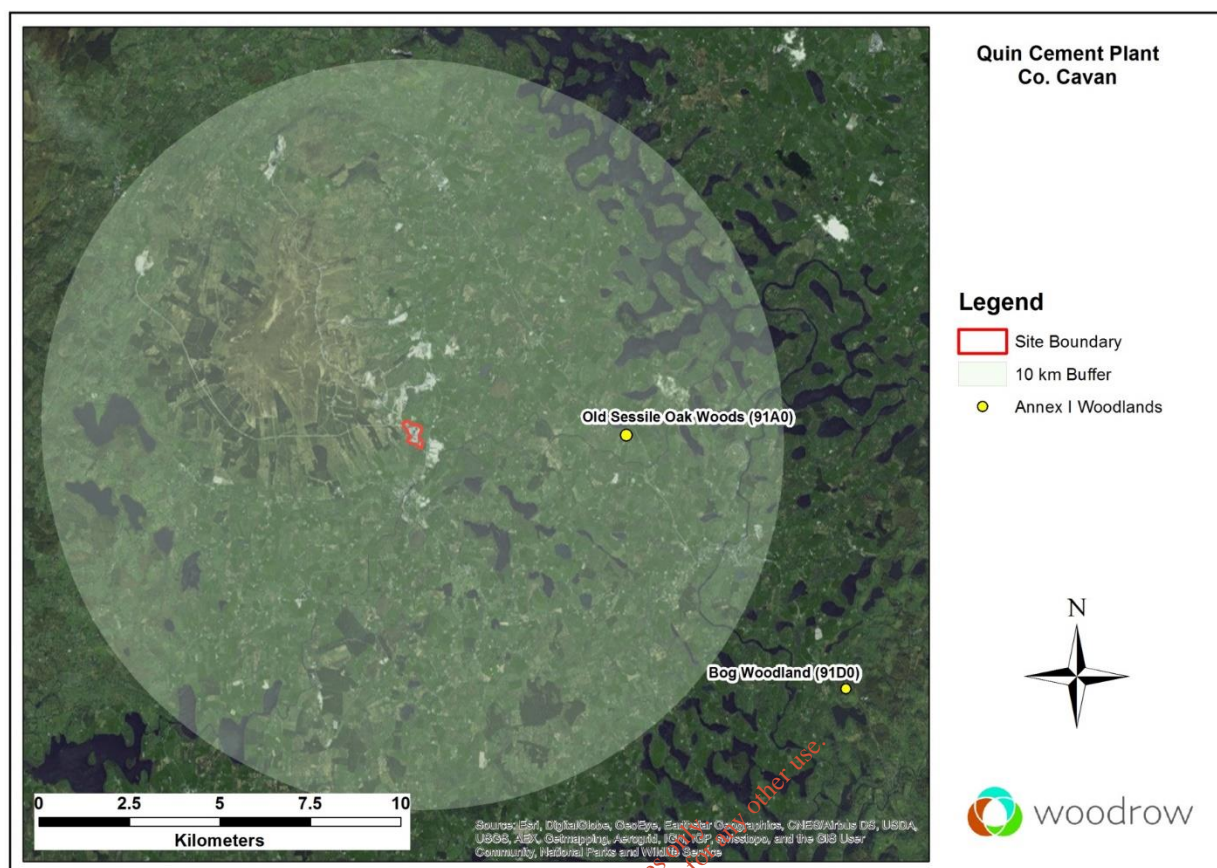


Figure 6 -The location of recorded stands of Annex I woodlands in relation to the zone of influence of the proposed development

7.4.1 Critical Loads

The *Review of Transboundary Air Pollution* (2012) states that uncertainties in critical loads are primarily due to uncertainties in the individual underlying datasets and the lack of detailed data on which to base model input parameters. The Environment Agency has conducted research aimed at quantifying the uncertainties in critical load assessment models (Skeffington et al. 2007). As measured data is available for only a tiny proportion of those 1km squares for which critical loads are identified most critical loads are calculated using modelled data which depend largely on accurate identification of the physical and biological characteristics of each mapped habitat, and accurate estimates of the deposition of acidifying and basic substances. Skeffington et al. (2007) states that using national data for sites for which measured data was available can lead to very different results to those which use the measurements. This suggests that applying the national critical loads data to individual sites can give rise to anomalous values, particularly for larger sites with variable soils and habitats and as such they may be inappropriate for site-specific assessments.

Skeffington et al. (2007) states that uncertainties in relation to critical loads can vary from one site to another with no single input parameter being identified as more important than another in this respect. However, a coefficients of variation for the entire dataset is provided which, it is stated, could be used as a rough guide as to the uncertainty in individual cases in the absence of other information (Skeffington et al. 2007). The data shows a coefficients of variation generally between 5% and 60%, with different values applicable to different nodes

on the critical load function: 30-60% for CL(A), 25-50% for CLmaxS, 10-35% for CLmaxN, 5-25% for CL minN (Skeffington et al. 2007).

7.4.1.1 Nitrogen Deposition Critical Loads

Skeffington et al. (2007) states that there is limited information available to estimate the uncertainties associated with empirical nutrient nitrogen critical loads. However as the critical load values for Nitrogen deposition for each EUNIS class are expressed as a range (eg. 5 – 10 kg N/ha/yr for bog habitats) this indicates a variation in sensitivity within an ecosystem.

Following Skeffington et al (2007) uncertainty in the critical load values for each EUNIS class is expressed qualitatively as “reliable”, “quite reliable” and “expert judgement”. Skeffington et al (2007) suggests using these qualitative categories can be used to further extend the range of uncertainty as follows;

- “reliable” use range as published
- “quite reliable” ± 5 kg N ha⁻¹ yr⁻¹ beyond the range
- “expert judgement” ± 10 kg N ha⁻¹ yr⁻¹ beyond the range

The critical load for bogs (EUNIS class D1) is treated as an exception to the above classification of uncertainty as the UK is using the upper limit of the range as its mapping value; to cover for this, the maximum was increased to 12 kg N/ha/yr to provide an estimate of uncertainty (Skeffington et al 2007). Table 20 shows the relevant critical load ranges and their certainty rating according to the APIS website (APIS, 2016).

Table 20 Critical Loads Ranges for Nitrogen Deposition (Skeffington et al 2007)

Natura 2000 Site	Conservation Interest	Relevant Critical Load Range	Certainty
Moninea Bog SAC	Active raised bog (7110)	5 – 12 kgN/ha/y	Reliable
Upper Lough Erne	Old Sessile Oak Woods	10-15 kgN/ha/y	Expert Judgment

7.4.1.2 Acid deposition Critical Loads

Moninea Bog SAC

Different methods are used to calculate acidity critical loads for different habitats in the UK. An empirical approach, based upon the mineralogy and weathering rate of the dominant soil in each 1 km x 1 km square is applied to non-woodland habitats on mineral or organo-mineral soils. However, where habitats occur on peat soils the critical load is based on the amount of acid deposition that would prevent the soil solution pH falling below pH 4.4 (RoTAP, 2012). This method sets the critical load to the amount of acid deposition that would give rise to an effective rain pH of 4.4, which reflects the buffering effects of organic acids upon peat drainage water pH (APIS, 2016)

Deposition of both S and N compounds can contribute to exceedance of acidity critical loads. The Critical Load Function (CLF) defines combinations of S and N deposition that will not

cause harmful effects. This requires the calculation of three acidity critical load values: the 'maximum critical load of sulphur' (i.e. the critical load in terms of S only (if N deposition was zero), taking into account base cation deposition to the soil system and base cation removal from the system), the 'minimum critical load of nitrogen' (i.e. the sum of the long-term N processes in the soil: removal and uptake by vegetation, N immobilisation and denitrification), the maximum critical load of N' (i.e. the critical load if S deposition was zero). These critical load values are calculated for mapped 1 km x 1 km squares of Broad Habitat sensitive to acidification using soil- and habitat-specific parameters (RoTAP, 2012).

In relation to Moninea Bog SAC the potential for variance within the SAC is relatively low given that the site is small (<1km) and the soil type within the confines of the SAC are predominately of one type i.e. peat. However, the results of the research undertaken by Skeffington et al (2007) indicate that without site specific input information there remains a margin of error in the calculation of critical loads for individual Natura 2000 sites which is significant and has the potential to reduce the PC to less than 1% of the critical load.

7.4.2 Sensitivity Analysis

The original dispersion model was produced to represent a worst case scenario as required by the EPA guidance. Redmore Environmental Ltd also conducted a sensitivity analysis which revised some of the key assumptions used in the original dispersion model and aimed to refine the model of outputs for the proposed alterations to the Ballyconnell cement plant (Redmore, 2016).

Quinn Cement envisages that operationally, the NH₃ emissions will be lower for a number of reasons. These reasons are as follows:

- The Emissions Limit Value (ELV) of 50mg/m³ for NH₃ is required to cover potentially high half hourly values that arise when the raw mill is off. The raw mill acts as a very effective scrubber for many potential pollutants from the gas stream including NH₃;
- Analysis from the facility shows that maximum half hourly values to date are close to 30mg/m³ in certain instances (e.g. when the raw mill is off). A review of plant operating data from November 2014 - March 2016 shows that maximum half hourly values ranged from 16.3 mg/m³ in February 2015 to 30mg/m³ in August 2015 when the ELV was reached. However, the average NH₃ emission for the same period, November 2014 - March 2016, was 7.1mg/m³;
- A flow rate at 615,000m³/hr was originally modelled as a maximum for the Ballyconnell cement plant. A flow rate of 501,000Nm³/hr is proposed as an average flow rate in the licence application;
- The Gortmullan Cement plant is included in the model with an NH₃ emission concentration of 50mg/m³. However, the plant does not currently operate and has not run since 2012. Furthermore, the plant does not currently have an ELV for NH₃, this emission has been included as a worst case scenario as it is envisaged that if the plant were to run a reduction in the NO_x ELV would be required. The model also includes the current ELV for NO_x in the Gortmullan permit (i.e. without any reduction due to SNCR) and is therefore again a worst-case scenario for NH₃ and NO_x;

- The model assumes a 24-hour / 365-days runtime for both cement plants. However, as detailed above, the Gortmullan plant has not run since 2012. Additionally, the maximum that either plant could operate is the industry benchmark of 330-days at 95% efficiency/utilisation to accommodate necessary and required plant maintenance shutdowns; and,
- A high raw mill run time of 85% at 4,200-tonnes/day kiln production is proposed for the Ballyconnell cement plant. When the raw mill is operating it acts to scrub NH₃ from the gas stream (Redmore, 2016).

7.4.2.1 Revision of outputs at Moninea Bog SAC

Nitrogen Deposition

Table 21 shows the result of the sensitivity analysis in relation to the predicted NH₃ Concentrations at Moninea Bog. It is predicted from the results of the sensitivity analysis that while the PEC would remain above the 1 µg/m³ critical level for the Active raised bog (7110) habitat the PC of the proposed alterations to the Ballyconnell cement plant would fall below 1% of this critical level and as such would not constitute a significant effect according to the guidance discussed in Section 2.1.1.

Similarly Table 22 shows the results of the sensitivity analysis in relation to the predicted level of nitrogen deposition at Moninea Bog SAC. It is predicted from the results of the sensitivity analysis that the PEC would remain significantly above the 5 kgN/ha/yr critical load relevant to the Active raised bog (7110) habitat at 13.08 kgN/ha/yr. The sensitivity analysis also predicts a decline in the PC of the Ballyconnell cement plant. The PC remains marginally above the 1% threshold at the low EQS but the PC is below 1% of the higher EQS and as such, predicted impacts are not considered to be significant.

Table 21 Results of Sensitivity analysis in relation to predicted Annual Mean NH₃ Concentrations

Receptor	Predicted Annual Mean NH ₃ Concentration (µg/m ³)		Proportion of EQS (%)	
	PC	PEC	PC	PEC
Moninea Bog	0.005	1.745	0.48	174.48

Table 22 Results of Sensitivity analysis in relation to predicted Annual Mean Nitrogen Deposition

Receptor	Predicted Annual Nitrogen Deposition Rate (kgN/ha/yr)		Proportion of EQS (%)			
	PC	PEC	Low EQS		High EQS	
			PC	PEC	PC	PEC
Moninea Bog	0.06	13.08	1.12	261.52	0.56	130.76

Acid Deposition

The original dispersion model was produced to represent a worst case scenario as required by the EPA guidance. Redmore Environmental Ltd also conducted a sensitivity analysis which revised some of the key assumptions used in the original dispersion model and aimed to refine the model of outputs for the proposed alterations to the Ballyconnell cement plant. Quinn Cement envisages that operationally, the NH3 emissions will be lower for a number of reasons as outlined previously.

Table 24 shows the minimum and maximum predicted annual acid deposition across 5 years of meteorological data. Although the sensitivity analysis predicts the acid deposition rates to be significantly lower than the initial air dispersion model, the predicted PC still exceeds the 1% threshold of the relevant critical load for Moninea Bog SAC with a predicted minimum value of 2.9% of the relevant critical load and a maximum value of 4.3 % of the critical load.

Redmore Environmental Ltd note that as the Ballyconnell cement plant is currently in operation and already emits acid gases this contribution will already be accounted for within the background levels for acid deposition at Moninea Bog SAC. Therefore, it is suggested that this introduces an element of double counting within the results. As such, actual deposition rates are likely to be lower than those predicted.

Table 24 Minimum and maximum predicted annual acid deposition rates of the sensitivity analysis (Redmore, 2016)

Receptor	Predicted Annual Acid Deposition Rate (keq/ha/yr)				Proportion of EQS (%)			
	S		N		PC		PEC	
	Min	Max	Min	Max	Min	Max	Min	Max
Moninea Bog	0.0207	0.0282	0.0029	0.0018	2.9	4.3	173.9	175.3

7.4.2.2 Revision of outputs at Upper Lough Erne SAC

Nitrogen Deposition

Table 25 shows the results of the sensitivity analysis in relation to the predicted level of nitrogen deposition at the Upper Lough Erne SAC. It is predicted from the results of the sensitivity analysis that the PEC would remain significantly above the 10 kgN/ha/yr critical load range which is relevant to the Old sessile oak woods with Ilex and Blechnum in the British Isles (H91A0) habitat at 22.29 kgN/ha/yr. However, the sensitivity analysis also predicts a decline in the PC of the Ballyconnell cement plant which drops the PC below the 1% threshold of the relevant critical load and would therefore not be considered significant under the screening guidelines stated in Section 2.1.1.

Table 25 Results of Sensitivity analysis in relation to predicted Annual Mean Nitrogen Deposition

Receptor	Predicted Annual Nitrogen Deposition Rate (kgN/ha/yr)		Proportion of EQS (%)			
	PC	PEC	Low EQS		High EQS	
			PC	PEC	PC	PEC
Upper Lough Erne SAC	0.03	22.29	0.29	222.89	0.19	148.59

7.5 Summary of Potential Impacts

Sections 7.1 to 7.4 discussed in detail the potential impacts on those Natura 2000 sites which were identified as being at risk of significant effect from the proposed alterations to the Ballyconnell cement plant during the Screening for Appropriate Assessment. These are summarised below.

7.5.1 Moninea Bog SAC

There is some potential for nitrogen deposition to have impacts on the Active raised bog (7110) habitat for which Moninea Bog SAC is designated. This habitat is sensitive to nitrogen deposition. Previous assessments of Moninea Bog SAC have shown that significant damage to the site has been caused by high concentrations of NH₃ in the past with an adjacent unlicensed poultry farm being identified as the source of this pollution. Subsequent to the failure of obtaining a license this farm is no longer an intensive poultry unit and a conservation assessment of Moninea Bog SAC undertaken in 2015 shows signs of recovery within the bog.

There is also potential for acid deposition to have impacts on the Active raised bog (7110) habitat for which Moninea Bog SAC is designated. Again, this habitat is considered sensitive to acid deposition, although there is some debate in the research as to the extent of the potential impacts caused by anthropogenic acid deposition on bog habitats.

Following a review of the key assumptions of the air emissions risk assessment process undertaken during the Screening Stage of the Appropriate Assessment process it has been established that:

- Moninea Bog SAC is a small site and as such its qualifying interests, namely Active raised bog (7110) remain inside the zone of influence of the proposal;
- The critical load which corresponds to the Active raised bog (7110) habitat is considered 'reliable' within the range of 5 – 12 kgN/ha/y;
- The sensitivity analysis shows a drop in the PC of ammonia concentrations at Moninea Bog SAC to below the 1% threshold of significance;
- The sensitivity analysis shows a drop in the PC of the Ballyconnell cement plant for nitrogen deposition. The PC remains marginally above the 1% threshold at the low EQS but the PC is below 1% of the higher EQS and as such, predicted impacts are not considered to be significant;
- The sensitivity analysis shows a drop in the PC of Acid deposition at the Moninea Bog SAC to min 2.9 %, max 4.3% of the relevant critical load, figures which remain above the 1% threshold of significance.

7.5.2 Lough Oughter and Associated Loughs SAC

Following a review of the key assumptions of the air emissions risk assessment process undertaken during the Screening Stage of the Appropriate Assessment process it has been established that:

- Records for the Bog Woodland (91D0) habitat, which was identified as the only receptor in this SAC sensitive to the potential impacts of nitrogen deposition, does not occur within the 10 km zone of influence and is therefore considered to be outside of the zone of influence of the proposed alterations to the cement plant.

7.5.3 Upper Lough Erne SAC/Ramsar site

Following a review of the key assumptions of the air emissions risk assessment process undertaken during the Screening Stage of the Appropriate Assessment process it has been established that:

- The Annex I habitat Old sessile oak woods with Ilex and Blechnum in the British Isles (H91A0), which is the only qualifying interest of this SAC considered to be sensitive to nitrogen deposition, occurs within the zone of influence of the proposal;
- The critical load which corresponds to the Old sessile oak woods with Ilex and Blechnum in the British Isles (H91A0) habitat is considered to require 'professional judgment' for its reliability at a given site and lies within the range of 10 – 15 kgN/ha/y;
- The sensitivity analysis shows a drop in the PC of nitrogen deposition at the Upper Lough Erne SAC to 0.56% of the relevant critical load for the Annex I habitat Old sessile oak woods with Ilex and Blechnum in the British Isles (H91A0). This is below the 1% threshold for significance.

8 IN-COMBINATION IMPACTS

8.1 Key Assumptions in Consideration of In-Combination Impacts

A number of assumptions are made in relation to in-combination impacts during the air emissions risk assessment undertaken during the Screening for Appropriate Assessment. Particularly it is reasonably assumed that all licensed facilities (bar the Gortmullan cement plant which is not currently operational) within the identified zone of influence are considered in the background figures provided by APIS for use in the air dispersion model.

Furthermore, Redmore Environmental Ltd suggest that there is potential for the Ballyconnell cement plant, which is currently in operation, to be already considered in those background figures. This would introduce an element of double counting within the subsequent air dispersion models conducted for the proposed alterations to the cement plant. Consequently, it is concluded that the PEC figures which are produced are likely to be over-estimated (Redmore, 2016).

9 CONCLUSION

Subsequent to the established guidance on the determination of adverse effects in relation to air emissions, this Natura Impact Statement has given further consideration to the modelling assumptions used in the screening assessment, the location of designated features, the sensitivity of those features, and the uncertainties within the assessment. Also, a sensitivity analysis, which offers a more detailed model to estimate the Process Contribution (PC) of the proposed development, provided by Redmore Environmental Ltd, has been considered in relation to potential for impacts on Natura 2000 sites.

Subsequent to this review the following conclusions can be drawn:

- There remains no potential for adverse impact on the integrity of Moninea Bog SAC by either nitrogen deposition or acid deposition
 - The sensitivity analysis indicates a PC of nitrogen deposition at Moninea Bog SAC of 0.06 Kg N/ha/y which is equivalent to 1.12% of the relevant low Environmental Quality Standards (EQS) or 0.56% of the high EQS. Predicted impacts are therefore not considered to be significant.
 - The sensitivity analysis shows a PC of acid deposition at the Moninea Bog SAC of between 2.9% to 4.3% of the relevant critical load. No guidance is provided on what constitutes an adverse effect in relation to acid deposition but it is considered that the PC in this instance can be considered to be minor.
- There remains no potential for adverse impact on the integrity of the Lough Oughter and Associated Loughs SAC as the only qualifying interest which was considered sensitive to nitrogen deposition, Bog Woodland (91D0), does not occur within the zone of influence.
- There remains no potential for adverse impact on the integrity of the Upper Lough Erne SAC/Ramsar site with the sensitivity analysis indicating a PC of nitrogen deposition at Lough Erne SAC of 0.56% of the relevant critical load. This is below the 1% threshold for significance established during the screening report.

Therefore, this Natura Impact Statement has concluded that the proposed alterations to the Ballyconnell cement plant will not, beyond reasonable scientific doubt, adversely affect the integrity of any European Site (Natura 2000 site) whether directly, indirectly or cumulatively.

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Appendix B.9

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SITE NOTICE

APPLICATION TO THE ENVIRONMENTAL PROTECTION AGENCY FOR THE REVIEW OF A LICENCE

Quinn Cement Ltd., Scotchtown, Ballyconnell, Co. Cavan gives notice of an application to the Environmental Protection Agency (EPA) for a Review of Industrial Emissions (IE) Licence number P0378-02 for the Cement Works at Ballyconnell, Co. Cavan (National Grid Reference 227500E, 320500N).

This Application for a Licence Review is to allow for an increase in the range and quantity of alternative fuels and alternative raw materials used at the existing Ballyconnell Cement Facility.

The classes of Industrial Emissions Directive activity in accordance with the First Schedule to the Environmental Protection Agency Act 1992 as amended are as follows:

10.2 Production of cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day or in other kilns with a production capacity exceeding 50 tonnes per day.

11.1 The recovery or disposal of waste in a facility within the meaning of the Act of 1996, which facility is connected or associated with another activity specified in this Schedule in respect of which a licence or revised licence under Part IV is in force or in respect of which a licence under the said Part is or will be required.

11.3 Disposal or recovery of waste in waste incineration plants or in waste co-incineration plants - (a) for non-hazardous waste with a capacity exceeding 3 tonnes per hour, (b) for hazardous waste with a capacity exceeding 10 tonnes per day.

11.6 Temporary storage of hazardous waste, (other than waste referred to in paragraph 11.5) pending any of the activities referred to in paragraph 11.2, 11.3, 11.5 or 11.7 with a total capacity exceeding 50 tonnes, other than temporary storage, pending collection, on the site where the waste is generated.

An Environmental Impact Statement (EIS) and Natura Impact Statement (NIS) will be submitted to the Agency with the application. The Environmental Impact Statement, Natura Impact Statement and any further information relating to the effects on the environment of emissions from the activity which may be furnished to the Agency in the course of the Agency's consideration of the application, will be available at the headquarters of the Environmental Protection Agency, Johnstown Castle Estate, Co Wexford. The Environmental Impact Statement and Natura Impact Statement have also been submitted to Cavan County Council.

A copy of the application for this licence review may be inspected on the Agency's website or inspected at or obtained from the Headquarters of the Agency as soon as is practicable after the receipt by the Agency of the application for the licence.

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10.2 Production of cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day or in other kilns with a production capacity exceeding 30 tonnes per day.

11.1 The recovery or disposal of waste in a facility, within the meaning of the Act of 1996, which facility is connected or associated with another activity specified in this Schedule in respect of which a licence or revised licence under Part IV is in force or in respect of which a licence under the said Part is or will be required.

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Date: 19/5/2016
Company: Quinn Cement Limited
Licence No. : P0378-02

RE: Notification to Cavan County Council under Section 87(1)(a) of the EPA Acts 1992 and 2003

A Chara,

This notification is submitted to Cavan County Council in accordance with the requirements of Section 87(1)a of the EPA Acts 1992 to 2003. Quinn Cement Limited (227500, 320500) will submit information in support of the determination of an Industrial Emissions Licence Review Application to the Environmental Protection Agency.

The Review Application covers the following classes of activity:

10.2 Production of cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day or in other kilns with a production capacity exceeding 50 tonnes per day.

11.1 The recovery or disposal of waste in a facility, within the meaning of the Act of 1996, which facility is connected or associated with another activity specified in this Schedule in respect of which a licence or revised licence under Part IV is in force or in respect of which a licence under the said Part is or will be required.

11.3 Disposal or recovery of waste in waste incineration plants or in waste co-incineration plants - (a) for non-hazardous waste with a capacity exceeding 3 tonnes per hour, (b) for hazardous waste with a capacity exceeding 10 tonnes per day.

11.6 Temporary storage of hazardous waste, (other than waste referred to in paragraph 11.5) pending any of the activities referred to in paragraph 11.2, 11.3, 11.5 or 11.7 with a total capacity exceeding 50 tonnes, other than temporary storage, pending collection, on the site where the waste is generated.

A copy of the application for this licence review may be inspected on the Agency's website or inspected at or obtained from the Headquarters of the Agency as soon as is practicable after the receipt by the Agency of the application for the licence.

Kind Regards,
Yours Sincerely,

Colin Lunney

Environmental Advisor
On behalf of Quinn Cement
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