Appropriate Assessment of the Castlecomer Local Area Plan in Relation to the River Barrow and River Nore SAC

Colin Buchanan in association with Openfield Ecological Services

Kilkenny County Council
September 2008

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8 Windsor Place
Dublin 2
Ireland
Telephone: 01 669 0820
Fax: 01 669 0827
Email : Info@cbpirl.com

Prepared by:	Approved by:
Openfield Ecological Services	Aislinn O'Brien

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Summary

As per Annex 2 of EU's methodology (Oxford Brooke University, 2001)

Assessment of the effects of the project or plan on the integrity of the site

Describe the elements of the project or plan (alone or in combination with other projects or plans) that are likely to give rise to significant effects on the site (taken from the screening assessment)	1. Designating areas within the SAC as 'open space' could lead to direct loss of habitat 2. Surface water run-off from new developments could contribute to water pollution in the river Dinin 3. Further loss of hedgerows that connect the SAC to the surrounding countryside could lead to a small but cumulative impact on the populations of species of conservation importance
Set out the conservation objectives of the site	Conservation objectives are not defined for the site but can be taken as: 1. Maintain the area of key habitats within the sites 2. Maintain or achieve high standards of water quality 3. Maintain the populations of key species within the sites
Describe how the project or plan will effect key species and key habitats. Acknowledge uncertainties and any gaps in information.	Impacts of the Local Area Plan are ultimately dependant on the design and location of developments that arise from it. The precautionary principle is therefore employed and these impacts represent the worst case scenario: 1. Designating areas of SAC as 'open space' could lead to direct loss of habitat (potentially either Riparian woodland or Mixed broadleaved woodland) 2. Ingress of pollutants, particularly particulates and hydrocarbons could deteriorate water quality and impact upon water dependant species for which the site is designated. 3. Continued loss of hedgerow habitat serves to isolate the SAC from the surrounding countryside and this has impacts (albeit unquantifiable) on the health of important species within the site.

Describe how the integrity of the site (determined by structure and function and conservation objectives) is likely to be affected by the project or plan (e.g. loss of habitat, disturbance, disruption, chemical changes, hydrological changes and geological changes, etc.). Acknowledge uncertainties and any gaps in information.	1. Loss of important habitats through built development within the SAC, although the nature of this impact depends on the type, location, design and timing of any building works. 2. Pollution from surface water run-off has cumulative impacts on water quality. Many aquatic species are pollution sensitive and their populations may decline, or fail to recover, because of this. 3. Very difficult to quantify the impact to biodiversity in general through the loss of connectivity but this is cumulative and may lead to lower populations of key species.
Describe what mitigation measures are to be introduced to avoid, reduce or remedy the adverse effects on the integrity of the site. Acknowledge uncertainties and any gaps in information.	Five recommendations are made in total: 1. Designate all areas of SAC within the LAP boundary for 'biodiversity conservation' or some other similarly explicit title. 2. Ensure that any specific project that may have an impact on the SAC is thoroughly screened through the Appropriate Assessment process. 3. Ensure that the boundary of the SAC as defined by NPWS is fully respected regardless of the perceived importance of features therein. 4. Ensure that appropriate attenuation of pollution from surface water is integrated into all new developments that will discharge into the Dinin river, including SUDS (sustainable drainage systems) where appropriate. 5. Provide for the retention, enhancement and replanting of hedgerows for all new developments within the LAP. Specific mention should be made to the importance of native species and to avoid Cherry laurel in particular as it is invasive.

Results of Consultation

Agency contacted	Response
NPWS	Mr Jimi Conroy, Wildlife Ranger with NPWS was consulted from the early stages of the screening process. He was particularly keen to make the following points: 1. The SAC should stand out from the plan as an area of international conservation importance and not merely be included with other designated zonings. This does not preclude all development within the SAC. 2. An opportunity exists for the creation of wetland habitat that could effectively treat pollution from surface water run-off from a number of developments. This would avoid the need for separate attenuation measures for each individual project.
Southern Regional Fisheries Board	no response

1. Introduction

1.1.1 This report was prepared for Kilkenny County Council by OPENFIELD Ecological Services and Colin Buchanan in accordance with Article 6 of the Habitat Directive. It follows completion of Step 1 of the process, a Screening Statement which determines what impacts are likely on European Sites. The screening report for the Draft Castlecomer LAP was prepared in July 2008 and, in consultation with the National Parks and Wildlife Service, found that significant impacts may be likely to arise. This assessment triggered the need for Step 2: Appropriate Assessment. This report is the Appropriate Assessment with respect to the Draft Castlecomer Local Area Plan.

1.2 European Court of Justice Ruling

1.2.1 A recent European Court of Justice Ruling against Ireland (Case 418/04 EC Commission v Ireland) relates to Ireland's transposition and implementation of the Birds Directive 79/409/EEC, as well as its implementation of relevant articles of the Habitats Directive 92/43/EEC.

1.2.2 The findings of the Court have major implications for the way in which Ireland protects areas important for birds, both designated and undesignated, and by implication, habitats requiring protection under EU law. The ruling requires a more robust and thorough application by all consent authorities, including planning authorities, of the requirement to do an appropriate assessment of the ecological implications of any plan or project, whether within or outside a designated site, which does not directly relate to the management of the site but may impact upon its conservation objectives.

1.2.3 The ruling among other things clarifies that Ireland has not correctly transposed Article 6(3) and (4) of the Habitats Directive 92/43/EEC by not providing explicitly for appropriate assessment of land use plans, as opposed to projects.

1.3 Background to the Habitats Directive

1.3.1 The continuing deterioration of natural habitats and the threats posed to certain species are one of the main concerns of EU environment policy. To tackle these threats the European Community, in 1992, adopted Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive').

1.3.2 The main aim of the Habitats Directive is to promote the maintenance of biodiversity by defining a common framework for the conservation of wild plants and animals and habitats of community interest. Member States are obliged to take measures to maintain or restore natural habitats and wild species at a favourable conservation status and introduce robust protection for those habitats and species of European importance.

1.3.3 The Directive establishes a European ecological network known as "Natura 2000" which comprises special areas of conservation (SAC) which applies to Habitats and species other than birds, and special protection areas (SPA) classified pursuant to Directive 79/409/EEC on the conservation of wild birds (the 'Birds Directive').

1.3.4 Included in Annexes I (Natural habitat types of Community interest) and II (Animal and plant species of Community interest) of the Habitats Directive are

the lists of habitats and species whose conservation requires the designation of SACs. Some of them are defined as "priority" habitats or species (in danger of disappearing). Annex IV lists animal and plant species in need of particularly strict protection. There are 189 habitats in Annex I of the Directive and 788 species in Annex II. Member States must take all necessary measures to guarantee the conservation of habitats in SACs.

1.3.5 The application of the Habitats Directive involves the precautionary principle; that is that plans and projects can only be permitted having ascertained no adverse effect on the integrity of the site. Plans and projects may still, however, be permitted if there are no alternatives, and there are imperative reasons of overriding public interest as to why they should go ahead. In such cases compensatory measures will be necessary to ensure the overall integrity of network of sites.

1.4 Articles 6(3) and 6(4) of the Habitats Directive

1.4.1 Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans or projects affecting Natura 2000 sites and 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 for the site in view of the site's conservation objectives. 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.

If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest… the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected.'

1.5 The process

1.5.1 Appropriate Assessment is an assessment of the potential effects of a proposed plan - 'in combination' with other plans and projects on one or more European sites. Key stages of the process are set out in Table 1.1. Stages 1 and 2 relate to Article 6(3) of the Habitats Directive, and Stages 3 and 4 relate to Article 6(4).

Table 1.1: Habitats Regulations Assessment Process

Article 6(3)	**Stage 1:**	**Screening** Determining whether the plan - 'in combination' with other plans and projects – is likely to have an adverse effect on a European site.
	Stage 2:	**Appropriate Assessment** Determining whether, in view of the site's conservation objectives, the plan - 'in combination' with other plans and projects – would have an adverse effect (or risk of this) on the integrity of the site (s). If it doesn't, the plan can proceed.
Article 6(4)	**Stage 3:**	**Assessment of alternative solutions**

		Where the plan is assessed as having an adverse effect (or risk of this) on the integrity of a site(s), there should be an examination of alternatives.
	Stage 4:	**Assessment where no alternative solutions remain and where adverse impacts remain** The 'IROPI test' and compensatory measures

1.5.2 This document focuses primarily on Stage 1, screening and 2, Appropriate Assessment, with the aim of avoiding the need for the more detailed, complex and expensive alternatives and IROPI stages.

1.5.3 It is an iterative process that requires undertaking of repeated rounds of mitigation and assessment of impacts as the plan emerges until any adverse effects on European sites are completely avoided. Such an approach is consistent with the aims of the Habitats Directive, and is likely to minimise time delays and risks to the adoption of the plan.

Key Principles

The precautionary principle

1.5.4 The Habitats Regulations applies the precautionary approach. The precautionary principle requires authorities to act prudently to avoid the possibility of irreversible environmental damage in situations where the scientific evidence is inconclusive but the potential damage could be significant. The precautionary principle applies in all cases when judging the significance of adverse impacts. If information or evidence is lacking, then adverse effects should be assumed.

Hierarchy of Avoidance, Mitigation and Compensation

1.5.5 The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures – see Figure 1.1.

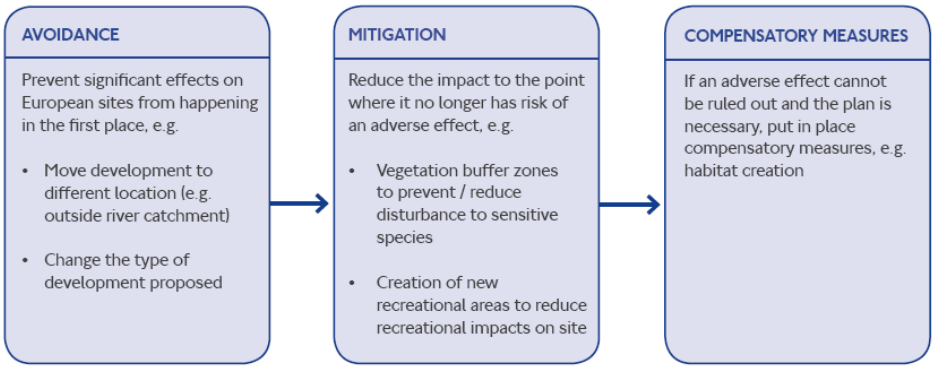

Figure 1.1: Hierarchy of Avoidance, Mitigation and Compensation (Scott Wilson et al., 2006)

2. Stage 1: Screening

2.1.1 A section of the River Barrow and River Nore SAC is situated within the boundary of the Plan. SACs form part of the European Union's (EU) Natura 2000 network of conservation sites and are of international importance (NRA, 2006) . These sites are designated under the EU's Habitats Directive (EC, 1992) and member states are required to maintain them in 'good conservation status'.

2.1.2 The methodology for screening stage referred to the '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' (Oxford Brookes University, 2001). In accordance with this guidance, the following methodology was used to compile the screening statement:

1. Management of the Site: determining whether the plan is necessary for the conservation management of the site in question.
2. Description of the Plan: describing the aspects of the plan that may have an impact on the Natura 2000 site.
3. Characteristics of the Site: identifies the conservation aspects of the site and determines whether negative impacts can be expected as a result of the plan. This is done through a literature survey and consultation with relevant stakeholders – particularly the National Parks and Wildlife Service and the Southern Regional Fisheries Board. Using the precautionary principle, and through consultation and a review of published data, it is normally possible to conclude at this point whether potential impacts are likely.
4. Assessment of Significance: Assessing whether an impact is significant or not is dependant on the ecological receptors in question in combination with the scale of the predicted impact. Guidance in this regard is available through the National Road Authority's 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA, 2006) and is best done in consultation with key stakeholders.

2.1.3 Since no field work was carried out to inform this screening study, the analysis is based on a combination of literature review and consultation. A full list of literature sources that have been consulted for this study is given in the **references** section to this report.

2.2 Consultation

Identification of Stakeholders

2.2.2 The National Parks and Wildlife Service (NPWS) and the Southern Regional Fisheries Board are considered the primary stakeholders relating to the site. The following consultation subsequently took place:

Table 2.1: Stakeholder Consultation

	Stakeholder (Name/Organisation)	**Form Of Consultation**
1	NPWS Development Application Unit	Letter (dated 14th May 2008)
2	Southern Regional Fisheries Board	Letter/email dated 14th May 2008)
3	Jimi Conroy, Wildlife Ranger, NPWS	Phone conversation
4	Environmental Protection Agency Regional Inspectorate, Kilkenny	(letter dated 13th May 2008).

Development Applications Unit

2.2.3 Correspondence received from the Department of Environment, Heritage and Local Government stated that **amenity uses** close to/or within the River Barrow River Nore cSAC have the potential to impact negatively on its conservation interests, through **loss of habitats and disturbance** to sensitive species and damage to riparian vegetation. Bat species and otters are likely to be present and are strictly protected under the Habitats Directive.

2.2.4 The response also states that additional development also has the potential to lead to a decrease in water quality within the cSAC, although this is likely to be addressed by tertiary treatment that will be provided by mid August 2009.

2.2.5 The response acknowledges the conclusions drawn in the screening statement which highlights potential impacts arising from

- Direct loss and disturbance of habitat;
- Cumulative impacts from loss of undesignated habitats; and
- Deterioration in water quality.

Conclusions

2.2.6 Significant impacts that may arise from the Plan are expected as a result of three aspects of the plan include:

1. Direct loss and disturbance of habitat as a result of 'open space' and other built development designations both within the SAC and in areas adjacent to it.
2. Cumulative impacts, both direct and indirect, through the loss of undesignated habitats such as hedgerow and woodland, through a lack of planning designations for these areas.
3. Deterioration of water quality as a result of contaminants in surface water run-off being discharged directly to the Dinin river.

Comment [a1]: Should we classify this as a significant impact – hedgerows do not directly relate to the integrity of the site?

2.2.7 In consultation with NPWS personnel, the screening stage concluded with the recommendation to proceed to Stage 2: Appropriate Assessment stage in order to fully assess the nature of these impacts, and to establish avoidance or mitigation measures.

3. Stage 2: Appropriate Assessment

3.1.1 Appropriate assessment was carried out in accordance with the following methodologies and guidelines:

1. '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'. Annex 2 of this document sets out an assessment template that is used in this report.
2. The 'Guidelines for Ecological Impact Assessment in the United Kingdom' by the Institute of Ecology and Environmental Management (IEEM, 2006).

3.1.2 The Appropriate Assessment must determine whether significant impacts on this status are likely, are if this is deemed to be the case, recommend avoidance or mitigation measures.

- **Stage 2A** – analyse the site(s) and the reasons for its designation, and the underlying trends affecting it.
- **Stage 2B** – analyse the plan, including its key components and how it would be implemented in practice.
- **Stage 2C** - analyse other plans and projects that could contribute to 'in combination' effects.
- **Stage 2D** - analyse how the plan – in combination with other plans and projects - and the site will 'interact' come plan implementation, i.e. Appropriate Assessment.
- **Stage 2E** – where applicable, propose and assess mitigation measures for addressing adverse effects.

3.2 Stage 2A – Analysis of the site and the reasons for its designation, and the underlying trends affecting it.

3.3 The River Barrow and River Nore SAC

3.3.1 As part of the screening study a comprehensive literature review was carried out to gather existing data. Information regarding the site is available through a site synopsis report which is reproduced as an appendix to this report. To date, a management plan has not been published for the River Barrow and River Nore SAC.

3.3.2 The conservation objectives of the site are not explicitly detailed through a management plan however it can be assumed that achieving, or maintaining, 'good ecological status' for each of the conservation aspects will be vital. This includes maintaining the area of important habitats, good water quality and the populations of important species.

3.3.3 The River Barrow and River Nore SAC (site code: 2162) is a large site consisting predominantly of river channel but also encompassing important areas of riparian and woodland habitats. These habitats support a number of species of conservation concern. Only a small portion of this site is contained within the boundary of the LAP. Table 3.1 details the conservation aspects of the SAC.

3.3.4 Figure 3.1: Riparian Woodland, part of the River Barrow and River Nore SAC Insert

3.4 Trends

3.4.1 In the absence of the LAP the fragmentation of habitats may continue through piecemeal developments and the continued removal of hedgerows. The presence of Cherry laurel, if left unchecked, will ultimately destroy the areas of forest in which it is present and may colonise new areas. This occurs because the year-round canopy of the Cherry laurel's leaves blocks all sunlight from the forest floor, thereby preventing the growth of herbaceous plants and inhibiting the regeneration of sapling trees.

3.4.2 Water quality in the Dinin river may improve with the implementation of the Water Framework Directive and the installation of new wastewater treatment facilities. However continued built development within the town, and the cumulative removal of biodiversity features, diminishes the capacity of the land to treat pollutants in surface water run-off. This can lead to a decrease in overall river water quality.

3.5 Stage 2B – analysis of the plan, including its key components

3.5.1 The Castlecomer Local Area Plan 2008-2014 provides the written statement and accompanying maps that will manage the development and growth of Castlecomer over the six year plan period.

3.5.2 The Castlecomer Local Area Plan 2008-2014 (the Plan) has been prepared in accordance with the requirements of the Planning and Development Act 2000 (as amended 2002 and 2006) and sets out an overall strategy for the proper planning and sustainable development of the town.

3.5.3 The Plan will comprise the statutory land use plan for the town in the promotion and regulation of development and therefore provides a clear vision for Castlecomer, reflecting the needs of the existing and future population. It will provide for the development of Castlecomer by setting out zoning and other objectives for the proper planning and sustainable development of the town, considering the needs of the town, and informing and coordinating decisions on planning applications. The Plan plays a key role in translating overarching County Development Plan policies and objectives at the local level.

3.6 Zone of Influence of the Plan

3.6.1 The zone of influence of the LAP is shown in figure 3.1. The SAC is a large site, only a small part of which runs through Castlecomer. While the water is the main feature of the site, there is significant riparian vegetation that falls within the site boundary. Larger terrestrial areas of the site are to be found in Castlecomer Demesne and to the south of the town along a tributary of the Dinin river (also known locally as the Deen).

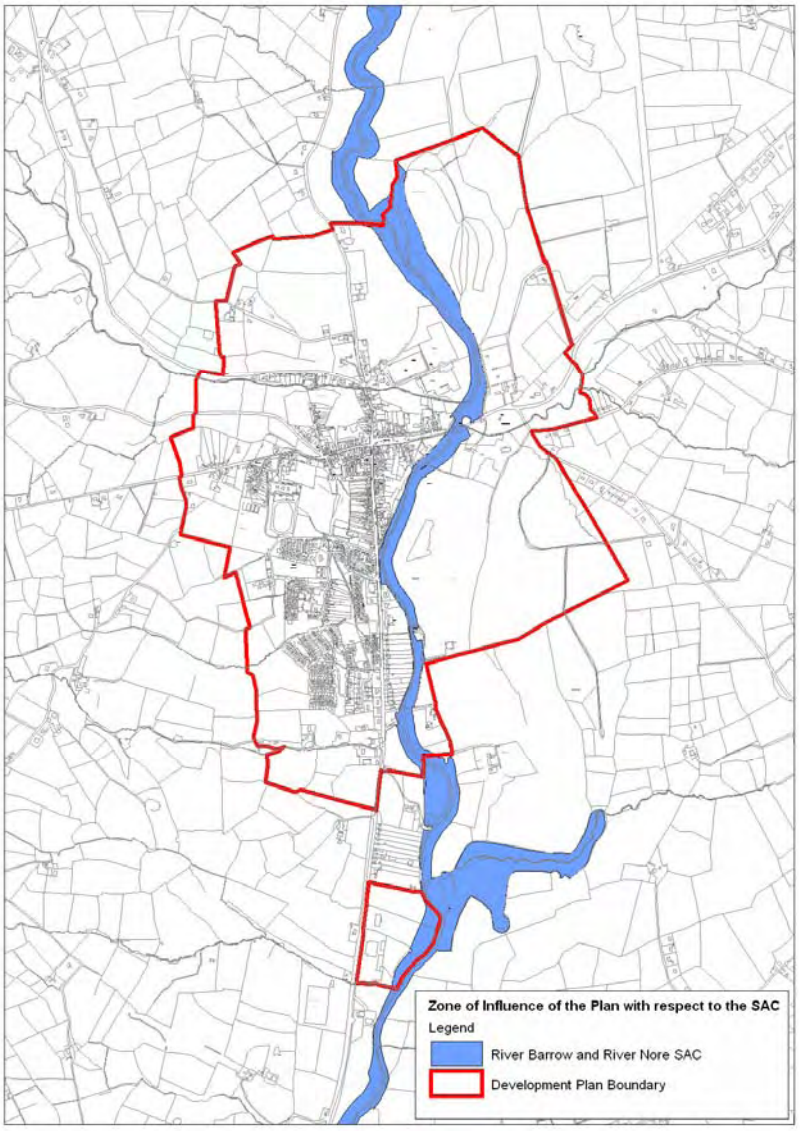

Figure 3.1: Zone of Influence of the Plan with respect to the SAC

Plan Objectives

3.6.2 The following Local Area Plan objectives have been generated through analysis and reflection of the general and strategic context of the study area. These plan objectives provide the framework for the future development of Castlecomer:

- To support town centre vitality and viability by extending the town centre;
- To provide high quality residential areas with direct linkages to open space, community and retail facilities;

- Address existing deficits within the recently established developments and provide for future community requirements in childcare, retail, open space and community services in the Castlecomer area;
- Protect and enhance the character and integrity of existing natural and built environments;
- Facilitate sustainable economic development through support for tourism development and provision of a new industrial area to the south of the town;
- Improve linkages between the town and Castlecomer Demesne;
- Support the reuse of land and buildings, particularly though backland development; and
- To seek a high level of design quality in all new development.

3.7 Strategic Vision

By 2020, Castlecomer will be a compact, sustainable and vibrant town of between 3,000 and 4,000 persons supported by a growth in retail services, jobs and community facilities. New Development will be well connected to the existing urban environment and of a high quality, reflecting and respecting existing character of the surrounding upland landscape in addition to the built and natural environment. Improved linkages between the town centre and Castlecomer Demesne will facilitate tourism development and benefit town centre vitality and viability.

3.8 Previous zoning

3.8.1 Existing zoning for the town was set out under the Kilkenny County Development Plan 2002 - 2008. The town boundary as defined in this plan includes 312.9 hectares of land, 239.45 ha of which is zoned for a range of uses as specified in **Table 3.2**.

3.8.2 Under the previous Plan, a total of 65.47 ha are zoned for residential use including established housing developments. This does not include opportunities to consolidate the town centre through additional backland development. There are a total of 21.23 ha of undeveloped residential lands in the town. In addition, the Local Area Plan 2002 – 2008 zoned a total of 13.19 ha for light industrial uses of which 0.62 ha are greenfield sites which remain undeveloped.

3.9 Draft Plan Zoning

3.9.1 The proposed amendments to the zoning with respect to the previous plan are set out in **Table 1.5** and indicated on the zoning map that accompanies this Plan. The Plan includes a number of zoning amendments.

Table 3.2: Proposed Zoning Capacity (hectares)

	Current	Proposed	Remaining Capacity (Proposed Zonings)
Residential	65.59	67.42	23.57 (excluding mixed use areas)
Industrial	13.39	23.04	13.20
Open Space	128.05	136.74	-
General Business	15.52	14.30	-
Community	17.02	18.57	
Mixed Use	0	5.72	5.72
Total	239.57	265.79	

3.10 Stage 2C: Determining whether, in view of the site's conservation objectives, the plan, 'in combination' with other plans and projects, would have an adverse effect on the integrity of the site.

3.10.1 Information regarding the site is available through a site synopsis report which has been reproduced as an appendix to this report. To date, no management plan has not been published for the River Barrow and River Nore SAC.

3.10.2 The River Barrow and River Nore SAC (site code: 2162) is a large site consisting predominantly of river channel but also encompassing important areas of riparian and woodland habitats. These habitats support a number of species of conservation concern. Only a small portion of this site is contained within the boundary of the LAP. **Table 3.2** details the conservation aspects of the SAC which are relevant to the zone of influence of the Plan. Relevance is interpreted as meaning the likely presence of the habitat/species in the study area and is taken from relevant literature sources. The likelihood of impact is based on the potential presence of habitats from aerial photography and presence of suitable habitats for different species.

3.10.3 Consideration of relevance and the presence of suitable habitats, the table details the aspects of the Plan that are likely to cause impacts.

Table 3.3: Conservation aspects of the River Barrow SAC

Aspect	Level of Protection	Relevant	Likelihood of potential impacts	Aspect of LAP likely to cause impact
Alluvial wet woodland (code: 91E0)	Habitats Directive Annex I priority	Possible	Possible	habitat loss/disturbance due to 'open space' zoning
Petrifying springs with tufa formation (code: 7220)		Possible	Possible	
Atlantic salt meadows (code: 1330)	Habitats Directive Annex I	No	None	-
Mediterranean salt meadows (code: 1410)		No	None	-
Old oak woodlands (code: 91A0)		Possible	Possible	habitat loss/disturbance due to 'open space' zoning
Eutrophic tall herbs (code: 6430)		Possible	Possible	
Floating river vegetation (code: 3260)		Possible	Possible	water pollution from increased population
Estuary (code: 1130)		No	None	-
Salicornia mudflats (code: 1310)		No	None	-
Dry heath (code: 4030)		Possible	Possible	habitat loss/disturbance due to 'open space' zoning
Tidal mudflats (code: 1140)		No	None	
Sea Lamprey *Petromyzon marinus*	Habitats Directive Annex II	Yes	Possible	water pollution from increased population
Brook Lamprey *Lampetra planeri*		Yes	Possible	
Semi-aquatic snail *Vertigo moulinsiana*		No	None	-
River Lamprey *Lampetra fluviatilis*	Habitats Directive Annex II, V	Yes	Possible	water pollution from increased population
Freshwater Pearl Mussel *Margaritifera margaritifera*		Yes - downstream	Possible	
Freshwater Crayfish *Austropotamobium pallipes*		Yes	Possible	
Twaite Shad *Alosa fallax fallax*		Yes	Possible	

Aspect	Level of Protection	Relevant	Likelihood of potential impacts	Aspect of LAP likely to cause impact
Atlantic Salmon *Salmo salar*		Yes	Possible	
Otter *Lutra lutra*		Yes	Possible	habitat loss/disturbance due to 'open space' zoning
Killarney fern *Trichomanes speciosum*	Habitats Directive Annex II, IV; Flora Protection Order, 1999	No	None	-
Daubenton's bat *Myotis daubentoni*	Habitats Directive Annex IV; Wildlife Act, 2000	Yes	Possible	habitat loss/disturbance due to 'open space' zoning
Irish hare *Lepus timidus hibernicus*	Habitats Directive Annex V; Wildlife Act, 2000	Yes	Possible	
Common frog *Rana temporaria*		Yes	Possible	
Badger *Meles meles*	Wildlife Act, 2000	Yes	Possible	
Pygmy shrew *Sorex minutus*		Yes	Possible	
Greenland white-fronted goose *Anser albifrons flavirostris*	Birds Directive Annex I; Wildlife Act 2000	No	None	-
Golden plover *Pluvialis apricaria*		Possible	Unlikely	-
Whooper swan *Cygnus cygnus*		No	None	-
Kingfisher *Alcedo atthis*		Possible	Possible	habitat loss/disturbance due to 'open space' zoning
Perigrine *Falco perigrinus*		Possible	Possible	
Bewick's swan *Cygnus columbianus bewickii*		No	None	-
Bar-tailed godwit *Limosa lapponica*	-	No	None	-

Aspect	Level of Protection	Relevant	Likelihood of potential impacts	Aspect of LAP likely to cause impact
Smelt *Osmerus eperlanus*	-	Yes	Possible	water pollution from increased population
Meadow Barley *Hordeum secalinum*	Flora Protection Order, 1999	No	None	-
Divided sedge *Carex divisa*		No	None	-
Clustered clover *Trfolium glomeratum*		No	None	-
Basil-thyme *Acinos arvensis*		No	None	-
Narrow-leaved hemp nettle *Galeopsis angustifolia*		No	None	-
Borrer's saltmarsh-grass *Puccinellia fasciculata*		No	None	-

3.11 Impact Assessment

3.12 Scope of Site Survey

3.12.1 The screening study identified three potential impacts on the SAC as a result of the LAP. These are:

1. Direct loss and disturbance of habitat as a result of 'open space' and other built development designations both within the SAC and in areas adjacent to it.
2. Cumulative impacts, both direct and indirect, through the loss of undesignated habitats such as hedgerow and woodland, through a lack of planning designations for these areas.
3. Deterioration of water quality as a result of contaminants in surface water run-off being discharged directly to the Dinin river.

3.12.2 The site survey was therefore focussed on areas of SAC that fell within the 'open space' designation as well as potential wildlife corridors that are associated with it.

Methodology

3.12.3 Two site visits were carried out during August 2008. The site was surveyed in accordance with the Heritage Council's draft Habitat Survey guidelines (Heritage Council, 2002) and the 'Guidelines for Baseline Ecological Assessment' from the Institute of Environmental Assessment (IEA, 1995). Habitats were identified in accordance with Fossitt's 'Guide to Habitats in Ireland' (Fossitt, 2000). A species list for each habitat was compiled and target notes were made. Targets notes

and location information were taken with a *Garmin GPS 60*. Data were then uploaded to the *ArcView 9.2* GIS software suite.

Constraints

3.12.4 The month of August lies well within the optimal season for habitat survey (NRA, 2006).

3.12.5 It is important to note that a baseline survey does not attempt to catalogue all the species that are either present on the site or that may use the site for essential resources (foraging, roosting etc.). Whole groups of species such as invertebrates or bats may therefore go unrecorded. However, this need not necessarily be an obstacle to a full ecological assessment. A baseline survey uses a group of indicator species, vascular plants, to determine the extent and conservation status of individual land parcels. It is therefore not necessary to identify species of other taxonomic groups. Target notes are taken where important features are noted during the survey and where the presence of a protected species is revealed, further studies may be required.

3.12.6 Heavy rain during the month of August meant that levels in the Dinin river were exceptionally high. As a result it was not possible to survey for Otters (these animals habitually defecate on rocks and stony ledges and this is the principle indicator of Otter presence. High water levels submerge these features and wash away older droppings). The high water levels also made surveying the river bank in some areas impossible as normally shallow areas became impassable. These are not viewed as major impediments to making a full assessment.

3.13 Flora

3.13.1 Areas surveyed include the Castlecomer Demesne, the riparian corridor running to the east of the town, and the small industrial area to the south. Within these areas semi-natural habitats were surveyed thoroughly and species lists for each are presented in Appendix 2 to this report. In some cases, entirely man-made or artificial habitats are represented but in general these are excluded as they are of extremely low biodiversity value. Species lists therefore do not appear for these habitats (e.g. buildings, amenity grassland or arable fields). The following habitats were found:

Woodlands

3.13.2 Large areas within the Castlecomer area are wooded. However the nature of this woodland varies considerably. Much is plantation coniferous woodland owned by Coillte and is of low biodiversity value. Within the Demesne itself two main types were identified and are shown in figure 2. These are:

(Mixed) Broadleaved woodland – WD1

3.13.3 This woodland type covers most of the Demesne and is characterised by a high proportion of non-native, broadleaved tree species such as Beech *Fagus sylvatica,* Sycamore *Acer pseudoplatanus* and Horse chestnut *Aesculus hipposcastanum.*

3.13.4 There are also patches of plantation conifers, Sitka spruce *Picea sitchensis,* although these seemed to be small areas and are not mapped on the habitat map. Areas of the invasive Cherry laurel *Prunus laurocerasus* represent a threat

to the long-term integrity of the forest as they will inhibit the regeneration of all other vegetation. Native tree species are also present, e.g. Ash *Fraxinus excelsior,* and Silver birch *Betula pendula* although these do not dominate the overall canopy. A number of individual exotic species are also present and it is likely that they were planted during the lifetime of the Demesne and have not naturalised (in other words they will not naturally recolonise or reproduce). With the exception of monocultural stands of Sitka spruce, where the ground level is devoid of vegetation, there is a well developed ground flora including Enchanters nightshade *Circaea lutetiana,* Wood avens *Geum urbanum,* Lords-and-ladies *Arum maculatum* and Bluebells *Hyacinthoides non-scripta.*

3.13.5 This woodland type is also characteristic of the riparian margin along the length of the river as it runs north to south along the eastern edge of the town. This differs from Riparian woodland (see **section 2.3.1.2** below) in that it is not routinely flooded and is dominated by non-native species, particularly Beech and Sycamore. Cherry laurel is also present and is a threat to biodiversity where it exists.

3.13.6 Because of the high proportion of non-native trees in the canopy, this type of woodland has a lower conservation value than it otherwise would. Nevertheless, it is an essential component of the SAC as it provides habitat and resources for the many important species for which the site is designated, e.g. Otter.

Riparian woodland – WN5

3.13.7 Riparian woodland is one of the rarest woodland types in Ireland (Little et al., 2008) and is a priority protected habitat under the EU Habitats Directive (Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior;* code: 91E0).

3.13.8 This habitat as shown in **Figure 2.1** as being the entire wooded area falling within the boundary of the SAC. In reality this area consists of a number of habitats that grade from the river's edge to higher ground where a corresponding change in species composition can be observed.

3.13.9 In some areas there are non-native trees and even patches of coniferous plantation. However these are small and overall there is a high (~80%) proportion of native tree species in the canopy. In the wettest areas the dominant species is Willow *Salix sp.* where the ground ranges from bare mud and open water to entirely vegetated. Where vegetation exists this is dominated by Common nettle *Urtica dioica,* Ground ivy *Glechoma hederacea* and Creeping buttercup *Ranunculus repens.* Wetter areas have rather sparse stands of Reed canary-grass *Phalaris arundinacea.* Where the ground is not quite so wet, Ash dominates and there are also impressive stands of Elder *Sambucus nigra.* Hawthorn *Crataegus monogyna* and Holly *Ilex aquifolium* are also present but in lower densities. The ground layer is cloaked in Bramble *Rubus fruticosus* in patches but also has large grassy areas. These grasses were difficult to identify as they were not in flower and had been flattened by recent flooding. However Creeping bent *Agrostis stolonifera,* False brome *Brachypodium sylvaticum* and Hairy brome *Bromus ramosus* were positively identified.

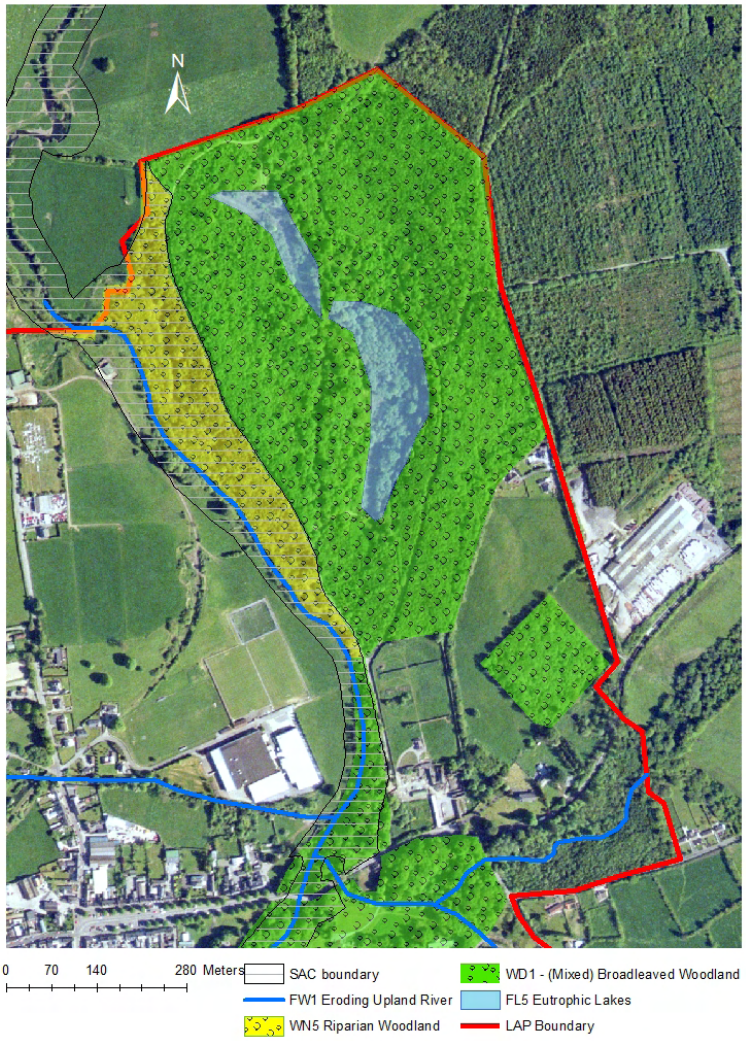

Figure 3.2: Habitats within the Castlecomer Demense

3.13.10 This area represents an important habitat due to the high proportion of native tree species, its rarity at a national level and its designation as a priority habitat under the Habitats Directive. For this reason it is encompassed within the boundary of the SAC.

Eroding Upland River – FW1

3.13.11 Heavy rain and flash-flooding in the days prior to and during the site survey resulted in a swollen river. The water was a muddy brown as sediment was

washed from surrounding land and the river's banks were eroded. It was therefore not possible to determine if the river was vegetated either under the water or along the wet margins.

Eutrophic lakes – FL5

3.13.12 The term 'eutrophic' refers to the high nutrient status of the lake (Allaby, 2004) as indicated by the presence of green algae (*Cladophora sp.*) and turbid waters. Wet margins of the lakes are small and are dominated by Bulrush *Typha latifolia* with a number of characteristic wetland species also present, e.g. Branched bur-reed *Sparganium erectum*, Floating sweet-grass *Glyceria fluitans*, Wild angelica *Angelica sylvestris,* and Common figwort *Scrophularia nodosa.*

Hedgerow

3.13.13 Hedgerows are woodland remnants that have acted as field margins for centuries and characterise much of the Irish countryside. In a human dominated landscape where intensive agricultural practices are hostile to biodiversity, the importance of hedgerows for wildlife cannot be overstated. The ecological functions of hedgerows include providing habitat for a range of plant and animal species; regulating the flow of water off land and acting as wildlife corridors, linking populations of species across great distances (Hickie et al., 2004). Hedgerows are therefore important for the integrity of SACs as they help maintain healthy populations and prevent such areas becoming isolated islands in a man-made landscape. The loss of hedgerows has been a cause of concern in recent times as built developments have not sought to integrate or replant these important features.

3.13.14 In Castlecomer, many hedgerows have already been lost and this is also the case within the LAP boundary in the industrial zone as shown in figure 3. Here the presence of hedgerows can be seen but some of these have been recently removed.

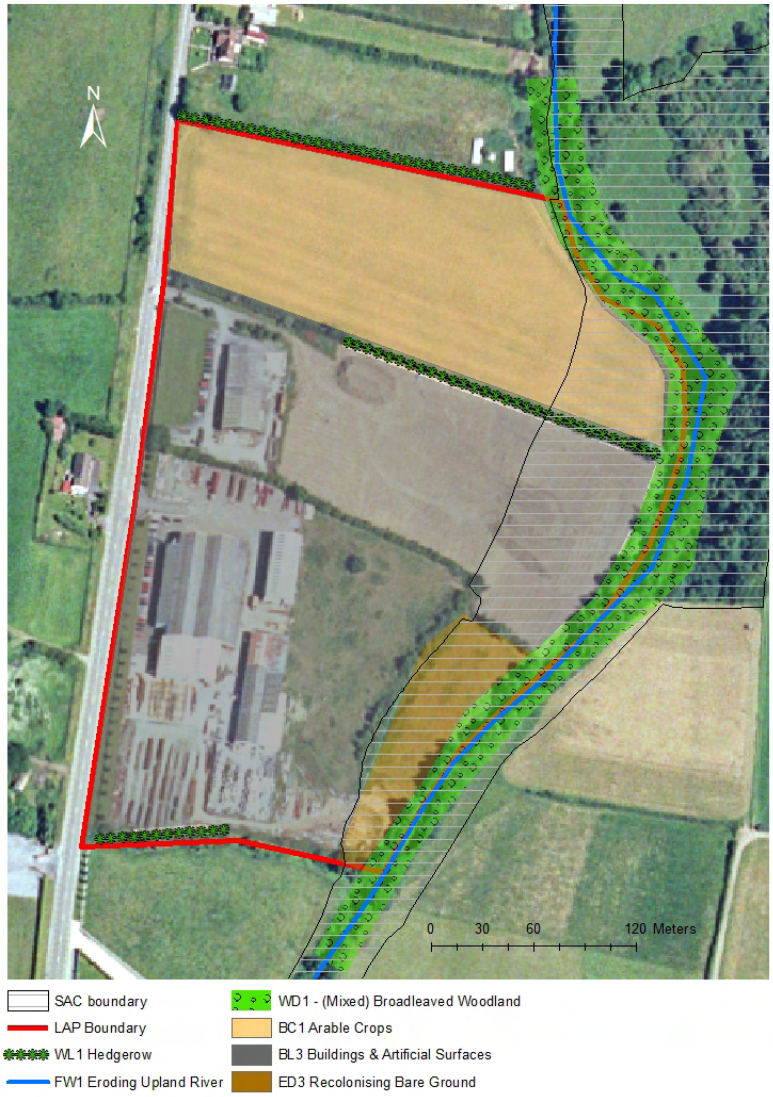

Figure 3.3: Habitats of the Industrial Zone to the South of Castlecomer

3.13.15 In **Figure 3.3** the SAC can be seen to encompass a sizable terrestrial portion of land to the east of the industrial buildings. It is not clear why this area has been included in the designation. The aerial photograph shows that it was probably cultivated land but the lower two fields have now been extensively developed and land has been cleared right up to the riparian margin.

3.13.16 The remaining hedgerow has been damaged to the south and centre as vegetation has been removed and gaps have appeared. To the north it is intact and is characterised by mature Ash, Hawthorn and occasional Oak *Quercus sp.*

3.14 Fauna

Mammals

3.14.2 Since a dedicated fauna survey was not carried out, the presence of various species is deduced from the presence of suitable habitat and this is shown in **Table 2.1**. Tracks and droppings of Badger *Meles meles* was recorded in woodland of Castlecomer Demesne. Otter *Lutra lutra* would be expected along the Dinin river although a search for spraint (droppings) was not permitted due to the high water levels (see **section 2.2**).

Birds

3.14.3 Incidental recordings of birds were made and include many typical countryside species: Robin *Erithacus rubecula*; Song thrush *Turdus philomelos*; Great tit *Parus major*; Coot *Fulica atra*. A Dipper *Cinclus cinclus* was noted along the Dinin river near the Discovery Park. No dedicated bird survey was carried out and so this list is far from exhaustive.

Amphibians

3.14.4 Common frog *Rana temporaria* was recorded within the Riparian woodland habitat and it is possible that Smooth newt *Triturus vulgaris* is also present, both are protected under the Wildlife (Amendment) Act, 2000 while the frog is also protected under Annex V of the Habitats Directive. The lakes, at least the areas of open water, do not provide suitable habitat for amphibians as the fish would quickly eat spawn or tadpoles.

Fish

3.14.5 The Dinin river catchment is known to provide habitat to species of conservation importance including Salmon *Salmo salar*, Sea Lamprey *Petromyzon marinus*, River lamprey *Lampetra fluviatilis* and Brook lamprey *L. planeri*, all of which are protected under Annex II of the Habitats Directive. These species require clean, well oxygenated gravel substrates for spawning (Hendry K & Cragg-Hine D, 2003; Maitland PS, 2003) and it is therefore possible that spawning is occurring in the study area. Pollution barriers can be a problem but it is not believed to be a particular issue in Castlecomer.

Invertebrates

3.14.6 A large number of invertebrate species are likely to be present in the area and all habitats present are suitable for a wide range of species. It is unlikely that protected species are present on the site but this is more to do with the limited number of protected invertebrates in Ireland and a similarly poor level of data.

Table 3.4: Mammals known from the area and for which there is suitable habitat (Mitchell-Jones et al., 1999)

Species	Level of Protection	Habitat
Otter *Lutra lutra*	Annex II & IV Habitats Directive; Wildlife (Amendment) Act, 2000	Rivers and wetlands
Whiskered bat *Myotis mystacinus*	Annex IV Habitats Directive; Wildlife (Amendment) Act, 2000	Gardens, parks and riparian habitats
Natterer's bat *Myotis nattereri*		Woodland
Leisler's bat *Nyctalus leisleri*		Open areas roosting in attics
Brown long-eared bat *Plecotus auritus*		Woodland
Leisler's bat *Nyctalus leisleri*		Woodlands and buildings
Common pipistrelle *Pipistrellus pipistrellus*		Farmland, woodland and urban areas
Daubenton's bat *Myotis daubentonii*		Woodlands and bridges associated with open water
Hedgehog *Erinaceus europaeus*	Wildlife (Amendment) Act, 2000	Woodlands and hedgerows
Pygmy shrew *Sorex minutus*		Woodlands, heathland, and wetlands
Red squirrel *Sciurus vulgaris*		Woodlands
Irish stoat *Mustela erminea hibernica*		Wide range of habitats
Badger *Meles meles*		Farmland, woodland and urban areas
Pine Marten *Martes martes*	Wildlife (Amendment) Act, 2000; Annex V Habitats Directive	Broad-leaved and coniferous forest

3.15 Water Quality

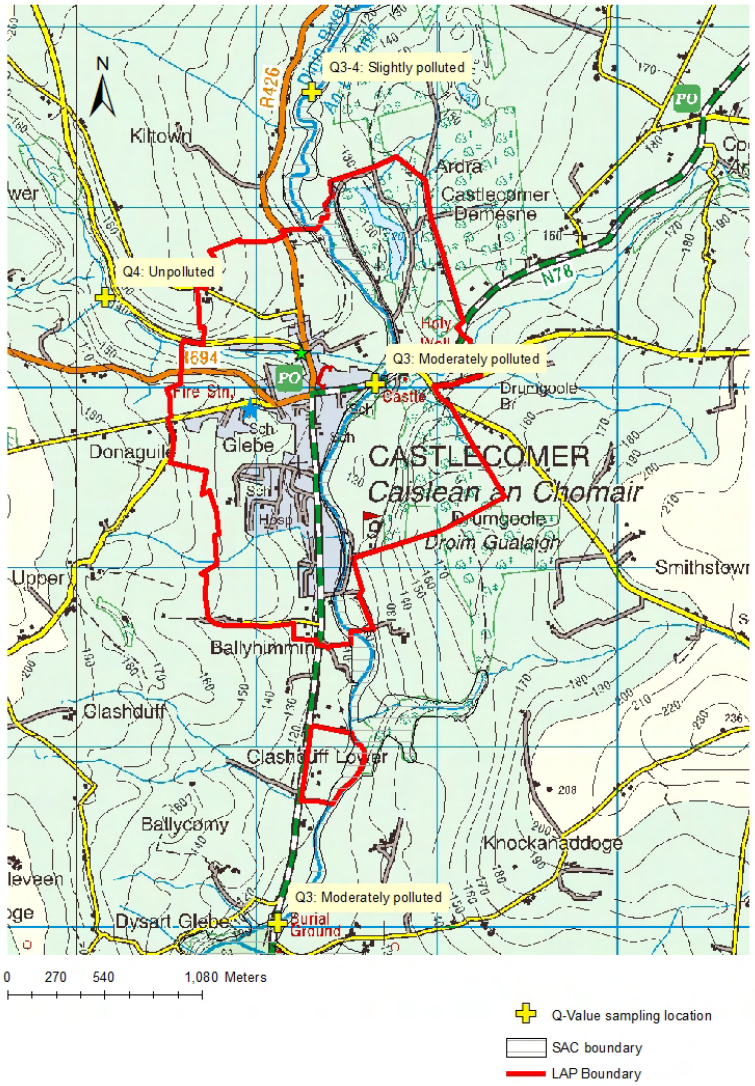

Figure 3.4: Ecological Water Quality in the Castlecomer Area

3.15.1 Water quality can be determined through analysing macro-invertebrates (i.e. those organisms that are visible to the naked eye) as these act as indicator

species for the health of the river ecosystem. In Ireland, the EPA have developed a detailed methodology for this and is known as the Q-Value. Q-Values vary from Q1: Seriously polluted, through to Q5: Unpolluted (Toner et al., 2005). The EPA conduct regular monitoring throughout the country and one monitoring station exists in Castlecomer where the river Dinin was most recently assessed as Q3-4: Slightly polluted (2005). This station is not located on the main channel of the Dinin, but rather along a tributary that runs from the west of the town.

3.15.2 For this study, four macro-invertebrate kick samples were taken and the location of these is shown in figure 4.

3.15.3 The flow of water in this figure is from north to south. As can be seen the quality of water is variable. Upstream of the town it is Slightly polluted in the Dinin main channel while Unpolluted in the tributary samples to the west. Meanwhile both in the town, and downstream of it, the quality deteriorates to Moderately polluted. This strongly indicates that either point or diffuse sources within the town are resulting in negative impacts on the ecological status of water in the SAC.

3.15.4 Full details of the Q-Value assessments are given in Appendix 3.

3.16 Determination of Value

3.16.1 Appendix 3 of the NRA guidelines (NRA, 2006) outlines a ‘site evaluation scheme’ that is designed to assign value to ecological features. **Table 2.2** lists the habitats that were recorded and their associated value.

Table 3.5: Valuation of habitats with reference to Appendix of the NRA guidance

Habitat	Rating	Criteria
Any area within the SAC (WN5 – Riparian woodland FW2 – Depositing/lowland river WD1 – (Mixed) broadleaved woodland	A – Internationally important	Sites designated as SAC under the EU's Habitats Directive
WD1 – Mixed broad-leaved woodland	C – High value, locally important	Sites containing semi-natural habitat types with high biodiversity in a local context.
WL1 - Hedgerow	D – Moderate value, locally important	Sites containing some semi-natural habitat or locally important for wildlife.

3.17 Impact prediction

Direct Impacts

3.17.2 A number of potential impacts arising from the plan are unquantifiable, particularly with respect to the detailed design of development. This makes it impossible to accurately quantify impacts that may occur as a result of planning decisions arising from the plan. It is therefore appropriate to apply the precautionary principle and so the impacts described below represent a worst case scenario.

Comment [a2]: Can we quantify this?

Comment [PF3]: For surface water run off the potential paved area would have to be calculated, along with projected rain fall and expected pollutant concentrations – complex! Population could be used for projecting loadings at treatment plant but this is not identified as a significant impact due to new works. Impacts are quantified in table 3.7

Direct loss of habitat

3.17.3 Direct loss of habitat within the SAC may occur through the designation of protected areas as 'open space' and 'industrial' to the south of the town. This may impact on Riparian woodland habitat within the Castlecomer Demesne but also on Mixed broadleaved woodland habitat that characterises much of the riparian margin of the Dinin river.

Comment [PF4]: Yes you're right 'industrial' should be included – although the habitat here is not important, see 3.13.15. should a buffer be required here anyway?

Water Quality

3.17.4 The screening report for this Appropriate Assessment determined that current projects would see a net improvement of water quality in the river Dinin. These include the construction of new wastewater treatment facilities in the town, as well as the on-going implementation of the Water Framework Directive. However this does not include the potential impact of water pollution through surface water run-off from new developments.

The loss of Adjacent Habitats

3.17.5 Potential indirect impacts may occur through the loss of adjacent habitats, disruption of hydrological flow (See Section 3.13.13), decrease in population of key species (Otter, but also species listed in **Tables 3.2 and 3.3** that were not recorded during the site survey). Forested areas within the Castlecomer Demesne and Castlecomer golf club are not considered under threat and so the loss of hedgerow is considered to be the greatest threat in this regard.

3.18 Nature of predicted impacts

3.18.1 The purpose of this section is to quantify and determine the significance of three potential impacts from this plan.

1. **Loss of habitat** within the SAC through designation of land as 'open space' and 'industrial'.
2. **Deterioration of water quality** stemming discharge of pollutants, particularly particulate matter and hydrocarbons, to the river Dinin from surface water run-off as a result of new built developments adjacent to the river.
3. **Cumulative loss of non designated habitat** that are near to, or associated with the SAC, leading to impacts on the health of populations of important species listed in Tables 3.2 and 3.3.

3.18.2 The nature of the impacts can be summarised in a table as follows:

Table 3.6: Nature of Predicted Impacts

Impact	Direct/ Indirect	Cumulative	Permanent/ Temporary[1]	Positive/ Negative	Reversible
1. Loss of habitat	Direct	No	Permanent	Negative	No
2. Deterioration of water quality	Direct	Yes	Permanent	Negative	Yes
3. Loss of non designated habitat	Indirect	Yes	Permanent	Negative	Yes

[1] The NRA guidelines (2006) define 'permanent' as an impact lasting over 60 years

3.19 Scale and likelihood of predicted impacts

3.19.1 Impacts are quantified where possible, both in absolute terms and as an impact of the whole resource.

Table 3.7: Scale and Likelihood of Predicted Impacts

Impact	Magnitude	As Proportion Of Resource	Likelihood
1. Loss of habitat	6.1 ha of Riparian woodland in Castlecomer Demesne but may also impact on other areas along the riparian corridor	Difficult to determine as it depends on subsequent plans for developments	Likely within the Demesne if plans for amenity development go ahead
2. Deterioration of water quality	Not possible to quantify as it depends on the nature of future development along the riparian zone	Could cancel out some of the potential improvements to water quality likely to occur through the installation of new wastewater treatment facilities	Likely
3. Loss of non designated habitat	It is not possible to quantify this impact. There is approximately 23 km of hedgerow remaining within the LAP boundary. Very little of this is directly connected to the SAC as a result of roads and built development. Because of this the cumulative impact to date is large but the further removal of small, individual stretches will not be great.	Approximately 1.2 km of hedgerow remain that have connectivity with the SAC representing ~5% of the total hedgerow within the LAP boundary.	The likelihood of further losses is high as a result of on-going development pressures.

3.20 Assessment of impact significance

3.20.1 Appendix 4 of the NRA guidelines (NRA, 2006) provides guidance on assessing impact significance. This is done by combining the magnitude of the impact (from **sections 3.2 and 3.3)** with the value of the ecological resource as assessed in **section 2.7.** The 'site' that is referred to is the overall area and not necessarily the designated site.

3.20.2 **Table 3.8: Insert Table Title**

Impact	Significance
1. Loss of habitat	Severe negative – any permanent impacts on an internationally important site
2. Deterioration of water quality	Severe negative – Localised[2], permanent impacts on an internationally important site
3 Loss of non designated habitat	Moderate negative – impacts on a small part of an internationally important site

Comment [a5]: If is localised can we map this?

3.20.3 Overall, the following statements can be made:

- **Severe Negative** impacts may occur as a result of 'open space' designations within the boundary of the SAC as well as from untreated surface water run-off from developments that discharge into the Dinin river.
- **Moderate Negative** impacts may occur through the continued removal of hedgerows that connect the SAC with the surrounding countryside.

Comment [a6]: Can we state that these are likely to be significant or insignificant?

3.20.4 Mitigation is required so that the Plan does not result in these negative impacts. These issues are addressed in section 4.

[2] NRA guidelines (2006) define 'localised' as an impact on a water course measurable no more than 250m from the impact source

3.21 Stage 2D - analyse other plans and projects that could contribute to 'in combination' effects.

Introduction

The Habitats Directive requires competent authorities to make an appropriate assessment of any plan or project which is likely to have a significant effect either alone or in combination with other plans and projects. As identified in Section 3.20, the Plan is likely to give rise to the following impacts on the River Nore and River Barrow SAC:

- Direct Loss and Disturbance
- Loss of undesignated Habitats
- Deterioration of Water Quality

3.21.2 Habitats Regulations Assessment / Appropriate Assessment, should be 'appropriate' in terms of the level detail and fit for purpose particularly in terms of the consideration of in combination effects.

3.21.3 The consideration of in combination effects has been limited to the issue of water quality as it is considered that loss of habitats and loss of non designated habitats are localised effects that can be dealt with through appropriate measures within the plan.

3.21.4 The consideration of the in combination effect on water quality has been considered through an analysis of other plans where Appropriate Assessment is currently underway. The following plans have been therefore been considered:

- South Eastern River Basin District Management Plan
- The Kilkenny County Development Plan
- Kilkenny City and Environs Development Plan
- Castlecomer Waste Water Treatment Upgrade
- Callan Draft Local Area Plan
- Ferrybank – Belview Local Area Plan
- Graiguenamanagh Draft Local Area Plan
- Bennettsbridge Local Area Plan
- Thomastown Draft Local Area Plan

3.21.5 The location of the settlements to which these apply are highlighted in the **Figure 3.5.**

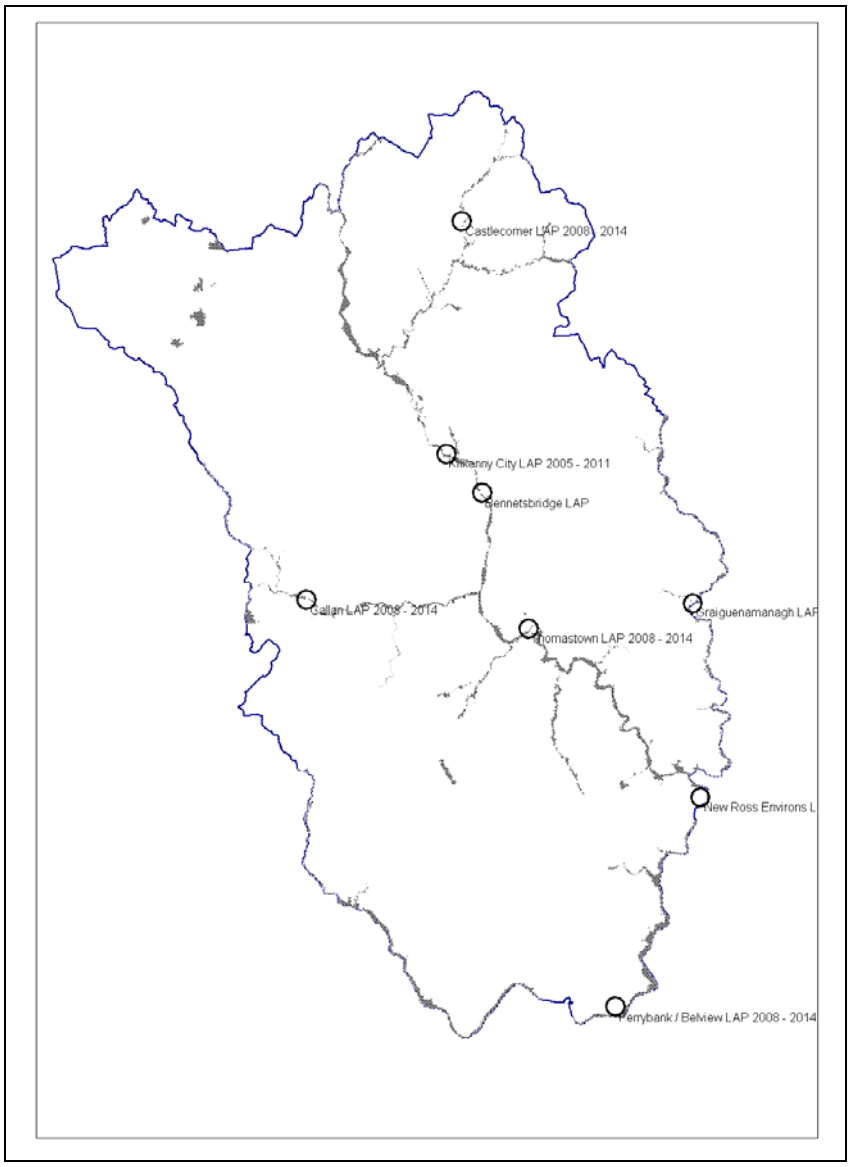

Figure 3.5: Location of other plans

South Eastern River Basin District Management Plan

3.21.6 Under the Water Framework Directive (Directive 2000/60/EC) all Irish waters must achieve 'good ecological status' by 2015. The South Eastern River Basin District encompasses all of county Kilkenny and the report, 'Water Matters' (SERBD, 2007) was recently published. In 2008 a program of measures will be published that will aim meet the targets of the Directive.

Kilkenny County Development Plan 2008 – 2014

3.21.7 The Kilkenny County Development Plan is the overarching planning documents for the County and includes the core policies about which the Local area plans are required to produce more detailed policies.

3.21.8 Chapter 8 of the plan focuses on protection of the natural heritage. Section 8.2.1 and 8.2.2 discuss sites and species respectively that are designated under National and European legislation. Of particular relevance to this study is section 8.2.1 entitled ' Designated Natural Heritage Sites of International and National Importance'. This discusses the role of the county council in protecting designated sites, in conjunction with NPWS. The following policy is stated:

- To protect natural heritage sites designated in National and European legislation. This includes sites proposed to be designated or designated as Special Areas of Conservation (SAC), Natural Heritage Areas (NHA), Nature Reserves and Wildfowl Sanctuaries. This protection will extend to any additions or alterations to sites that may arise during the lifetime of this plan.
- To assess all proposed developments (individually or in combination with other proposals, as appropriate) which are likely to impact on designated natural heritage sites or those sites proposed to be designated.
- To consult with the prescribed bodies and relevant government agencies when assessing developments which are likely to impact on designated natural heritage sites or those sites proposed to be designated.
- To ensure that any development in or near a designated natural heritage site will avoid any significant adverse impact on the features for which the site has been designated.
- To require an appropriate environmental assessment in respect of any proposed development likely to have an impact on a designated natural heritage site, or those sites proposed to be designated.

3.21.9 The Plan has therefore been formulated to ensure that uses, developments and effects arising from permissions based upon this Plan (either individually or in combination with other plans or projects) shall not give rise to significant adverse impacts on the integrity of any Natura 2000 sites, having regard to their conservation objectives and as such does not need to be assessed for 'in combination' effects.

3.21.10 The Appropriate Assessment Screening concludes that Kilkenny County Development Plan will not give rise to significant adverse direct, indirect or secondary impacts on the integrity of any Natura 2000 sites having regard to their conservation objectives, or their key features arising from their proximity shall be permitted on the basis of this Plan (either individually or in combination with other plans or projects.

Kilkenny City and Environs Development Plan

3.21.11 The Kilkenny City and Environs Development Plan is intended to provide for the proper planning and sustainable development for Kilkenny City and Environs for a duration of six years from the date on which it is adopted. It consists of a written statement and accompanying maps and includes policies, strategies and actions for the City and Environs. The Plan's vision is to develop Kilkenny City as a centre of excellence for creativity in all sectors whilst ensuring the continued protection and enhancement of the city's magnificent built and natural heritage, its thriving cultural and artistic base and its strong and dynamic services economy. This will ensure that the city will be a vibrant and attractive place for

people to visit, work and live in as it fulfils its role as a Hub for the South East Region.

3.21.12 The Appropriate Assessment Screening concludes that Kilkenny County Development Plan will not give rise to significant adverse direct, indirect or secondary impacts on the integrity of any Natura 2000 sites having regard to their conservation objectives, or their key features arising from their proximity shall be permitted on the basis of this Plan (either individually or in combination with other plans or projects.

Castlecomer Waste Water Treatment Upgrade

3.21.13 Waste Water Treatment in Castlecomer is presently provided for by secondary treatment which is a combined system that deals with both sewage and overflow resulting from periods of heavy rain.

3.21.14 Current waste water treatment capacity stands at 2,500 population equivalent (PE), with present loading of 4,000 PE and discharge is made to a freshwater (river) which is defined as a sensitive area. The Upgrade, which is to be confirm by the Department of the Environment, Heritage and Local Government, will increase the capacity to 6,000 population equivalent by mid August 2009 which will provide the town with a tertiary treatment system to the standard required by the Urban Wastewater Treatment regulations. These standards require the assimilative capacity of the receiving water for nutrients (Nitrogen & Phosphorus) to be assessed (in accordance with the regulations) and the calculation of the permitted nutrient loadings in the treated effluent discharged.

Callan Draft Local Area Plan

3.21.15 Appropriate Assessment has been completed in accordance with Article 6(3) of the Habitats Directive and concludes a number of potentially significant impacts:

- Severe Negative impacts may occur as a result of additional pollutant impacts and ecological deterioration of the King's river. This will result from direct discharges of poorly treated wastewater and surface run-off from concreted, or hard surfaces.
- Moderate Negative impacts may occur through the continued removal of hedgerows that connect the SAC with the surrounding countryside.
- Positive impacts may occur through the development of riparian and amenity area.

3.21.16 Mitigation will be implementated with regard to the upgrade of the waste water treatment plant so that the Callan Plan does not result in these negative impacts.

Ferrybank – Belview Local Area Plan

3.21.17 The screening report for this Appropriate Assessment determined that current projects would see a net improvement of water quality in the river Suir and so this has been discounted as a potential impact of the Plan.

Graiguenamanagh Draft Local Area Plan

3.21.18 There is no information available as an Appropriate Assessment is currently underway in relation to this plan.

Bennettsbridge Local Area Plan

3.21.19 There is no information available as an Appropriate Assessment is currently underway in relation to this plan.

Thomastown Draft Local Area Plan

3.21.20 There is no information available as an Appropriate Assessment is currently underway in relation to this plan.

Conclusion

3.21.21 Significant in combination effects are likely in relation water quality. It is considered that these impacts will be mitigated as a result of appropriate upgrade of the Urban Waste Water treatment in Castlecomer and Callan.

4. Stage 2E – where applicable, propose and assess mitigation measures for addressing adverse effects

4.1.1 According to accepted methodologies (EPA, 2003; IEEM, 2006) mitigation is required where there are likely, significant, negative impacts. Three likely significant impacts have been identified and it is proposed to address these through appropriate mitigation measures.

5. Impact Mitigation

5.1.1 The Plan is predicted to result in three negative impacts on the integrity of the River Barrow and River Nore SAC that range from severe to moderate. Five recommendations have been made to mitigate for these impacts and, if implemented, could ensure that the magnitude of these impacts is reduced to neutral.

5.2 Loss of habitat within the SAC through 'open space' designations.

Comment [a7]: And industrial?

5.2.1 An 'open space' designation within an SAC is inappropriate as it does not mark the site out as being of special conservation value. It also leads to ambiguity in relation to what actions may and may not be permissible on the site.

Recommendation 1:

5.2.2 Ensure that the boundary of the SAC is clearly marked on the LAP objectives map. Designate this area for 'biodiversity conservation' or other similar title that accurately conveys the purpose and importance of the site.

Recommendation 2:

5.2.3 Ensure that *any* development within the town that is within or adjacent to the SAC is screened for impacts in accordance with the requirements for Appropriate Assessment under the Habitats Directive.

Recommendation 3:

5.2.4 The boundary of the SAC as given by NPWS must be strictly respected at all times. From this data it can be seen that the site boundary encompasses margins of riparian vegetation and this should fenced off and maintained during any adjacent construction works.

5.2.5 Only the Appropriate Assessment process can determine the value of features and land parcels within the SAC. A note to this effect should be included in the LAP to ensure it is clear to planners, developers and other interested parties.

5.2.6 These actions would reduce this **severe negative** impact to **neutral through avoidance**.

5.3 Deterioration of water quality

5.3.1 Discharge of pollutants into the Dinin river as a result of surface-water run-off from new developments.

5.3.2 Macroinvertebrate analysis at points both upstream and downstream of the town suggest that water quality is vulnerable to further pollutant inputs. This is likely to improved with the operation of new wastewater treatment facilities in 2009 but can be undermined if greater levels of untreated surface water run-off are allowed to enter the Dinin.

Recommendation 4:

5.3.3 Ensure that all new developments that will be discharging surface water to the Dinin river include appropriate abatement measures to ensure that final concentrations of pollutants will not result in a deterioration of water quality. This may include providing for Sustainable Drainage Systems (SUDS) which are proven to protect water quality and alleviate flood impacts.

5.3.4 An innovative opportunity exists to provide an attenuation solution for all new developments at once through the creation of a constructed wetland. This is potentially more cost effective as it requires minimal maintenance, has excellent pollutant attenuation performance and can enhance the conservation objectives of the site through habitat creation.

5.3.5 Implementing this recommendation could reduce the magnitude of the impact from potentially **severe negative** to **neutral**.

5.4 Loss of non designated habitat

5.4.1 Loss of connectivity between the SAC and the surrounding countryside due to cumulative loss of hedgerows

5.4.2 Much of the hedgerow within the LAP boundary has already been lost due to the cumulative impacts of built development in the Castlecomer area. Nevertheless it is important to retain what is left where possible and to introduce enhancement measures within the design of new developments.

Recommendation 5:

5.4.3 Ensure that the retention, enhancement or replanting of native hedgerows is integrated into new plans for development. It is essential to use appropriate native species for this purpose and specifically the use of Cherry laurel and Leyland cypress should be avoided at all costs. The former species is invasive and is responsible for degrading many of Ireland's semi-native woodlands.

5.5 Monitoring

5.5.1 Monitoring is required where there may be residual impacts despite implementation of mitigation measures. The EPA have a monitoring station in the town as part of their on-going programme of data collection and this is expected to highlight the impact of future projects on water quality.

5.5.2 It is not considered necessary to propose further monitoring for the impacts highlighted in this report. However, monitoring may be necessary as part of Appropriate Assessments for individual developments in the future

5.5.3 The 'Guidelines for Baseline Ecological Assessment' (IEA, 1995) recommends that further, more detailed study be carried out where the presence of species of conservation importance is highlighted through the literature review or site survey. Section 6.1 of the guidelines, *Mammals*, recommends further study where the baseline survey indicates the probable presence of species protected under...the Wildlife and Countryside Act [in Ireland the equivalent is the Wildlife (Amendment) Act 2000]".

5.5.4 Where impacts are likely on these species, further studies will be required.

Comment [a8]: Is this mitigation i.e a requirements for project level AA in these circumstances

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Appendix 1 – NPWS Site Synopsis for River Barrow and River Nore SAC

Site SYNOPSIS: RIVER BARROW AND RIVER NORE (SITE CODE : 2162)

This site consists of the freshwater stretches of the Barrow/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, Portarlington, 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. Both rivers rise in the Old Red Sandstone of the Slieve Bloom Mountains before passing through a band of Carboniferous shales and sandstones. The Nore, for a large part of its course, traverses limestone plains and then

Old Red Sandstone for a short stretch below Thomastown. Before joining the Barrow it runs over intrusive rocks poor in silica. The upper reaches of the Barrow also runs through limestone. The middle reaches and many of the eastern tributaries, sourced in the Blackstairs Mountains, run through Leinster Granite. The southern end, like the Nore runs over intrusive rocks poor in silica. Waterford Harbour is a deep valley excavated by glacial floodwaters when the sea level was lower than today. The coast shelves quite rapidly along much of the shore.

The site is a candidate SAC selected for alluvial wet woodlands and petrifying springs, priority habitats on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for old oak woodlands, floating river vegetation, estuary, tidal mudflats, *Salicornia* mudflats, Atlantic salt meadows, Mediterranean salt meadows, dry heath and eutrophic tall herbs, all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Nore Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon, Otter, *Vertigo moulinsiana* and the plant Killarney Fern.

Good examples of Alluvial Forest are seen at Rathsnagadan, Murphy's of the River, in Abbeyleix estate and along other shorter stretches of both the tidal and freshwater elements of the site. Typical species seen include Almond Willow (*Salix triandra*), White Willow (*S. alba*), Grey Willow (*S. cinerea*), Crack Willow (*S. fragilis*), Osier (*S. viminalis*), with Iris (*Iris pseudacorus*), Hemlock Water-dropwort (*Oenanthe crocata*), Angelica (*Angelica sylvestris*), Thin-spiked Wood-sedge (*Carex strigosa*), Pendulous Sedge (*C. pendula*), Meadowsweet (*Filipendula ulmaria*), Valerian (*Valeriana officinalis*) and the Red Data Book species Nettle-leaved Bellflower (*Campanula trachelium*).

Three rare invertebrates have been recorded in this habitat at Murphy's of the River. These are: *Neoascia obliqua* (Diptera: Syrphidae), *Tetanocera freyi* (Diptera: Sciomyzidae) and *Dictya umbrarum* (Diptera: Sciomyzidae).

A good example of petrifying springs with tufa formations occurs at Dysart Wood along the Nore. This is a rare habitat in Ireland and one listed with priority status on Annex I of the EU Habitats Directive. These hard water springs are characterised by lime encrustations, often associated with small waterfalls. A rich bryophyte flora is typical of the habitat and two diagnostic species, *Cratoneuron commutatum* var*. commutatum* and *Eucladium verticillatum*, have been recorded.

The best examples of old Oak woodlands are seen in the ancient Park Hill woodland in the estate at Abbeyleix; at Kyleadohir, on the Delour, Forest Wood House, Kylecorragh and Brownstown Woods on the Nore; and at Cloghristic Wood, Drummond Wood and Borris Demesne on the Barrow, though other patches occur throughout the site.

Abbeyleix Woods is a large tract of mixed deciduous woodland which is one of the only remaining true ancient woodlands in Ireland. Historical records show that Park Hill has been continuously wooded since the sixteenth century and has the most complete written record of any woodland in the country. It supports a variety of woodland habitats and an exceptional diversity of species including 22 native trees, 44 bryophytes and 92 lichens. It also contains eight indicator species of ancient woodlands. Park Hill is also the site of two rare plants, Nettle-leaved Bellflower and the moss *Leucodon sciuroides.* It has a typical bird fauna including Jay, Long-eared Owl and Raven. A rare invertebrate, *Mitostoma chrysomelas,* occurs in Abbeyleix and only two other sites in the country.

Two flies *Chrysogaster virescens* and *Hybomitra muhlfeldi* also occur. The rare Myxomycete fungus, *Licea minima* has been recorded from woodland at Abbeyleix. Oak woodland covers parts of the valley side south of Woodstock and is well developed at Brownsford where the Nore takes several sharp bends. The steep valley side is covered by Oak (*Quercus* spp.), Holly (*Ilex aquifolium*)*,* Hazel (*Corylus avellana*) and Birch (*Betula pubescens*) with some Beech (*Fagus sylvatica*) and Ash (*Fraxinus excelsior*). All the trees are regenerating through a cover of Bramble (*Rubus fruticosus* agg.)*,* Foxglove (*Digitalis purpurea*) Wood Rush (*Luzula sylvatica*) and Broad Buckler-fern (*Dryopteris dilatata*)*.*

On the steeply sloping banks of the River Nore about 5 km west of New Ross, in County Kilkenny, Kylecorragh Woods form a prominent feature in the landscape. This is an excellent example of a relatively undisturbed, relict Oak woodland with a very good tree canopy. The wood is quite damp and there is a rich and varied ground flora. At Brownstown a small, mature Oak-dominant woodland occurs on a steep slope. There is younger woodland to the north and east of it. Regeneration throughout is evident. The understorey is similar to the woods at Brownsford. The ground flora of this woodland is developed on acidic, brown earth type soil and comprises a thick carpet of Bilberry (*Vaccinium myrtillus*)*,* Heather (*Calluna vulgaris*)*,* Hard Fern (*Blechnum spicant*)*,* Cowwheat (*Melampyrum* spp.) and Bracken (*Pteridium aquilinum*)*.* Borris Demesne contains a very good example of a semi-natural broad-leaved woodland in very good condition. There is quite a high degree of natural re-generation of Oak and Ash through the woodland. At the northern end of the estate Oak species predominate.

Drummond Wood, also on the Barrow, consists of three blocks of deciduous woods situated on steep slopes above the river. The deciduous trees are mostly Oak species. The woods have a well established understorey of Holly (*Ilex aquifolium*), and the herb layer is varied, with Brambles abundant. Whitebeam (*Sorbus devoniensis*) has also been recorded.

Eutrophic tall herb vegetation occurs in association with the various areas of alluvial forest and elsewhere where the flood-plain of the river is intact. Characteristic species of the habitat include Meadowsweet (*Filipendula ulmaria*), Purple Loosestrife (*Lythrum salicaria*), Marsh Ragwort (*Senecio aquaticus*), Ground Ivy (*Glechoma hederacea*) and Hedge Bindweed

(*Calystegia sepium*). Indian Balsam (*Impatiens glandulifera*), an introduced and invasive species, is abundant in places.

Floating River Vegetation is well represented in the Barrow and in the many tributaries of the site. In the Barrow the species found include Water Starworts (*Callitriche* spp.), Canadian Pondweed (*Elodea canadensis*), Bulbous Rush (*Juncus bulbosus*), Milfoil (*Myriophyllum* spp.), *Potamogeton* x *nitens,* Broad-leaved Pondweed (*P. natans*), Fennel Pondweed (*P. pectinatus*), Perfoliated Pondweed (*P. perfoliatus*) and Crowfoots (*Ranunculus* spp.). The water quality of the Barrow has improved since the vegetation survey was carried out (EPA, 1996).

Dry Heath at the site occurs in pockets along the steep valley sides of the rivers especially in the Barrow Valley and along the Barrow tributaries where they occur in the foothills of the Blackstairs Mountains. The dry heath vegetation along the slopes of the river bank consists of Bracken (*Pteridium aquilinum*) and Gorse (*Ulex europaeus*) species with patches of acidic grassland vegetation. Additional typical species include Heath Bedstraw (*Galium saxatile*), Foxglove (*Digitalis purpurea*), Common Sorrel (*Rumex acetosa*) and Bent Grass (*Agrostis stolonifera*). On the steep slopes above New Ross the Red Data Book species Greater Broomrape (*Orobanche rapum-genistae*) has been recorded.

Where rocky outcrops are shown on the maps Bilberry (*Vaccinium myrtillus*) and Wood Rush (*Luzula sylvatica*) are present. At Ballyhack a small area of dry heath is interspersed with patches of lowland dry grassland. These support a number of Clover species including the legally protected Clustered Clover (*Trifolium glomeratum*) – a species known from only one other site in Ireland. This grassland community is especially well developed on the west side of the mud-capped walls by the road. On the east of the cliffs a group of rock-dwelling species occur, i.e. English Stonecrop (*Sedum anglicum*), Sheep's-bit (*Jasione montana*) and Wild Madder (*Rubia peregrina*). These rocks also support good lichen and moss assemblages with *Ramalina subfarinacea* and *Hedwigia ciliata*.

Dry Heath at the site generally grades into wet woodland or wet swamp vegetation lower down the slopes on the river bank. Close to the Blackstairs Mountains, in the foothills associated with the Aughnabrisky, Aughavaud and Mountain Rivers there are small patches of wet heath dominated by Purple Moor-grass (*Molinia caerulea*) with Heather (*Calluna vulgaris*), Tormentil (*Potentilla erecta*), Carnation Sedge (*Carex panicea*) and Bell Heather (*Erica cinerea*).

Saltmeadows occur at the southern section of the site in old meadows where the embankment has been breached, along the tidal stretches of in-flowing rivers below Stokestown House, in a narrow band on the channel side of Common Reed (*Phragmites*) beds and in narrow fragmented strips along the open shoreline. In the larger areas of salt meadow, notably at Carrickcloney, Ballinlaw Ferry and Rochestown on the west bank; Fisherstown, Alderton and Great Island to Dunbrody on the east bank, the Atlantic and Mediterranean sub types are generally intermixed. At the upper edge of the salt meadow in the narrow ecotonal areas bordering the grasslands where there is significant percolation of salt water, the legally protected species Borrer's Saltmarsh-grass (*Puccinellia fasciculata*) and Meadow Barley (*Hordeum secalinum*) (Flora Protection Order, 1987) are found. The very rare Divided Sedge (*Carex divisa*) is also found. Sea Rush (*Juncus maritimus*) is also present. Other plants recorded and associated with salt meadows include Sea Aster (*Aster tripolium*), Sea Thrift (*Armeria maritima*), Sea Couch (*Elymus pycnanthus*), Spear-leaved Orache (*Atriplex prostrata*), Lesser Sea-spurrey (*Spergularia marina*), Sea Arrowgrass (*Triglochin maritima*) and Sea Plantain (*Plantago maritima*).

Salicornia and other annuals colonising mud and sand are found in the creeks of the saltmarshes and at the seaward edges of them. The habitat also occurs in small amounts on some stretches of the shore free of stones.

The estuary and the other Habitats Directive Annex I habitats within it form a large component of the site. Extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. Good quality intertidal sand and mudflats have developed on a linear shelf on the western side of Waterford Harbour, extending for over 6 km from north to south between Passage East and Creadaun Head, and in places are over 1 km wide. The sediments are mostly firm sands, though grade into muddy sands towards the upper shore. They have a typical macro-invertebrate fauna, characterised by polychaetes and bivalves. Common species include *Arenicola marina*, *Nephtys hombergii*, *Scoloplos armiger*, *Lanice conchilega* and *Cerastoderma edule*.

The western shore of the harbour is generally stony and backed by low cliffs of glacial drift. At Woodstown there is a sandy beach, now much influenced by recreation pressure and erosion. Behind it a lagoonal marsh has been impounded which runs westwards from Gaultiere Lodge along the course of a slow stream. An extensive reedbed occurs here. At the edges is a tall fen dominated by sedges (*Carex* spp.), Meadowsweet, Willowherb (*Epilobium* spp.) and rushes (*Juncus* spp.). Wet woodland also occurs. This area supports populations of typical waterbirds including Mallard, Snipe, Sedge Warbler and Water Rail.

The dunes which fringe the strand at Duncannon are dominated by Marram grass (*Ammophila arenaria*) towards the sea. Other species present include Wild Sage (*Salvia verbenaca*), a rare Red Data Book species. The rocks around Duncannon ford have a rich flora of seaweeds typical of a moderately exposed shore and the cliffs themselves support a number of coastal species on ledges, including Thrift (*Armeria maritima*), Rock Samphire (*Crithmum maritimum*) and Buck's-horn Plantain (*Plantago coronopus*). Other habitats which occur throughout the site include wet grassland, marsh, reed swamp, improved grassland, arable land, quarries, coniferous plantations, deciduous woodland, scrub and ponds.

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 (*Carex divisa*), Clustered Clover (*Trifolium glomeratum*), Basil Thyme (*Acinos arvensis*), Hemp nettle (*Galeopsis angustifolia*), Borrer's Saltmarsh Grass (*Puccinellia fasiculata*), Meadow Barley (*Hordeum secalinum*), Opposite-leaved Pondweed (*Groenlandia densa*), Autumn Crocus (*Colchicum autumnale*), Wild Sage (*Salvia verbenaca*), Nettle-leaved Bellflower (*Campanula trachelium*), Saw-wort (*Serratula tinctoria*), Bird Cherry (*Prunus padus*), Blue Fleabane (*Erigeron acer*), Fly Orchid (*Ophrys insectifera*), Broomrape (*Orobanche hederae*) and Greater Broomrape (*Orobanche rapum-genistae*). Of these the first nine are protected under the Flora Protection Order 1999. Divided Sedge (*Carex divisa*) was thought to be extinct but has been found in a few locations in the site since 1990. In addition plants which do not have a very wide distribution in the country are found in the site including Thin-spiked Wood-sedge (*Carex strigosa*), Field Garlic (*Allium oleraceum*) and Summer Snowflake (*Leucojum aestivum*). Six rare lichens, indicators of ancient woodland, are found including *Lobaria laetevirens* and *L. pulmonaria.* The rare moss *Leucodon sciuroides* also occurs.

The site is very important for the presence of a number of EU Habitats Directive Annex II animal species including Freshwater Pearl Mussel (*Margaritifera margaritifera* and *M. m. durrovensis*), Freshwater Crayfish (*Austropotamobius pallipes*), Salmon (*Salmo salar*), Twaite Shad (*Alosa fallax fallax*), three Lamprey species - Sea (*Petromyzon marinus*), Brook (*Lampetra planeri*) and River (*Lampetra fluviatilis*), the marsh snail *Vertigo moulinsiana* and Otter (*Lutra lutra*). This is the only site in the world for the hard water form of the 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 (*Myotis daubentoni*), Badger (*Meles meles*), Irish Hare (*Lepus timidus hibernicus*) and Frog (*Rana temporaria*). 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, Bartailed 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.

Landuse at the site consists mainly of agricultural activities – many intensive, principally grazing and silage production. Slurry is spread over much of this 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 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. Fishing is a main tourist attraction along stretches of the main rivers and their tributaries and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. 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, overgrazing within the woodland areas, and invasion by non-native species, for example Cherry Laurel 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 respectively. 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 Pearl Mussel which is limited to a 10 km stretch of the Nore, add further interest to this site.

Appendix 2 – Species Lists For Surveyed Habitats

Riparian Woodland - WN5

*Acer pseudoplatanus**	Sycamore
*Aegopodium podagraria**	Ground-elder
Agrostis stolonifera	Creeping bent
Alnus glutinosa	Alder
Anthriscus sylvestris	Cow parsley
Brachypodium sylvaticum	False brome
Bromus ramosus	Hairy-brome
Carex sylvatica	Wood sedge
Circaea lutetiana	Enchanter's-nightshade
Crataegus monogyna	Hawthorn
Festuca rubra	Red fescue
Filipendula ulmaria	Meadowsweet
Fraxinus excelsior	Ash
Galium aparine	Cleavers
Geranium robertianum	Herb-Robert
Geum urbanum	Wood avens
Glechoma hederacea	Ground ivy
Hedera helix	Ivy
Ilex aquifolium	Holly
Lapsana communis	Nipplewort
Phalaris arundinacea	Reed canary-grass
Phleum pratense	Timothy
Populus sp.	Poplar
Ranunculus repens	Creeping buttercup
Rubus fruticosus	Bramble
Rubus idaeus	Raspberry
Salix sp.	Willow
Sambucus nigra	Elder
Stellaria graminae	Lesser stitchwort
Ulmus glabra	Wych elm
Urtica dioica	Common nettle

(Mixed) Broadleaved Woodland - WD1

*Aesculus hipposcastanum**	Horse-chestnut
Alnus glutinosa	Alder
Carex remota	Remote sedge
Carex sylvatica	Wood sedge
*Castanea sativa**	Sweet chestnut
Circaea lutetiana	Enchanter's-nightshade
Cirsium vulgare	Spear thistle
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Elymus repens	Common couch
Epilobium hirsutum	Great willowherb
Epilobium montanum	Broad-leaved willowherb
Filipendula ulmaria	Meadowsweet
Fraxinus excelsior	Ash
Galium aparine	Cleavers
Geranium robertianum	Herb-Robert
Geum urbanum	Wood avens
Glechoma hederacea	Ground ivy
Hedera helix	Ivy
Heracleum sphondylium	Hogweed
Hyacinthoides non-scripta	Bluebell
Ilex aquifolium	Holly
Lamium album	White dead-nettle
*Larix sp.**	Larch
Petasites hydridus	Butterbur
Phyllitis scolopendrium	Hart's tongue
Picea sitchensis	Sitka spruce
Polystichum setiferum	Soft shield-fern
Primula vulgaris	Primrose
*Prunus laurocerasus**	Cherry laurel
Quercus sp.	Oak
Ranunculus repens	Creeping buttercup
Rubus fruticosus	Bramble
Rumex obtusifolius	Broad-leaved dock
Salix sp.	Willow
Sambucus nigra	Elder
Senecio jacobaea	Common ragwort
Stachys sylvatica	Hedge woundwort
*Symphoricarpos albus**	Snowberry
Taxus baccata	Yew
Trifolium repens	White clover
Urtica dioica	Common nettle
Viola riviniana	Common dog-violet

Eutrophic lakes - FL5

Angelica sylvestris	Wild angelica
*Avena strigosa**	Bristle oat
Circaea lutetiana	Enchanter's-nightshade
Cirsium vulgare	Spear thistle
Deschampsia cespitosa	Tufted hair-grass
Epilobium hirsutum	Great willowherb
Epilobium montanum	Broad-leaved willowherb
Glyceria fluitans	Floating sweet-grass
Hypericum tetrapterum	Square-stalked St. John's wort
Lotus uliginosus	Greater bird's-foot-trefoil
Myosotis scorpioides	Water forget-me-not
Nymphaea alba	White water-lily
Plantago major	Greater plantain
Prunella vulgaris	Selfheal
Scrophularia nodosa	Common figwort
Sparganium erectum	Branched bur-reed
Stachys sylvatica	Hedge woundwort
Typha latifolia	Bulrush
Urtica dioica	Common nettle

Hedgerow - WL1

Fraxinus excelsior	Ash
Crataegus monogyna	Hawthorn
Rubus fruticosus	Bramble
Vicia sepium	Buch vetch
Arrhenatherum elatius	False oat-grass
Rosa arvensis	Field-rose
Prunus spinosa	Blackthorn
Anthriscus sylvestris	Cow parsley
Calystegia sepium	Hedge bindweed
Hedera helix	Ivy
Epilobium montanum	Broad-leaved willowherb
Galium aparine	Cleavers
Corylus avellana	Hazel
Senecio jacobaea	Common ragwort
Sonchus arvensis	Perennial sow-thistle
Ilex aquifolium	Holly
Festuca rubra	Red fescue
Sambucus nigra	Elder
Ulmus glabra	Wych elm
Lapsana communis	Nipplewort
*Acer pseudoplatanus**	Sycamore
Filipendula ulmaria	Meadowsweet
Cirsium vulgare	Spear thistle
Hypericum tetrapterum	Square-stalked St. John's wort
Quercus sp.	Oak
*Avena strigosa**	Bristle oat
Plantago lanceolata	Ribwort Plantain
Holcus lanatus	Yorkshire-fog

Deleted: ¶

Appendix 3 – Q-Value Assessments

Location 1: Downstream of bridge near the Discovery Park									
TAXA	Group A	TAXA	Group C	TAXA	Group D		Total Numbers	Relative Abundance, %	Abundance Category
Plecoptera		**Ephemeroptera**		**Megaloptera**		Group A	0	0	Absent
All except *Leuctra* spp.		*Baetis rhodani*	72	Sialidae					
Ephemeroptera		Caenidae		**Crustacea**		Group B	12	9	Fair Numbers
Heptageniidae		Ephemerellidae		Assellus sp.					
Siphlonuriidae		**Trichoptera**		Crangonyx sp.		Group C	121	90	Excessive
Ephemera danica		Uncased spp.		**Gastropoda**					
Lamellibranchiata		**Hemiptera**				Group D	1	1	Present
Margaritifera margaritifera		All except *A. aestivalis*		*Lymnaea peregra*					
		Coleoptera	7	Physa sp.					
TAXA	Group B	**Diptera**		**Lamellibranchiata**		Group E	0	0	Absent
Plecoptera		Chrionomidae (excl. Chironomus sp.)	1	Sphaeriidae					
Leuctra spp.	12	Simuliidae	37	**Hirudinea**		Q-Value Determination – Q3: Moderately Polluted			
Ephemeroptera		Tipulidae	3	All except Piscicola sp.	1				
Baetidae (excl. *B. rhodani*)		**Hydracarina**		TAXA	Group E				
Leptophlebidae		**Crustacea**		**Diptera**		Notes:			
Trichoptera		Gammarus spp.	1	Chrionomus sp.					

Cased spp.		*Austropotamobius pallipes*		Eristalis sp.		Substrate made up of large rocks Light/Moderate siltation No Cladophora sp. growth Moderate in-stream macrophyte growth Slime growths absent
Hemiptera		**Gastropoda**		**Oligochaeta**		
Aphelocheirus aestivalis		(all excl. L. peregra & Physa sp.)		Tubificidae		
Odonata		**Lamellibranchiata**				
		Anodonta sp.				
		Hirudinea				
		Piscicola sp.				
		Platyhelminthes				

Location 2: Main channel of Dinin, upstream of LAP area									
TAXA	Group A	TAXA	Group C	TAXA	Group D		Total Numbers	Relative Abundance, %	Abundance Category
Plecoptera		**Ephemeroptera**		**Megaloptera**		Group A	6	2	Small Numbers
All except *Leuctra* spp.		*Baetis rhodani*	92	Sialidae					
Ephemeroptera		Caenidae		**Crustacea**		Group B	9	3	Small Numbers
Heptageniidae	6	Ephemerellidae	8	Assellus sp.					
Siphlonuriidae		**Trichoptera**		Crangonyx sp.		Group C	321	95	Excessive
Ephemera danica		Uncased spp.	3	**Gastropoda**					
Lamellibranchiata		**Hemiptera**				Group D	0	0	Absent
Margaritifera margaritifera		All except *A. aestivalis*		*Lymnaea peregra*					
		Coleoptera	69	Physa sp.					
TAXA	Group B					Group E	0	0	Absent
		Diptera		**Lamellibranchiata**					
Plecoptera		Chrionomidae (excl. Chironomus sp.)		Sphaeriidae					
Leuctra spp.	9	Simuliidae	112	**Hirudinea**		Q-Value Determination – Q3-4: Slightly Polluted			
Ephemeroptera		Tipulidae	28	All except Piscicola sp.					
Baetidae (excl. *B. rhodani*)		**Hydracarina**		TAXA	Group E				
Leptophlebidae		**Crustacea**		**Diptera**		Notes: Moderate siltation and extensive erosion of river banks Cattle access in evidence No Cladophora sp. growth			
Trichoptera		Gammarus spp.	7	Chrionomus sp.					
Cased spp.		*Austropotamobius pallipes*		Eristalis sp.					
Hemiptera		**Gastropoda**		**Oligochaeta**					
Aphelocheirus		(all excl. L. peregra &		Tubificidae					

aestivalis		Physa sp.)				No in-stream macrophyte growth Slime growths present
Odonata		**Lamellibranchiata**				
		Anodonta sp.				
		Hirudinea				
		Piscicola sp.	2			
		Platyhelminthes				

Location 3: Upstream of LAP area, along tributary running to the west of the town									
TAXA	Group A	TAXA	Group C	TAXA	Group D		Total Numbers	Relative Abundance, %	Abundance Category
Plecoptera		**Ephemeroptera**		**Megaloptera**		Group A	4	5	Fair Numbers
All except *Leuctra* spp.		*Baetis rhodani*	24	Sialidae					
Ephemeroptera		Caenidae		**Crustacea**		Group B	22	29	Numerous
Heptageniidae	4	Ephemerellidae	2	Assellus sp.					
Siphlonuriidae		**Trichoptera**		Crangonyx sp.		Group C	51	66	Dominant
Ephemera danica		Uncased spp.	2	**Gastropoda**					
Lamellibranchiata		**Hemiptera**		*Lymnaea peregra*		Group D	0	0	Absent
Margaritifera margaritifera		All except *A. aestivalis*		Physa sp.					
		Coleoptera							
TAXA	Group B	**Diptera**		**Lamellibranchiata**		Group E	0	0	Absent
Plecoptera		Chrionomidae (excl. Chironomus sp.)	2	Sphaeriidae					
Leuctra spp.	22	Simuliidae	8	**Hirudinea**		Q-Value Determination – Q4: Unpolluted			
Ephemeroptera		Tipulidae	13	All except Piscicola sp.					
Baetidae (excl. *B. rhodani*)		**Hydracarina**		TAXA	Group E	Notes: Substrate made up of rocks and stones Very light siltation No Cladophora sp. growth			
Leptophlebidae		**Crustacea**		**Diptera**					
Trichoptera		Gammarus spp.		Chrionomus sp.					
Cased spp.		*Austropotamobius pallipes*		Eristalis sp.					
Hemiptera		**Gastropoda**		**Oligochaeta**					
Aphelocheirus		(all excl. L. peregra &		Tubificidae					

aestivalis		Physa sp.)				No in-stream macrophyte growth Slime growths absent
Odonata		**Lamellibranchiata**				
		Anodonta sp.				
		Hirudinea				
		Piscicola sp.				
		Platyhelminthes				

Location 4: Downstream of LAP area									
TAXA	Group A	TAXA	Group C	TAXA	Group D		Total Numbers	Relative Abundance, %	Abundance Category
Plecoptera		**Ephemeroptera**		**Megaloptera**		Group A	0	0	Absent
All except *Leuctra* spp.		*Baetis rhodani*	35	Sialidae					
Ephemeroptera		Caenidae		**Crustacea**		Group B	13	12	Common
Heptageniidae		Ephemerellidae		Assellus sp.					
Siphlonuriidae		**Trichoptera**		Crangonyx sp.		Group C	92	88	Excessive
Ephemera danica		Uncased spp.		**Gastropoda**					
Lamellibranchiata		**Hemiptera**		*Lymnaea peregra*		Group D	0	0	Absent
Margaritifera margaritifera		All except *A. aestivalis*		Physa sp.					
		Coleoptera	1						
TAXA	Group B	**Diptera**		**Lamellibranchiata**		Group E	0	0	Absent
Plecoptera		Chrionomidae (excl. Chironomus sp.)		Sphaeriidae					
Leuctra spp.	13	Simuliidae	50	**Hirudinea**		Q-Value Determination – Q3: Moderately Polluted			
Ephemeroptera		Tipulidae	4	All except Piscicola sp.					
Baetidae (excl. *B.*		**Hydracarina**		TAXA	Group				

rhodani)					E	
Leptophlebidae		**Crustacea**		**Diptera**		Notes: Substrate made up of rocks and boulders Moderate siltation No Cladophora sp. growth Luxuriant macrophyte growth, especially *Nasturtium officinale* Slime growths absent
Trichoptera		Gammarus spp.	2	Chrionomus sp.		
Cased spp.		*Austropotamobius pallipes*		Eristalis sp.		
Hemiptera		**Gastropoda**		**Oligochaeta**		
Aphelocheirus aestivalis		(all excl. L. peregra & Physa sp.)		Tubificidae		
Odonata		**Lamellibranchiata**				
		Anodonta sp.				
		Hirudinea				
		Piscicola sp.				
		Platyhelminthes				