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IW-ER-LT0150

28th October 2014

Re: Callan Waste Water Discharge Licence Application (D0159-01)

Dear Deirdre French,

In response to the Regulation 18(3)(b) request for further information notice, dated the 15 September 2014.

Provide details of all storm water overflows and emergency overflows for the Callan agglomeration, including details of the overflow type, the location grid references (6E, 6N) of the overflow locations and discharge locations, and a map showing the locations.

Please see attached revised Section C Attachments, which provides the requested information.

There was a typographical error in Section C.1.1.3 of the original application where the reference to "Pipe Street" should have read "Mill Street Callan".

The photographs, drawings and co-ordinates submitted as part of the application are correct.

The reference "Cloheen Lane" has been added to the Surface Water Overflow and Pumping Station to tie it in to the drawings better.

A screening for Appropriate Assessment was undertaken on 22/08/2014 and the Agency determined that an Appropriate Assessment of the activity is required. The Agency acknowledges receipt of a Natura Impact Statement (NIS), submitted on 24/06/2011, however it is not to the satisfaction of the Agency. The NIS received does not address the impacts from the Callan agglomeration on the River Nore SPA. You are required to submit a revised NIS detailing the impact of the discharges from the Callan agglomeration on all relevant European Site(s).

Please see attached the Appropriate Assessment (Natura Impact Statement) Report for Callan agglomeration as requested.

Best Regards,



Gerry Galvin
Chief Technical Advisor

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Section C Attachments

Infrastructure and Operation

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C.1 Operational Information Requirements

C.1.1.1 P1 Primary Discharge Pipe



Photo KK-WWDL-210-C.1.1.1

Please refer to drawing **KK-WWDL-210-B.3.01** for location details

- If the storm Forward Feed Tanks in the WWTP are full then they overflow into the outlet pipe and to the river
- This occurrence only happens in long durations of heavy rainfall and it is monitored using the flow meters on the inlet and outlet of the WWTP.
- There are no immediate plans to cease the operation of this Storm overflow.

C.1.1.2 SWO Pumping Station at the River (Cloheen Lane)



Photo KK-WWDL-210-C.1.1.2

Please refer to drawing **KK-WWDL-210-B.5.01** for location details

- If the sumps over fills then the effluent can get to the river via this SWO pipe.
- With no flow meters in place it is difficult to determine compliance with regulations. This SWO is checked by the caretaker on a daily basis.
- There are no immediate plans to cease the operation of this overflow.

C.1.1.3 SWO at Mill Street



Photo KK-WWDL-210-C.1.1.3

Please refer to drawing **KK-WWDL-210-B.5.07** for location details

- The effluent flows through this SWO manhole on a channel. If the flow increases, some of the flow can decant over to a stream below.
- With no flow meters in place it is difficult to determine compliance with regulations. This SWO is checked by the caretaker on a daily basis.
- There are no available drawings of the overflow construction details
- There are no immediate plans to cease the operation of this overflow.

C.1.1.4 SWO at The Cross



Photo KK-WWDL-210-C.1.1.4

Please refer to drawing **KK-WWDL-210-B.5.08** for location details

- The effluent flows through this SWO manhole on the pipe below. If the flow increases, the level will rise and a portion of the flow can then reach the SWO outlet on the top left of the photo.
- With no flow meters in place it is difficult to determine compliance with regulations. This SWO is checked by the caretaker on a daily basis.
- There are no available drawings of the overflow construction details
- There are no immediate plans to cease the operation of this overflow.

C.1.2 Pumping Stations

C.1.2.1 Pumping Station at The River (Cloheen Lane)



Photo KK-WWDL-210-C.1.2.1

Please refer to drawing ~~KK-WWDL-210-B.5.01~~ for location details

Pumping Station Details: Operated By Kilkenny County Council

- 1. Number of duty and standby pumps?**
2 Pumps (1 Duty and 1 Standby)
2 x Flyght (5.5Kw)
- 2. The measures taken in the event of power failure.**
In the very unlikely scenario that both duty and standby pumps fail or in the event of power failure the pump sump will fill and over flow to the river. No alarm system is in place but pumps are inspected on daily basis as detailed in table **KK-WWDL-210-B.5.01**.
- 3. Pumping Station Storage Capacity**
Approx. 22.8m³
- 4. The Frequency and duration of activation of emergency overflow**
With no flow meters in place it is difficult to determine compliance with regulations. This SWO is checked by the caretaker on a daily basis.

C.1.2.2 Pumping Station at Kilkenny Road



Photo KK-WWDL-210-C.1.2.2

Please refer to drawing **KK-WWDL-210-B.5.02** for location details

Pumping Station Details: Operated by Kilkenny County Council

- 1. Number of duty and standby pumps?**
(2 Pumps 1 Duty & 1 Standby)
2 x ABS M15 (2kw)
- 2. The measures taken in the event of power failure.**
In the very unlikely scenario that both duty and standby pumps fail or in the event of power failure the pump, the pump sump will fill, overflow out of the sump and flood the area surrounding the pump sump and/or backup the inlet line to the sump.
- 3. Pumping Station Storage Capacity**
18.5 m³
- 4. The Frequency and duration of activation of emergency overflow?**
No Overflow Facility.

C.1.2.3 Pumping Station at Cannafahy



Photo KK-WWDL-210-C.1.2.3

Please refer to drawing **KK-WWDL-210-B.5.03** for location details

Pumping Station Details: Operated by Kilkenny County Council

- 1. Number of duty and standby pumps?**
(2 Pumps 1 Duty & 1 Standby)
2 x ABS M15 (2kw)
- 2. The measures taken in the event of power failure.**
In the very unlikely scenario that both duty and standby pumps fail or in the event of power failure the pump, the pump sump will fill, overflow out of the sump and flood the area surrounding the pump sump and/or backup the inlet line to the sump.
- 3. Pumping Station Storage Capacity**
18.5 m³
- 4. The Frequency and duration of activation of emergency overflow?**
No Overflow Facility.

C.1.2.4 Pumping Station at Collaire Court



Photo KK-WWDL-210-C.1.2.4

Please refer to drawing **KK-WWDL-210-B.5.04** for location details

Pumping Station Details: Privately Operated by Private

This pumping Station pumps directly to The PS at Friary Walk

- 1. Number of duty and standby pumps?**
2 pumps (1 Duty and 1 Standby)
2 x FDL YM 62-43 (2.2 kw)
- 2. The measures taken in the event of power failure.**
In the very unlikely scenario that both duty and standby pumps fail or in the event of power failure the pump, the pump sump will fill, overflow out of the sump and flood the area surrounding the pump sump and/or backup the inlet line to the sump.
- 3. Pumping Station Storage Capacity**
16m³
- 4. The Frequency and duration of activation of emergency overflow?**
No Overflow Facility

C.1.2.5 Pumping Station at Friary Walk



Photo KK-WWDL-210-C.1.2.5

Please refer to drawing **KK-WWDL-210-B.5.05** for location details

Pumping Station Details: Privately Operated by Private

This pumping Station takes the effluent from The PS at Collaire Court

1. Number of duty and standby pumps?

2 pumps (1 Duty and 1 Standby)
2 x ABS AFP 1041.1 M30/4D

2. The measures taken in the event of power failure.

In the very unlikely scenario that both duty and standby pumps fail or in the event of power failure the pump, the pump sump will fill, overflow out of the sump and flood the area surrounding the pump sump and/or backup the inlet line to the sump.

3. Pumping Station Storage Capacity

24m³

4. The Frequency and duration of activation of emergency overflow?

No Overflow Facility

C.1.2.6 Pumping Station at Tinnamona



Photo KK-WWDL-210-C.1.2.6

Please refer to drawing **KK-WWDL-210-B.5.06** for location details

Pumping Station Details: Privately Operated by Kilkenny County Council

1. **Number of duty and standby pumps?**
2 pumps (1 Duty and 1 Standby)
2 x ABS M15 (2kw)
2. **The measures taken in the event of power failure.**
In the very unlikely scenario that both duty and standby pumps fail or in the event of power failure the pump, the pump sump will fill, overflow out of the sump and flood the area surrounding the pump sump and/or backup the inlet line to the sump.
3. **Pumping Station Storage Capacity**
15m³
4. **The Frequency and duration of activation of emergency overflow?**
No Overflow Facility

C.2.1 Outfall Design and Construction

C.2.1 P1 Primary Discharge Point

Please refer to drawing **KK-WWDL-210-B.3.01** for location details.

There are no design detail criteria or construction details available for this discharge point.

C.2.2 Secondary Discharge Points

There are no Secondary Discharge points on this scheme.

C.2.3 Storm Water Overflows

Please refer to drawing **KK-WWDL-210-B.5.00 to B.5.10** for the storm water overflow location details.

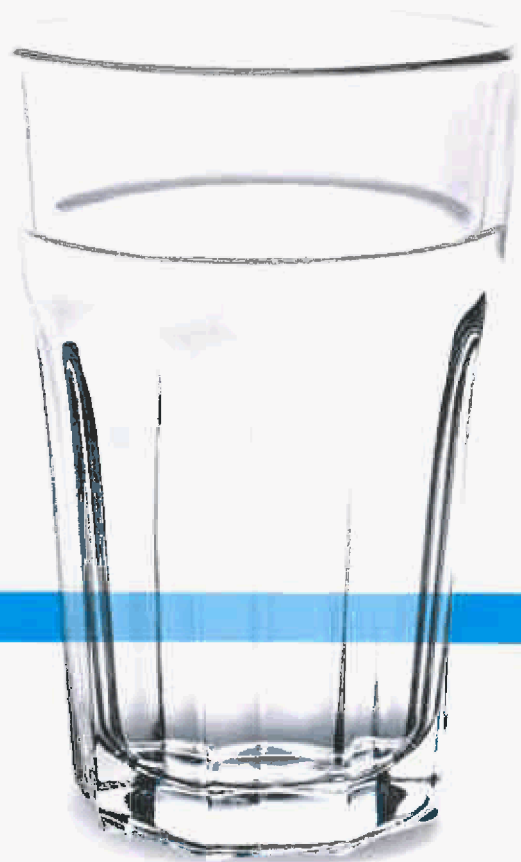
There are no design detail criteria or construction details available for these storm water overflow points.

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Irish Water Report

Natura Impact Statement as part of the Callan Waste Water
Discharge Licence Application: D0159-01

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Introduction

This Natura Impact Statement provides an Appropriate Assessment (AA) of the existing Waste Water Treatment Plant (WwTP), located at Callan, County Kilkenny, for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007), as amended. It assesses whether the on-going operation of the plant, alone or in combination with other plans and projects, is likely to have significant effects on a European Site(s) in view of best scientific knowledge and the conservation objectives of the site(s). European Sites are those identified as sites of European Community importance designated as Special Areas of Conservation under the Habitats Directive or as Special Protection Areas under the Birds Directive.

This report follows the guidance for AA published by the Environmental Protection Agency's (EPA) 'Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007)' (EPA, 2009); and takes account of the Department of the Environment, Heritage and Local Government's guidelines 'Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities' (DoEHLG, 2009) and Circular L8/08 'Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments' (DoEHLG, 2008).

Legislative Context

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, better known as "The Habitats Directive", provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/ECC) as codified by Directive 2009/147/EC.

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect Natura 2000 sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment (AA):

Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

Article 6(4) states:

If, in spite of a negative assessment of the implications for the [Natura 2000] site and in the absence of alternative solutions, a plan or project must nevertheless be carried out

for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

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Methodology

Guidance Followed

Both EU and national guidance exists in relation to Member States fulfilling their requirements under the EU Habitats Directive, with particular reference to Article 6(3) and 6(4) of that Directive. The methodology followed in relation to this AA has had regard to the following guidance:

- **Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007).** Environmental Protection Agency, (EPA, 2009).
- **Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities.** Department of Environment, Heritage and Local Government, (DoEHLG, 2010).
- **Circular L8/08 – Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments.** Department of Environment, Heritage and Local Government, (DoEHLG, 2008).
- **Communication from the Commission on the Precautionary Principle.** Office for Official Publications of the European Communities, Luxembourg, (EC, 2000a).
- **Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC,** Office for Official Publications of the European Communities, Luxembourg, (EC, 2000b).
- **Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC.** Office for Official Publications of the European Communities, Brussels (EC, 2001).
- **Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission.** Office for Official Publications of the European Communities, Luxembourg, (EC, 2007).
- **Nature and biodiversity cases: Ruling of the European Court of Justice.** Office for Official Publications of the European Communities, Luxembourg (EC, 2006).
- **Marine Natura Impact Statements in Irish Special Areas of Conservation: A working document,** National Parks and Wildlife Service, Dublin (NPWS, 2012).
- **European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No.477 of 2011).**
- **Interpretation Manual of European Union Habitats. Version EUR 28.** European Commission (EC, 2013).

Stages Involved in the Appropriate Assessment Process

Stage 1: Screening / Test of Significance

This process identifies whether the WwTP discharge is directly connected to or necessary for the management of a European Site(s); and identifies whether the discharge is likely to have significant impacts upon a European Site(s) either alone or in combination with other projects or plans.

The output from this stage is a determination for each European Site(s) of not significant, significant, potentially significant, or uncertain effects. The latter three determinations will cause that site to be brought forward to Stage 2.

Stage 2: Appropriate Assessment

This stage considers the impact of the WwTP discharge on the integrity of a European Site(s), either alone or in combination with other projects or plans, with respect to (1) the site's conservation objectives; and (2) the site's structure and function and its overall integrity. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts

The output from this stage is a Natura Impact Statement (NIS). This document must include sufficient information for the EPA to carry out the appropriate assessment. If the assessment is negative, i.e. adverse effects on the integrity of a site cannot be excluded, then the process must consider alternatives (Stage 3) or proceed to Stage 4.

Stage 3: Assessment of Alternatives

This process examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the European Site. This assessment may be carried out concurrently with Stage 2 in order to find the most appropriate solution. If no alternatives exist or all alternatives would result in negative impacts to the integrity of the European sites then the process either moves to Stage 4 or the project is abandoned.

Stage 4: Assessment Where Adverse Impacts Remain

An assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed.

Field Walkover Surveys

Field walkover surveys were undertaken during 29th of September 2014 to identify the potential for qualifying species and habitats in the surrounding environs of the WwTP discharge.

Consultation

The EPA, as the competent authority, will seek NPWS advice as may be required in reaching their decision on a WwTP discharge. The NPWS can only communicate with the applicant (i.e. Irish Water) on request from the competent authority, when the formal application process to the competent authority has already commenced.

Stage 1: Screening

Screening for Appropriate Assessment was undertaken by the Environmental Protection Agency who determined that an Appropriate Assessment of the existing discharge from the Callan WwTP is required due to the potential adverse impact on the qualifying interests of the River Barrow and River Nore SAC and the River Nore SPA. This determination was based on the following:

- The activity is not directly connected with or necessary to the management of those sites as European Sites; and
- It cannot be excluded, on the basis of objective scientific information, that the activity, individually or in combination with other plans or projects, will have a significant effect on a European Site and accordingly determined that an Appropriate Assessment of the activity is required.

Therefore, applying the Precautionary Principle and in accordance with Article 6(3) of the Habitats Directive, the current WwTP discharge at Callan will be brought forward for a Stage 2 Appropriate Assessment.

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Stage 2: Appropriate Assessment

The River Barrow and River Nore SAC and River Nore SPA, which has been determined as requiring AA, are described and all the potential impacts resulting from the Callan WwTP discharge are discussed in relation to the conservation objectives of these designated sites.

Description of the Project

Callan is located 16.5 Km South West of Kilkenny City. The N79 Clonmel to Kilkenny National Secondary route passes through the town.

The Waste Water Treatment Plant (WwTP) is located in the Eastern side of the town, approximately 0.5Km from the town centre and on the banks of the Kings River (242012E, 143524N). This plant was newly upgraded in 2005 and has a capacity of 4,000 PE. The plant operates using Sequence Batch Reactors (SBR's). The layout of the WwTP is:

- Inlet Works;
- Screenings;
- Forward Feed Tank;
- 2 x SBR Tanks; and
- Sludge Holding Tank.

The SBR's work in a timed format. The sequences are:

- Fill, Mix and Aerate;
- Settlement Phase;
- Decant; and
- Desludge.

A full phase of each reaction takes approximately 5 hours. The two SBR's are both working but the phases are operated at different times. From the SBR's the final effluent then flows to the King's River by gravity. This is the only discharge pipe from the works. The SBR's are desludged on a regular basis to a sludge holding tank. The final sludge is thickened on site and is then transported to Kilkenny Main Drainage for disposal.

The influent from the agglomeration enters the treatment plant predominately through gravity. There are six pumping stations in the town which pump up to the WwTP. On the sewerage network there is three Storm Water Overflows, one from the pumping station at the river and two storm overflow weirs.

The area where the WwTP discharges to the King's River is designated as part of the River Barrow and River Nore SAC. Approximately 1.3 km downstream of the discharge location the King's River is also designated as part of the River Nore SPA .

The standards for the final effluent are:

- BOD:** 25 mg/l (70-90% reduction);
- COD:** 125 mg/l (90% reduction);
- TSS:** 35 mg/l (90 % reduction);
- TN:** 15 mg/l N (70-80% Reduction); and
- TP:** 2 mg/l P (80% Reduction).

Based on 2013 monitoring data, the WwTP is not operating in compliance with the Urban Waste Water Regulations.

Description of the Receiving Environment and Monitoring Results

The WwTP discharges to the King's River. Monitoring data from both upstream and downstream of the discharge location demonstrates that the water quality within the King's River is not in compliance with Schedule 5 of the European Communities Environmental Objectives (Surface Water) Regulations 2009 (S.I. No. 272 of 2009). The BOD, Ammonia and Orthophosphate levels downstream of the WwTP discharge, are all above that for a Good Status water body. However, the upstream monitoring results indicate that the King's River has already been impacted prior to the WwTP discharge.

Table 1.0: Monitoring Data both Upstream and Downstream of WwTP Discharge

Parameter	EQS*	Upstream	Downstream
BOD	≤2.6	2.64	3.0
Ammonia (as NH ₃ – N)	≤0.14	0.082	0.14
Orthophosphate	≤0.075	0.056	0.10

*European Communities Environmental Objectives (Surface Waters) Regulations 2009, S.I. No. 272 of 2009 (95%ile standards presented).

EPA Biological Water Quality monitoring data shows that the current biological water quality upstream (approximately 0.5 km upstream of the discharge location at Station Bridge in Callan) is Q 4 which indicates Good Status water quality, and downstream (approximately 1.5 km downstream at Station 2 km d/s Callan – near Old Mill) is Q 3-4, which indicates Moderate Status water quality downstream of the WwTP discharge.

Waste Assimilative Capacity

Table 2.0 summaries the assimilative capacity calculations which are based on a loading of 2,921p.e., 95%ile river flow and water quality standards in the European Communities Environmental Objectives (Surface Water) Regulations, 2009 (S.I. No. 272 of 2009). Assimilative capacity calculations use both actual background concentrations and the 'notionally clean river' approach.

Table 2.0: Assimilative capacity calculations at estimated 2020 loadings of 2,921p.e. for actual background concentrations and for a notionally clean river.

Parameter		Background (mg/l)	Predicted downstream quality (mg/l)	EQS* (mg/l)
BOD	Actual Background	2.64	3.48	≤2.6
	Notionally Clean	0.260	1.10	
Ammonia	Actual Background	0.082	1.42	≤0.14
	Notionally Clean	0.008	1.34	
Orthophosphate	Actual Background	0.056	0.32	≤0.075
	Notionally Clean	0.005	0.27	

*European Communities Environmental Objectives (Surface Waters) Regulations 2009, S.I. No. 272 of 2009 (95%ile standards presented).

Using both the actual background concentrations and the notional clean approach demonstrates that the Kings River has very limited assimilative capacity to accept the current WwTP discharge.

Field Walkover Survey

Both upstream and downstream of the existing discharge location the King's River contained a glide / riffle habitat type, with the greater amount of riffle habitats located upstream of the discharge location. This stretch of the King's River had a good flow with a substratum type of cobbles, gravel and sand, with silt deposition in places. Water depth 0.2 – 0.5m, with a river width of 8 – 10m. In-stream vegetation was dominated by filamentous algae (an indication of eutrophication), both upstream and downstream of the discharge location, but also included Common club-rush (*Schoenoplectus lacustris*), Reed canary-grass (*Phalaris arundinacea*), Watercress (*Rorippa nasturtium-aquaticum*), *Ranunculus* spp. and Duckweed.

The bankside contains Sycamore (*Acer pseudoplatanus*), Willow (*Salix* spp.), Ash (*Fraxinus excelsior*), Hawthorn (*Crataegus monogyna*), Bramble (*Rubus fruticosus*), Ivy (*Hedera helix*) and riparian grasses. Both upstream and downstream of Callan the river was surrounded by pasture lands which appeared to be grazed up to the water edge in places. River is subject to 10% summer shading.

Field examination, including both upstream and downstream of the discharge location, revealed the presence of the Annex I habitat (see Table 3.0) both upstream and downstream of the discharge location:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation [3260].

And suitable habitats for the Annex II Species (see Table 4.0):

- Brook lamprey (*Lampetra planeri*) [1096];
- River lamprey (*Lampetra fluviatilis*) [1099];
- Salmon (*Salmo salar*) [1106]; and

- Otter (*Lutra lutra*) [1355].

Good spawning and nursery habitats are located along this stretch of the Kings River, both upstream and downstream of the discharge location. However, no salmonids were observed either upstream or downstream of the discharge location during the field surveys.

Otter are widespread throughout the River Nore catchment, however no otter signs (e.g. spraints, holt, prints) were recorded during the field surveys.

Approximately 2km downstream of the discharge location the King's River is designated as part of the River Nore SPA for Kingfisher. No Kingfisher nests/burrows were observed either upstream or downstream of the discharge location during the field surveys.

Description of the Natura 2000 Site Affected

River Barrow and River Nore SAC

This site consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom Mountains, and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford. The site passes through eight counties – Offaly, Kildare, Laois, Carlow, Kilkenny, Tipperary, Wexford and Waterford. Major towns along the edge of the site include Mountmellick, Portarlinton, Monasterevin, Stradbally, Athy, Carlow, Leighlinbridge, Graiguenamanagh, New Ross, Inistioge, Thomastown, Callan, Bennettsbridge, Kilkenny and Durrow. The larger of the many tributaries include the Lerr, Fushoge, Mountain, Aughavaud, Owenass, Boherbaun and Stradbally Rivers of the Barrow, and the Delour, Dinin, Erkina, Owveg, Munster, Arrigle and King's Rivers on the Nore.

Seventeen Red Data Book plant species have been recorded within the site, most in the recent past. These are Killarney Fern (*Trichomanes speciosum*), Divided Sedge, Clustered Clover, Basil Thyme (*Acinos arvensis*), Red Hemp-nettle (*Galeopsis angustifolia*), Borrer's Saltmarsh-grass, Meadow Barley, Opposite-leaved Pondweed (*Groenlandia densa*), Meadow Saffron/Autumn Crocus (*Colchicum autumnale*), Wild Clary/Sage, Nettle-leaved Bellflower, Saw-wort (*Serratula tinctoria*), Bird Cherry (*Prunus padus*), Blue Fleabane (*Erigeron acer*), Fly Orchid (*Ophrys insectifera*), Ivy Broomrape (*Orobanche hederæ*) and Greater Broomrape. Of these, the first nine are protected under the Flora (Protection) Order, 1999. Divided Sedge was thought to be extinct but has been found in a few locations in the site since 1990.

The site is very important for the presence of a number of E.U. Habitats Directive Annex II animal species including Freshwater Pearl Mussel (both *Margaritifera margaritifera* and *M. m. durrovensis*), White-clawed Crayfish, Salmon, Twaite Shad, three lamprey species – Sea Lamprey, Brook Lamprey and River Lamprey, the tiny whorl snail *Vertigo moulinsiana* and Otter. This is the only site in the world for the hard water form of the Freshwater Pearl Mussel, *M. m. durrovensis*, and one of only a handful of spawning grounds in the country for Twaite Shad. The freshwater stretches of the River Nore main channel is a designated salmonid river. The Barrow/Nore is mainly a grilse fishery though spring salmon fishing is good in the vicinity of Thomastown and Inistioge on the Nore. The upper stretches of the Barrow and Nore, particularly the Owenass River, are very important for spawning.

The site supports many other important animal species. Those which are listed in the Irish Red Data Book include Daubenton's Bat, Badger, Irish Hare and Common Frog. The rare Red Data Book fish species Smelt (*Osmerus eperlanus*) occurs in estuarine stretches of the site. In addition to the Freshwater Pearl Mussel, the site also supports two other freshwater mussel species, *Anodonta anatina* and *A. cygnea*.

The site is of ornithological importance for a number of E.U. Birds Directive Annex I species, including Greenland White-fronted Goose, Whooper Swan, Bewick's Swan, Bar-tailed Godwit, Peregrine and Kingfisher. Nationally important numbers of Golden Plover and Bar-tailed Godwit are found during the winter. Wintering flocks of migratory birds are seen in Shanahoe Marsh and the Curragh and Goul Marsh, both in Co. Laois, and also along the Barrow Estuary in Waterford Harbour. There is also an extensive autumnal roosting site in the reedbeds of the Barrow Estuary used by Swallows before they leave the country. The old oak woodland at Abbeyleix has a typical bird fauna including Jay, Long-eared Owl and Raven. The reedbed at Woodstown supports populations of typical waterbirds including Mallard, Snipe, Sedge Warbler and Water Rail.

Land use at the site consists mainly of agricultural activities – mostly intensive in nature and principally grazing and silage production. Slurry is spread over much of the area. Arable crops are also grown. The spreading of slurry and fertiliser poses a threat to the water quality of the salmonid river and to the populations of E.U. Habitats Directive Annex II animal species within the site. Many of the woodlands along the rivers belong to old estates and support many non-native species. Little active woodland management occurs. Both commercial and leisure fishing takes place on the rivers. There is net fishing in the estuary and a mussel bed also. Other recreational activities such as boating, golfing and walking, particularly along the Barrow towpath, are also popular. There is a golf course on the banks of the Nore at Mount Juliet and GAA pitches on the banks at Inistioge and Thomastown. There are active and disused sand and gravel pits throughout the site. Several industrial developments, which discharge into the river, border the site. New Ross is an important shipping port. Shipping to and from Waterford and Belview ports also passes through the estuary.

The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, over-grazing within the woodland areas, and invasion by non-native species, for example Cherry Laurel (*Prunus laurocerasus*) and Rhododendron (*Rhododendron ponticum*). The water quality of the site remains vulnerable. Good quality water is necessary to maintain the populations of the Annex II animal species listed above. Good quality is dependent on controlling fertilisation of the grasslands, particularly along the Nore. It also requires that sewage be properly treated before discharge. Drainage activities in the catchment can lead to flash floods which can damage the many Annex II species present. Capital and maintenance dredging within the lower reaches of the system pose a threat to migrating fish species such as lamprey and shad. Land reclamation also poses a threat to the salt meadows and the populations of legally protected species therein.

Overall, the site is of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive. Furthermore it is of high conservation value for the populations of bird species that use it. The occurrence of several Red Data Book plant species including three

rare plants in the salt meadows and the population of the hard water form of the Freshwater Pearl Mussel, which is limited to a 10 km stretch of the Nore, add further interest to this site.

Description of the Conservation Interests of the SAC

Annex I Habitats

The River Barrow and River Nore SAC contains fourteen Annex I habitats:

- Estuaries (1130);
- Mudflats and sandflats not covered by seawater at low tide (1140);
- *Salicornia* and other annuals colonizing mud and sand (1310);
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330);
- Mediterranean salt meadows (*Juncetalia maritimi*) (1410);
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260);
- European dry heaths (4030);
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430);
- Petrifying springs with tufa formation (Cratoneurion) (7220);
- Old sessile oak woods with *Ilex* and *Blechnum* in British Isles (91A0); and
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) (91E0);

Of these habitats, the Callan WwTP discharge is assessed as having the potential to impact on floating river vegetation (Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion*) and Hydrophilous tall herb fringe communities only, as these habitats are dependent on water quality. The petrifying springs are groundwater dependent habitats, whereas the old sessile oak woods, dry heaths and alluvial forest habitats are all terrestrial habitats. The estuaries, mudflats and sandflats, *Salicornia*, Atlantic and Mediterranean salt meadows are all estuarine/marine habitats which are located a significant distance downstream of the discharge location. Water quality from discharges does not threaten these other habitats for which the site has been selected to the same degree with little/no potential for adverse effects, and no changes to the conservation status of these habitats.

Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260) (floating river vegetation) is characterised by the abundance of water-crowfoots *Ranunculus* spp. Floating mats of these white-flowered species are characteristic of river channels in early to mid-summer. They may modify water flow, promote fine sediment deposition, and provide shelter and food for fish and invertebrate animals.

Hydrophilous tall herb fringe communities habitat occurs as a plant community of along unmanaged edges of slow-moving rivers. Nutrient levels may be naturally high in vegetative communities of this type. The main pressures associated with this habitat is grazing (particularly by cattle) as well as agricultural and industrial pollution. As a marginal habitat agricultural intensification and land reclamation are also deemed to be pressures (NPWS, 2013c).

Annex II Species

The River Barrow and River Nore SAC contains eleven Annex II Species:

- Desmoulin's whorl snail (*Vertigo moulinsiana*);
- Freshwater Pearl Mussel (*Margaritifera margaritifera*);
- White-clawed crayfish (*Austropotamobius pallipes*);
- Sea Lamprey (*Petromyzon marinus*);
- Brook Lamprey (*Lampetra planeri*);
- River Lamprey (*Lampetra fluviatilis*);
- Twaite shad (*Alosa fallax fallax*);
- Atlantic Salmon (*Salmo salar*) (only in fresh water);
- Otter (*Lutra lutra*);
- Killarney fern (*Trichomanes speciosum*); and
- Nore Pearl mussel (*Margaritifera durrovensis*).

Desmoulin's whorl snail (1016)

Desmoulin's whorl snail, with a shell height of about 2.5mm, is the largest of this group of whorl snails in Ireland. All whorl snails favour damp or wet habitats. Desmoulin's whorl snail is particularly sensitive to changes in water levels. In Ireland, the species mainly inhabits calcareous, lowland wetlands. It occurs in swamps, fens and marshes usually bordering rivers, canals, lakes and ponds where very humid conditions prevail. It lives on both living and dead stems and leaves of tall plants and requires a stable water-table.

There are two known sites for Desmoulin's whorl snail within the River Barrow and River Nore SAC; Borris Bridge, Co. Carlow and Boston Bridge, Kilmaseer, Co. Laois.

The NPWS (2013b) overall assessment of the conservation status of Desmoulin's whorl snail is 'Bad', with the overall trend in conservation status is 'Bad'.

Freshwater Pearl Mussel (1029)

The distribution of freshwater pearl mussel *Margaritifera margaritifera* is well known and mapped in Ireland. There have been no documented population extinctions since before the 1970s, therefore the species' range is stable. The population has been in decline for a very long time, and was likely initiated by early drainage schemes in Ireland (NPWS, 2013b). Pearl mussels have a complicated life cycle, involving native salmon or trout. The key cause of decline in pearl mussel populations in Ireland is unsuitable habitat for juvenile mussels after they fall off the gills of host salmonids (Moorkens, 1999). This stage requires the safety of remaining within the river bed gravels, before growing to a size that allows the emergence of the filtering siphons into the open water body. While the juvenile mussels remain within the river bed gravels, they filter the interstitial water within the gravels. Where the gaps between the gravel and stones get clogged with fine silt, either physical (from suspended solids entering the river) or organic (from algal growth and decay prompted by nutrients in the water), the flow of water in the interstices becomes very restricted. Without adequate water movement and replacement, oxygen levels are exhausted and young mussels die.

The status of the freshwater pearl mussel (*Margaritifera margaritifera*) as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review. The outcome of this review will determine whether a site-specific conservation objective is set for this species.

White-clawed crayfish (1092)

The King's River is within the known range of White-clawed crayfish *Austropotamobius pallipes* (Demers *et al.*, 2005) and occurs in the main channel of the River Nore. This species is recognised as being tolerant of moderate pollution levels; classed as Group C organisms in the EPA Q-Value biotic index.

There has been an improvement or no deterioration in the in the range and habitat quality and population of White-clawed crayfish in Ireland. As the greatest threat to the species is from disease and introduction of alien species and this is as likely in the future as now, the overall trend is considered stable. The overall assessment of the conservation status of White-clawed crayfish is 'Unfavourable Inadequate' (NPWS, 2013b).

Sea Lamprey (Petromyzon marinus)(1095) / River lamprey Lampetra fluviatilis (1099)

Sea lamprey *Petromyzon marinus* (1095) and River lamprey *Lampetra fluviatilis* (1099) are anadromous species, spending part of their life cycle in the marine environment and returning to natal watercourses to spawn. These species are likely to be confined to the lower reaches of the River Nore. Spawning of river lampreys starts when the water temperature reaches 10–11°C, usually in March and April (Morris & Maitland 1987). The sea lamprey usually spawns in late May or June, when the water temperature reaches at least 15°C (Maitland, 2003).

The NPWS (2013b) overall assessment of the conservation status of sea lamprey is 'Bad', with the overall trend in conservation status and the habitat status 'Good'. The status of river lamprey is evaluated as being of 'Favourable' conservation status nationally (NPWS, 2013b).

Brook Lamprey (Lampetra planeri) (1096)

The brook lamprey is the smallest of the three lampreys native to Ireland and it is the only one of the three species that is non-parasitic and spends all its life in freshwater (Maitland & Campbell, 1992). All three species of lamprey spawn in fresh waters, and juveniles of all three species, known as ammocoetes, are found within the same catchments, using similar microhabitats, but with varying geographical distribution. Lampreys show a preference for gravel-dominated substratum for spawning, and mainly silt and sand-dominated substratum for nursery habitat (Harvey & Cowx, 2003). The spawning season of brook lampreys starts when the water temperatures reach 10–11°C (Maitland, 2003). This usually occurs in March/April.

Brook lamprey is evaluated as being of 'Favourable' conservation status nationally (NPWS 2013b).

Brook lamprey is likely to occur in the King's River where suitable habitat occurs i.e. deposited sand and silt, which were recorded downstream of the discharge location.

Twaite Shad (1103)

Twaite Shad (1103) are one of the rarest fish species which breed in Irish freshwaters. Shad have an anadromous life cycle and have been recorded in the lower reaches of the River Barrow and River Nore.

Overall, the status of Twaite shad is considered Inadequate – Bad (NPWS, 2013b).

Atlantic Salmon (Salmo salar) (only in fresh water) (1106)

Salmon are present throughout the Barrow and Nore catchments. The Salmon Conservation Limit (CL) in any river is the number of spawning salmon required to maintain a sustainable population and is used to indicate the number of salmon in a river system above which a harvestable surplus can be considered. Salmon conservation limits are set similarly for all of Ireland's 143 salmon rivers. When the average threshold level of 17 salmon fry is not reached over a four year period, fisheries have been opened for catch and release angling only or the fishery is closed. The River Nore is currently considered to be above the conservation limit and consequently the fishery is open, whereas the River Barrow is below the conservation limit and consequently the fishery is open to catch and release of wild fish and harvesting of hatchery salmon only, over the forthcoming 2014 angling season.

The conservation status of salmon in the River Barrow and River Nore is dependent on good water quality status; as this species requires clean water (Q4) for spawning and early life stages in the fresh water only. This species is evaluated as being of overall 'Bad' conservation status nationally (NPWS 2013b).

Otter (Lutra lutra) (1355)

Otter is widespread in the River Barrow and River Nore SAC. Otters have two basic requirements: aquatic prey and safe refuges where they can rest. This species is dependent on fish stocks which are ultimately dependent on water quality. Otter signs were not recorded during the current survey downstream of the discharge location along the King's River.

The overall assessment of the conservation status of otter is 'Favourable' (NPWS, 2013b).

Killarney fern (1421)

Killarney fern is a large filmy fern, of deeply shaded habitats such as dripping caves, crevices on cliffs, gullies by waterfalls, and occasionally on damp woodland floors. Specialised microhabitat requirements mean that modifications to a site's hydrology, through pollution or woodland clearance, remain a threat.

Killarney fern is evaluated as being of 'Favourable' conservation status nationally (NPWS 2013b).

Nore Pearl mussel (1990)

The population stretches from Poorman's Bridge to Lismaine Bridge, along a 15.5km stretch of the main channel of the River Nore, with most of the population found between Poorman's Bridge and the Avonmore Creamery above Ballyragget (Moorkens, 1996). This stretch of the

River Nore is upstream of the confluence with the King's River, and therefore, cannot be impacted by the Callan WwTP discharge.

The extant wild population of Nore freshwater pearl mussel is estimated as 300 adult individuals (Moorkens, 2009).

River Nore SPA

The River Nore SPA is a long, linear site that includes the following river sections: the River Nore from the bridge at Townparks, (north-west of Borris in Ossory) to Coolnamuck (approximately 3 km south of Inistioge) in Co. Kilkenny; the Delour River from its junction with the River Nore to Derrynaseera bridge (west of Castletown) in Co. Laois; the Erkina River from its junction with the River Nore at Durrow Mills to Boston Bridge in Co. Laois; a 1.5 km stretch of the River Goul upstream of its junction with the Erkina River; the Kings River from its junction with the River Nore to a bridge at Mill Island, Co. Kilkenny. The site includes the river channel and marginal vegetation.

For a large part of its course the River Nore traverses Carboniferous limestone plains; it passes over a narrow band of Old Red Sandstone rocks below Thomastown.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive of special conservation interest for the following species: Kingfisher.

A survey in 2010 recorded 22 pairs of Kingfisher (based on 16 probable and 6 possible territories) within the SPA. Other species which occur within the site include Mute Swan (35), Mallard (267), Cormorant (14), Grey Heron (45), Moorhen (14), Snipe (17) and Sand Martin (1,029) – all figures are peak counts recorded during the 2010 survey.

The River Nore SPA is of high ornithological importance as it supports a nationally important population of Kingfisher, a species that is listed on Annex I of the E.U. Birds Directive.

Table 3.0: Qualifying Habitats along Surveyed Stretch

Site	Qualifying Habitats	Present	
		Upstream	Down stream
River Barrow and River Nore SAC	Estuaries	Upstream	No
		Down stream	No
	Mudflats and sandflats	Upstream	No
		Down stream	No
	<i>Salicornia</i>	Upstream	No
		Down stream	No
	Atlantic salt meadows	Upstream	No
		Down stream	No
	Mediterranean salt meadows	Upstream	No
		Down stream	No
	Floating river vegetation	Upstream	Yes
		Down stream	Yes
	European dry heaths	Upstream	No
		Down stream	No
Hydrophilious tall herbs	Upstream	No	

Site	Qualifying Habitats	Present	
		Down stream	No
	Petrifying springs	Upstream	No
		Down stream	No
	Old sessile oak woods	Upstream	No
		Down stream	No
	Alluvial forests	Upstream	No
		Down stream	No

Table 8.0: Qualifying Species along Surveyed Stretch

Site	Qualifying Species	Observed or signs of species presence		Suitable Habitat Present	
		Upstream	No	Upstream	No
River Barrow and River Nore SAC	Desmoulins whorl snail	Upstream	No	Upstream	No
		Downstream	No	Downstream	No
	Freshwater pearl mussel	Upstream	No	Upstream	Yes
		Downstream	No	Downstream	Yes
	Sea lamprey	Upstream	No	Upstream	No
		Downstream	No	Downstream	No
	Brook lamprey	Upstream	No	Upstream	Yes
		Downstream	No	Downstream	Yes
	River lamprey	Upstream	No	Upstream	No
		Downstream	No	Downstream	No
	Atlantic Salmon	Upstream	No	Upstream	Yes
		Downstream	No	Downstream	Yes
	Otter	Upstream	No	Upstream	Yes
		Downstream	No	Downstream	Yes
	White-clawed crayfish	Upstream	No	Upstream	Yes
		Downstream	No	Downstream	Yes
	Twaite	Upstream	No	Upstream	No
		Downstream	No	Downstream	No
Killarney fern	Upstream	No	Upstream	No	
	Downstream	No	Downstream	No	
Nore Pearl Mussel	Upstream	No	Upstream	No	
	Downstream	No	Downstream	No	
River Nore SPA	Kingfisher	Upstream	No	Upstream	No
		Downstream	No	Downstream	No

Conservation Objectives

Article 6 of the Habitats Directive states that:

Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications of the site in view of the site's conservation objectives.

The importance of a site designated under the Habitats Directive is defined by its qualifying features or interests. Qualifying interests for any Natura 2000 site are listed on a *pro forma*, called the Natura 2000 standard data form, which forms the basis of the rationale behind designation, and informs the Conservation Management Plan for targeted management and monitoring of key species and habitats.

River Barrow and River Nore SAC

The conservation objectives for the River Barrow and River Nore SAC are set out below:

1. To maintain the favourable conservation condition of Desmoulin's whorl snail in the River Barrow and River Nore SAC;
2. The status of the freshwater pearl mussel (*Margaritifera margaritifera*) as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review. The outcome of this review will determine whether a site-specific conservation objective is set for this species;
3. To maintain the favourable conservation condition of White-clawed crayfish in the River Barrow and River Nore SAC;
4. To restore the favourable conservation condition of Sea Lamprey in the River Barrow and River Nore SAC;
5. To restore the favourable conservation condition of Brook Lamprey in the River Barrow and River Nore SAC;
6. To restore the favourable conservation condition of River Lamprey in the River Barrow and River Nore SAC;
7. To restore the favourable conservation condition of Twaite shad in the River Barrow and River Nore SAC;
8. To restore the favourable conservation condition of Salmon in the River Barrow and River Nore SAC;
9. To maintain the favourable conservation condition of Estuaries in the River Barrow and River Nore SAC;
10. To maintain the favourable conservation condition of the Mudflats and sandflats not covered by seawater at low tide in the River Barrow and River Nore SAC;
11. To maintain the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in the River Barrow and River Nore SAC;
12. To restore the favourable conservation condition of Atlantic salt meadows (*Glaucopuccinellietalia maritimae*) in the River Barrow and River Nore SAC;
13. To restore the favourable conservation condition of Otter in the River Barrow and River Nore SAC;
14. To restore the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in the River Barrow and River Nore SAC;
15. To maintain the favourable conservation condition of Killarney Fern in the River Barrow and River Nore SAC;
16. To restore the favourable conservation condition of the Nore freshwater pearl mussel in the River Barrow and River Nore SAC;
17. To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation in the River Barrow and River Nore SAC;

18. To maintain the favourable conservation condition of European dry heaths in the River Barrow and River Nore SAC;
19. To maintain the favourable conservation condition of Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels in the River Barrow and River Nore SAC;
20. To maintain the favourable conservation condition of Petrifying springs with tufa formation (*Cratoneurion*) in the River Barrow and River Nore SAC;
21. To restore the favourable conservation condition of Old oak woodland with *Ilex* and *Blechnum* in the River Barrow and River Nore SAC; and
22. To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) in the River Barrow and River Nore SAC

River Nore SPA

The conservation objectives for the River Nore SPA are set out below:

To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

- *Alcedo atthis* [breeding].

Impact Prediction

Impacts on Water Quality

The aquatic conservation interests of the River Barrow and River Nore SAC are directly dependant on the aquatic environment and as the Callan WwTP discharges to the King's River within the SAC designation, there is a connection between this facility and the ecological receptors in the King's River.

Elevated nutrient levels in the King's River, specifically Orthophosphates, Nitrates, Ammonia and also Suspended Solids are considered to be the most significant threats to the integrity and favourable conservation status of the SAC and the Annex II species for which it is designated.

As part of its rollover water quality monitoring, the EPA carries out biological monitoring on the King's River at the Bridge in Callan, approximately 0.5km upstream of the discharge location, and at the Station 2 km d/s Callan – near Old Mill, approximately 1.5km downstream of the discharge location. The current biological water quality upstream is Q 4 which indicates Good Status water quality, whereas the water quality downstream is Q 3-4 which indicates Moderate Status water quality. Monitoring data from both upstream and downstream of the discharge location demonstrates that the water quality within the King's River is not in compliance with Schedule 5 of the European Communities Environmental Objectives (Surface Water) Regulations 2009 (S.I. No. 272 of 2009). The BOD, Ammonia and Orthophosphate levels downstream of the WwTP discharge, are all above that for a Good Status water body. However, the upstream monitoring results indicate that the King's River has already been impacted prior to the WwTP discharge. Using both the actual background concentrations and the notional clean approach demonstrates that the Kings River has very limited assimilative capacity to accept the current WwTP discharge.

To comply with the measures in the Kings Water Management Unit action plan, an investigation into the CSO's is required and the capacity of the Callan WwTP should not be exceeded.

Cumulative impacts in the catchment possibly pose the greatest risk to the conservation objectives. The potential threat(s) of the Callan WwTP on water quality (long term or single event) is greatly increased when taken in combination with other water quality concerns in the catchment. For example there are 8 WwTP's which discharge to the Kings River. Other impacts which are likely to act cumulatively and impact on the SAC result from the following:

- Chemical fertiliser application to agricultural lands (the main fertilisers in use supply nitrogen, phosphorus, potassium and sulphur);
- Agricultural practices such as ploughing leads to greater mineralisation and nitrification, and in the case of old grassland, it can result in an increase in the release of nitrogen over a number of years (OECD, 1986);
- Artificial drainage increases nitrate leaching and reduce the morphological qualities of watercourses, thereby reducing the quality of habitat for flora and fauna;
- Endocrine disruptors in domestic sewage, including the main active component in the oral contraceptive pill, can interfere with the endocrine system of plants and animals which controls a wide range of processes including metabolism, growth and reproduction. Effects include a high degree of intersexuality downstream of sewage works (Routledge *et al.* 1998);
- Forestry may alter water quality indirectly through increased evaporation losses and hence an increase in solute concentrations;
- On-site wastewater treatment systems, poorly performing septic tank units and other small effluent systems can be significant sources of nutrients to rivers;
- Water abstraction from rivers can cause low flows, which can be directly damaging due to reducing flows and assimilation capacity;
- Point pressures including IPPC and mining;
- Quarries - there are 6 quarries in the Kings WMU.

Impacts on Annex I Habitats

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260]

Water quality (particularly phosphorus and nitrates) strongly influences the species composition, extent and condition of riverine plant communities. The key parameters include alkalinity, pH, nitrate, phosphate, potassium and suspended solids. Eutrophication is regarded as the major water quality issue currently affecting plant communities in British rivers (Environment Agency 2000). The process of eutrophication and its impact on macrophyte communities varies, depending upon river type and catchment. The effects of eutrophication on aquatic macrophytes are documented (Haslam 1978; Spink *et al.* 1993; Mainstone *et al.* 2000) as usually causing a shift in community composition and increased biomass. Increasing nutrient supply will lead to an overall reduction in the number of species, with a loss of *Ranunculus spp.* and an increase in pollution-tolerant species such as *Potamogeton pectinatus*, *Myriophyllum spicatum*, *Sparganium emersum*, *Schoenoplectus lacustris* and filamentous algae. More extreme nutrient increases lead to an overall impoverishment of the plant community, with algae dominating.

It is considered that the ongoing operation of the Callan WwTP plant is contributing to background quality pressures in the Kings River. This plant discharges directly to the River Barrow and River Nore SAC. According to NPWS (2008), discharges, fertilisation and water pollution are identified as the main pressures affecting floating river vegetation habitat. This has implications for the existing WwTP at Callan, which is contributing to cumulative impacts on background water quality in the Kings River. It is considered however that the ongoing operation of the Callan plant would have localised impacts in this habitat.

Table 5.0: Qualifying Habitats Potentially Impacted by WwTP Discharge

Qualifying Habitats	Potential Impacts	Brief Explanation	Mitigation required
Estuaries	No	The petrifying springs are groundwater dependent habitats, whereas the old sessile oak woods, dry heaths and alluvial forest habitats are all terrestrial habitats. The estuaries, mudflats and saltflats, <i>Salicornia</i> , Atlantic and Mediterranean salt meadows are all estuarine/marine habitats which are located a significant distance downstream of the discharge location. Water quality from discharges does not threaten these other habitats for which the site has been selected to the same degree with little/no potential for adverse effects, and no changes to the conservation status of these habitats.	No
Mudflats and sandflats	No		No
<i>Salicornia</i>	No		No
Atlantic salt meadows	No		No
Mediterranean salt meadows	No		No
European dry heaths	No		No
Hydrophilous tall herbs	No		No
Petrifying springs	No		No
Old sessile oak woods	No		No
Alluvial forests	No		No
Water courses of plain to montane levels	Yes	Water quality (particularly phosphorus and nitrates) strongly influences the species composition, extent and condition of riverine plant communities. Increasing nutrient supply will lead to an overall reduction in the number of species, with a loss of <i>Ranunculus spp.</i> and an increase in pollution-tolerant species	Yes

Impacts on Annex II Species

Desmoulin's Whorl Snail (1016)

Desmoulin's whorl snail is found in calcareous wetlands, usually adjacent to lowland rivers and lakes (Kerney, 1999). However, as it is not an aquatic species, it is not susceptible to changes in quality of river water.

Freshwater Pearl Mussel (1029)

The status of the freshwater pearl mussel (*Margaritifera margaritifera*) as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review. The outcome of this review will determine whether a site-specific conservation objective is set for this species.

White-clawed Crayfish (1092)

This species formerly occurred throughout much of the River Nore and tributaries (J. Lucey, *pers. comm.*). A decline in the crayfish population was first noted in 2001. Information from local anglers indicates that a considerable kill occurred around this time in, with accumulations of dead crayfish reported in areas of slack water in the main channel of the Nore and in the King's River. A crayfish survey on 8 river stretches in the Nore catchment established an absence of the species in all except the Ballyroan River (Sweeney, 2006). The Nore population of this species could, however, recover in time. In the present survey, good crayfish habitat was recorded in this watercourse. Demers *et al.* (2005) reported that over one third of the sites where crayfish were found were Q3-4 or less. A significant drop in water quality could negatively affect crayfish, if they were present.

Sea Lamprey (1095)/River Lamprey (1099)

These anadromous fish species are confined to the lower reaches of the River Nore and its tributaries close to the sea. Due to the geographical separation of the Callan WwTP and distance upstream of spawning and nursery areas of migratory lampreys, effluent discharged to the Kings River from the plant would not affect the status or distribution of Sea or River lampreys within the River Barrow and River Nore SAC. A significant drop in water quality could negatively affect any lamprey present.

Brook Lamprey (1096)

Water quality impacts downstream of the Callan WwTP outfall would not be expected to have significant negative impacts on existing brook lamprey populations, as they would tolerate such pollution. Such pollution would however be expected to affect recruitment of this species as they are understood to require a high standard of water quality for successful spawning and ova survival. Water quality impacts arising from the operation of the WwTP and storm water discharges would be expected to have direct impacts on existing brook lamprey populations, particularly in relation to recruitment within the stretch of the Kings River downstream of the discharge point. However, brook lampreys can be expected to be found throughout the SAC and other tributaries of the river and have a favourable conservation status nationally. In this respect, it is unlikely that the ongoing operation of the Callan WwTP would have the potential to affect the integrity of this SAC conservation interest.

Twaite Shad (1103)

Twaite shad is an anadromous fish which enters large estuaries in late April or May to spawn in gravels near the end of the freshwater reaches (Whelan, 1989). Doherty *et al.* (2004) state that in Ireland the only known spawning location for Twaite shad is in the River Barrow. Adult Twaite shad are also known to occur in the lower parts of the River Nore, although spawning has not

been confirmed here in recent years. Threats to Irish shad populations include deterioration of water quality and habitat degradation. Given the distance from Callan WwTP to the upstream end of the tidal range (c. 33km), no impacts are considered likely.

Atlantic Salmon (1106)

Poor water quality will affect the conservation status of salmon in the Kings River, as this species requires clean water (Q4) for spawning and early life stages. The Callan WwTP is considered to be contributing to water quality problems in the Kings River. In this light, the Callan WwTP is affecting the potential of the Kings River as a salmon producing watercourse at a limited localised level at most. Overall, the conservation status of salmon in the River Barrow and River Nore SAC is not thought to be affected by the Callan plant discharge as this species has a wide range in the catchment and impacts from the plant appear to be localised only.

Otter (1355)

Reduced water quality and ecological status downstream of the discharge of the Callan WwTP could be potentially having indirect effects on otters; as a result of reduced food supply i.e. reduced macroinvertebrate and fisheries production. The otter is dependent on fish stocks, which are ultimately dependent on water quality. However, there is no indication that the ongoing operation of this plant is having an adverse effect on otters within the River Barrow and River Shannon SAC as a whole.

Killarney Fern (1421)

Killarney fern is a terrestrial species, found on very sheltered, damp rock faces (Stace, 1991) and could not be affected by the river water quality.

Nore Pearl Mussel (1990)

The population stretches from Poorman's Bridge to Lismaine Bridge, along a 15.5km stretch of the main channel of the River Nore, with most of the population found between Poorman's Bridge and the Avonmore Creamery above Ballyragget (Moorkens, 1996). This stretch of the River Nore is upstream of the confluence with the King's River, and therefore, cannot be impacted by the Callan WwTP discharge.

Kingfisher (River Nore SPA)

Reduced water quality and ecological status downstream of the discharge of the Callan WwTP could be potentially having indirect effects on kingfisher; as a result of reduced food supply i.e. reduced fisheries production. The kingfisher is dependent on fish stocks, which are ultimately dependent on water quality. However, there is no indication that the ongoing operation of this plant is having an adverse effect on kingfisher within the River Nore SPA as a whole.

Table 5.0: Qualifying Species Potentially Impacted by WwTP Discharge

Qualifying Species	Potential Impact	Brief Explanation	Mitigation Required
Desmoulins whorl snail	No	It is not an aquatic species, it is not susceptible to changes in quality of river water.	No
Freshwater pearl mussel	No	The status of the freshwater pearl mussel (<i>Margaritifera margaritifera</i>) as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review. The outcome of this review will determine whether a site-specific conservation objective is set for this species.	No
White-clawed crayfish	Yes	In the present survey, good crayfish habitat was recorded in this watercourse. Demers <i>et al.</i> (2005) reported that over one third of the sites where crayfish were found were Q3-4 or less. A significant drop in water quality could negatively affect crayfish, if they were present.	Yes
Sea lamprey/River lamprey	No	Due to the geographical separation of the Callan WwTP and distance upstream of spawning and nursery areas of migratory lampreys, effluent discharged to the Kings River from the plant would not affect the status or distribution of Sea or River lampreys within the River Barrow and River Nore SAC. A significant drop in water quality could negatively affect any lamprey present.	Yes
Brook lamprey	Yes	Water quality impacts arising from the operation of the WwTP and storm water discharges would be expected to have direct impacts on existing brook lamprey populations, particularly in relation to recruitment within the stretch of the Kings River. However, it is unlikely that the ongoing operation of the Callan WwTP would have the potential to affect the integrity of this SAC conservation interest.	Yes
Twaite shad	No	Threats to Irish shad populations include deterioration of water quality and habitat degradation. Given the distance from Callan WwTP to the upstream end of the tidal range (c. 33km), no impacts are considered likely.	No
Atlantic Salmon	Yes	The Callan WwTP is affecting the potential of the Kings River as a salmon producing watercourse at a limited localised level at most.	Yes
Otter	Yes	The otter is dependent on fish stocks, which are ultimately dependent on water quality. However, there is no indication that the ongoing operation of this plant is having an adverse effect on otters within the River Barrow and River Nore SAC as a	Yes

Qualifying Species	Potential Impact	Brief Explanation	Mitigation Required
		whole.	
Killarney fern	No	Killarney fern is a terrestrial species, found on very sheltered, damp rock faces (Stace, 1991) and could not be affected by the river water quality.	No
Nore Pearl Mussel	No	The population stretches from Poorman's Bridge to Lismaine Bridge, along a 15.5km stretch of the main channel of the River Nore, with most of the population found between Poorman's Bridge and the Avonmore Creamery above Ballyragget (Moorkens, 1996). This stretch of the River Nore is upstream of the confluence with the King's River, and therefore, cannot be impacted by the Callan WwTP discharge.	No
Kingfisher (River Nore SPA)	Yes	Reduced water quality and ecological status downstream of the discharge of the Callan WwTP could be potentially having indirect effects on kingfisher; as a result of reduced food supply i.e. reduced fisheries production. The kingfisher is dependent on fish stocks, which are ultimately dependent on water quality.	Yes

Mitigation Measures

Assuming notional clean water in the King's River, the receiving water does not have adequate waste assimilative capacity for the Callan WwTP. To comply with the measures in the Kings Water Management Unit Action Plan, an investigation into the CSO's is required and the capacity of the Callan WwTP should not be exceeded.

Mitigation Measures recommended for the ongoing operation of the existing plant are as follows:

- Ensure that the capacity of the WwTP is not exceeded;
- Optimisation of the current waste water treatment process and investigate further measures to reduce the levels of BOD, Ammonia and Orthophosphate currently being discharged from the plant; and
- Continuation of monitoring of the discharge, both upstream and downstream of the plant on a consistent regular basis. Annual biological water quality monitoring should also be undertaken upstream and downstream of the WwTP outfall. Any biological monitoring should be carried out during the summer / autumn periods.

Stage 2 Appropriate Assessment Conclusion Statement

The current Appropriate Assessment has been prepared following the EPA (2009) 'Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation)

Regulations, 2007 (S.I. No. 684 of 2007). The Department of the Environment, Heritage and Local Government guidance '*Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities*' (DoEHLG, 2009a) has also been taken into account. The current assessment for the Waste Water Discharge Licence Application investigates the potential adverse effects on the aquatic qualifying interests of the Natura 2000 network arising from the plant discharge, in combination with other plans / projects affecting the aquatic environment. The assessment considers whether the discharge, alone or in combination with other projects or plans, will have adverse effects on the *integrity* of a Natura 2000 site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects.

When the above mitigation measures are implemented in full, it is envisaged that there will be no significant adverse effects on the integrity of the River Barrow and River Nore SAC and the River Nore SPA in view of the site's conservation objectives and that the conservation status of the Annex I habitats and Annex II species will not be compromised by WwTP discharge either directly, indirectly or cumulatively.

It is therefore concluded that the Callan WwTP discharge, alone or in-combination with other plans and / or projects will not give rise to significant effects on the integrity of the River Barrow and River Nore SAC or the River Nore SPA, as long as the mitigation measures as listed above are implemented in full. Stage 2 concludes the Appropriate Assessment process of the Callan Waste Water Discharge Licence Application.

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