Appropriate Assessment of the Ferrybank - Belview Local Area Plan in Relation to the Lower River Suir Special Area of Conservation (SAC) and the Grannyferry Natural Heritage Area (NHA).

prepared by OPENFIELD Ecological Services
for the National Building Agency

June 2008

www.openfield.ie

Table of Contents

EXECUTIVE 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. The principle potential impact of the LAP was identified as loss of habitat adjacent to important sites through built development. This focussed on two areas: Grannyferry; and Belview 2. A lesser impact was predicted through the designation of areas as 'passive open space', rather than specifically for 'biodiversity conservation'.
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.	1. Habitat removal in the Granny area would reduce a buffer zone around the SAC/NHA and further diminish already fragmented ecological corridors between the two sites. 2. Habitat removal in the Granny area would further reduce an already damaged wetland system known to be home to Otter, an Annex I listed species under the Habitats Directive. This could also lead to a deterioration of water quality in the SAC although the extent to which this may occur is uncertain. 3. Loss of derelict buildings to the south of the Grannyferry area could result in impacts on bat populations – a key species in the NHA and protected under the Wildlife (Amendment) Act, 2000 and Annex IV of the Habitats Directive. This is highly uncertain as no data exists for the site. 4. Zoning ecologically important areas as 'passive open space' does not adequately communicate the function of these area and may lead to ambiguity, particularly where development for amenity may be proposed.

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. In the Grannyferry area the sites could be impacted through diminished functioning through loss of adjacent semi-natural habitat, reduced connectivity between the SAC and NHA, and loss of key species (bats). Bat data for the area however is not available. 2. In the Belview area, loss of semi-natural habitats could result in a deterioration of water quality in the SAC (uncertain), reduction in Otter population (uncertain though likely), and reduced connectivity between the SAC and riparian woodland.
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.	1. In the Grannyferry area, rezone built development for 'biodiversity conservation'. 2. Survey derelict buildings (factory to the south and old farm buildings to the north) for bats in compliance with the Wildlife (Amendment) Act 2000 3. Ensure that a full Ecological Impact Assessment is carried out for development projects in the Belview port area adjacent to the SAC. This should focus on avoiding/mitigating negative impacts and enhancing features where possible. 4. Where areas in the plan are being zoned for conservation, created a title of 'biodiversity conservation' in order to communicate their importance and function.

Results of Consultation

Agency contacted	**Response**
NPWS	Mr Jimi Conroy, NPWS Wildlife Ranger, discussed how the site of the service station near the Granny roundabout has been the subject of on-going consultations that have recently reached a conclusion. The zoning at this site is therefore considered appropriate. The site around the service station nearer to the Newrath roundabout was until recently a wetland but this has been in-filled. The legality of this action is unclear and he believes that zoning for built development here is inappropriate.
Southern Regional Fisheries Board	no response

Irish Wildlife Trust – Waterford branch	Highlighted the damage that has already occurred in the Granny area and expressed concern that more land was being zoned for built development despite continued fragmentation and illegal infilling.
Kilkenny county council, heritage office	Emphasised the need to maintain connectivity between the SAC/NHA and surrounding sites, particularly along river corridors

1.0 INTRODUCTION

1.1 The nature of the proposed plan

Kilkenny county council are currently preparing a Local Area Plan (LAP) for the Ferrybank - Belview area. This plan provides for the proper planning of the region and the sustainable development of communities and the overall economy.

1.2 The need for an Appropriate Assessment

The Lower River Suir SAC (site code: 2137) and the Grannyferry NHA (site code: 833) are both situated within the boundary of the LAP. 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'. Under Article 6 of its provisions, an Appropriate Assessment is required to be carried out by the competent authority where a plan or project may impact on the site's conservation status. 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.

Step 1 of this process is a screening of the plan to determine, at an initial level, whether impacts are likely. The screening report for Ferrybank - Belview LAP was prepared in May 2008 and found that significant impacts are likely to arise (OPENFIELD, 2008). This assessment triggered Step 2, the full Appropriate Assessment stage.

1.3 Methodology

The 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).

1.4 Zone of Influence

The zone of influence of the LAP is shown in figure 1. As can be seen, the SAC is a large site that transects Waterford city. Through most of the study area, the border of the SAC is coincident with the high water mark. Only in the Grannyferry area does the boundary include a terrestrial portion – in this case an island in the Blackwater estuary.

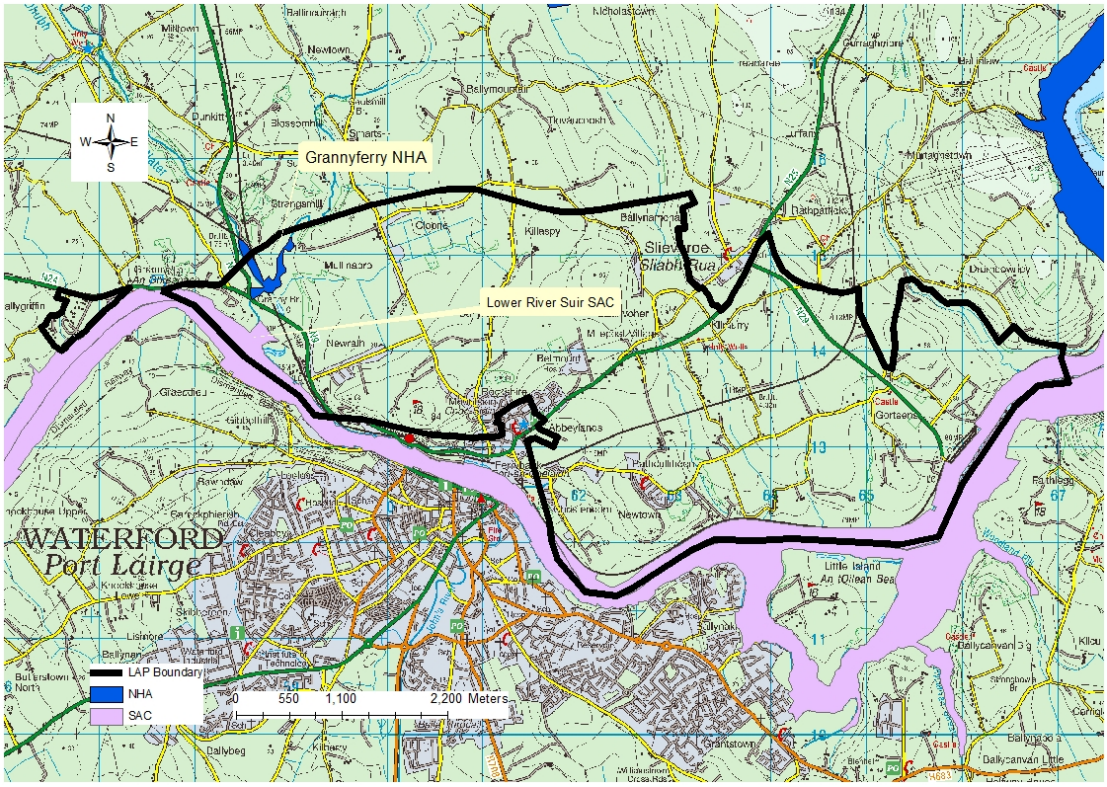


Figure 1 – Zone of Influence of the Ferrybank - Belview LAP showing the location of the SAC and the NHA

1.5 Stakeholders and Consultees

1.5.1 Identification of Stakeholders

The primary stakeholders on this site were judged to be: the National Parks and Wildlife Service (NPWS); the Southern Regional Fisheries Board. Secondary stakeholder are : Kilkenny county council; and the Waterford branch of the Irish Wildlife Trust (IWT).

Consultation was consequently sought from the following people:

	Stakeholder (name/organisation)	**Form of Consultation**
1	NPWS Development Application Unit	Letter
2	Southern Regional Fisheries Board	Letter
3	Jimi Conroy, Wildlife Ranger, NPWS	Phone conversation
4	Miriam Cass, IWT	Phone conversation
	Dearbhala Ledwidge, Heritage Officer, Kilkenny County Council	Meeting

1.5.2 Consultation outcomes

Ms Ledwidge felt that the management of the SACs and NHAs are under the remit of NPWS. Nevertheless, non-designated areas can impact on these sites, particularly the riparian margins of tributaries of the Suir.

Mr Conroy accepted that much damage has occurred to the wetland ecosystem in the Grannyferry area due to a number of development projects including road and rail lines, built development and infilling, both legal and illegal. Despite loss of habitat through major road construction projects, compensatory works are underway in consultation with NPWS.

Ms Cass discussed the fragmented state of habitats in the Grannyferry area and expressed concern that further built development was planed.

No response was received from either the Southern Regional Fisheries Board or the NPWS Development Application Unit.

1.6 Existing legislation, plans and proposals

1.6.1 Convention on Biological Diversity (CBD)

The protection of biodiversity is enshrined in the CBD to which Ireland is a signatory. As part of its commitment to this international treaty Ireland, as part of a wider European Union initiative, is committed to the halt in loss of biodiversity by the year 2010. The National Biodiversity Plan (Dúchas, 2002), published in 2002, states that “each local authority [is] to prepare a local biodiversity action plan”. Kilkenny County Council is currently in the process of drawing up its first Biodiversity Action Plan. The contents of this document however are not available. In addition, the Department of the Environment, Heritage and Local Government is currently preparing the second National Biodiversity Plan.

1.6.2 Kilkenny County Draft Development Plan 2008 – 2014 (KCC, 2008)

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.

1.6.3 National Sustainable Development Strategy

The 2002 document: 'Making Ireland's Development Sustainable' (DOEHLG, 2002) highlights "respect for ecological integrity and biodiversity" as a core theme, while the associated principle is that: "the diversity of wildlife, habitats and species should be maintained and improved". An update to this document was due in 2007 but is not expected until 2008.

1.6.4 Long-term Strategy of the Environmental Protection Agency (EPA)

In 2007 the EPA published '2020 Vision: Protecting and Improving Ireland's Environment' (EPA, 2007) and identified the protection of soil and biodiversity as one of six environmental goals.

1.6.5 South Eastern River Basin District Management Plan

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.

1.7 Scoping of the study/Literature Review

As part of the screening study a comprehensive literature review was carried out to gather existing data. This is reproduced below for completeness.

1.7.1 NPWS Site Synopsis

Information regarding the sites is available through site synopsis reports. These are reproduced as appendices to this report. To date, a management plan has not been published for the Lower River Suir SAC.

The Lower River Suir SAC (site code: 2137) is a large site consisting predominantly of river channel but also encompassing important areas of riparian and estuarine 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.

The Grannyferry NHA (site code: 833) covers a much smaller area but is adjacent to the SAC. It consists of a number of wetland habitats that are home to species of national importance.

Tables 1 and 2 detail the conservation aspects of the SAC and NHA respectively.

Table 1 – Conservation aspects of the Lower River Suir SAC

Aspect	**Level of Protection**	**Relevant[1]**	**Likelihood of potential impacts[2]**
Alluvial wet woodland (code: 91E0)	Habitats Directive Annex I priority	No	None
Yew Woodland (code: 91J0)		No	None
Atlantic Salt Meadows (code: 1330)	Habitats Directive Annex I	Possible	Possible
Mediterranean Salt Meadows (code: 1410)		Possible	Possible
Old Oak Woodlands (code: 91A0)		No	None
Eutrophic Tall Herbs (code: 6430)	Habitats Directive Annex I	Possible	Possible
Sea Lamprey *Petromyzon marinus*	Habitats Directive Annex II	Yes	Unlikely
River Lamprey *Lampetra fluviatilis*		Yes	Unlikely
Brook Lamprey *Lampetra planeri*		Yes	Unlikely
Freshwater Pearl Mussel *Margaritifera margaritifera*		No	None
Freshwater Crayfish *Austropotamobium pallipes*		No	None
Twaite Shad *Alosa fallax fallax*		Yes	Unlikely
Atlantic Salmon *Salmo salar*		Yes	Unlikely
Otter *Lutra lutra*		Yes	Possible
Opposite-leaved pondweed *Groendlandia densa*	Flora Protection	No	None

[1] Relevance is interpreted as meaning the likely presence of the habitat/species in the study area and is taken from relevant literature sources

[2] The likelihood of impact is based on the potential presence of habitats from aerial photography and presence of suitable habitats for different species

Meadow Barley *Hordeum secalinum*	Order, 1999	Yes	Possible
Daubenton's bat *Myotis daubentoni*	Habitats Directive Annex IV; Wildlife Act, 2000	Yes	Possible
Natterer's Bat *Myotis nattereri*		Yes	Possible
Pipistrelle *Pipistrellus pipistrellus*		Yes	Possible
Pine Marten *Martes martes*	Habitats Directive Annex V; Wildlife Act, 2000	No	None
Irish Hare *Lepus timidus hibernicus*		Yes	Possible
Common Frog *Rana temporaria*		Yes	Possible
Badger *Meles meles*	Wildlife Act, 2000	No	None
Greenland White-fronted Goose *Anser albifrons flavirostris*	Birds Directive Annex I; Wildlife Act 2000	No	None
Golden Plover *Pluvialis apricaria*		Yes	Possible
Whooper Swan *Cygnus cygnus*		Yes	Possible
Kingfisher *Alcedo atthis*		Yes	Possible
Smelt *Osmerus eperlanus*	-	Yes	Unlikely

Table 2 – Conservation aspects of the Grannyferry NHA

Conservation aspect	**Level of protection**	**Likelihood of potential impact**
Meadow Barley *Hordeum secalinum*	Flora Protection Order, 1999	Possible
Strawberry clover *Trifolium maritimum*	-	Possible
Brookweed *Samolus valerandi*	-	Possible
Slender spike rush *Eleocharis uniglumis*	-	Possible
Water rail *Rallus aquaticus*	-	Possible
Sedge warbler *Acrocephalus schoenobaenus*	-	Possible
Reed bunting *Emberiza schoeniclus*	-	Possible

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.

1.8 Scope of Site Survey

From the literature review, in addition to a habitat map, the scope of the site survey was broadened to include a search for species identified in tables 1 and 2.

The Grannyferry NHA and the Lower River Suir are intimately linked as they are both part of a wetland system that incorporates the river Suir and its tributaries. Particularly in the Grannyferry area, the site boundaries to not obviously convey this link. Ecologically the whole area is the estuary of the Blackwater river, itself a tributary of the Suir but with some typical estuarine features given the tidal nature of the Suir at this point. For this reason, not only the designated areas, but also the surrounding, non-designated area was included in the scope of the survey. This will allow a better picture to be presented as to how the ecosystem functions as a unit.

Target notes indicate the presence of protected or notable species or ecological features.

2.0 BASELINE DATA

2.1 Methodology

A number of site visits were carried out during June 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.

2.2 Constraints

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

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.

Two major road construction projects currently underway converge in the Grannyferry area: the M9 Dublin-Waterford and the M25 Waterford bypass. The river Blackwater, the current N9 Dublin-Waterford road and the mainline railway also pass through the area. As a result, site survey was difficult in the region and zones that were marked out as construction sites were not entered. In these cases survey took place from the nearest vantage point and in general habitats were easily identified.

This Appropriate Assessment is based on the screening report which identified potential significant impacts to the SAC/NHA in two areas: Granny; and Belview port. Field survey was focussed on these sites only and the full area of the SAC within the BAP boundary was not included. In any case, the SAC is predominantly aquatic and the thin riparian margin is on an active train line, making survey work prohibitive.

The portion of the SAC in the Granny area was inaccessible as it is effectively an island with the river Blackwater on one side and transected throughout by brackish channels. The species list for this area is consequently limited.

2.3 Presentation of results. The screening report identified potential significant impacts in two key areas: Granny; and Belview port. The scope of the baseline survey focussed on these two areas. For clarity the baseline data for these areas is presented separately.

Specific fauna surveys were not carried out and so overview data for both areas is presented together in section 2.6.

2.4 Grannyferry

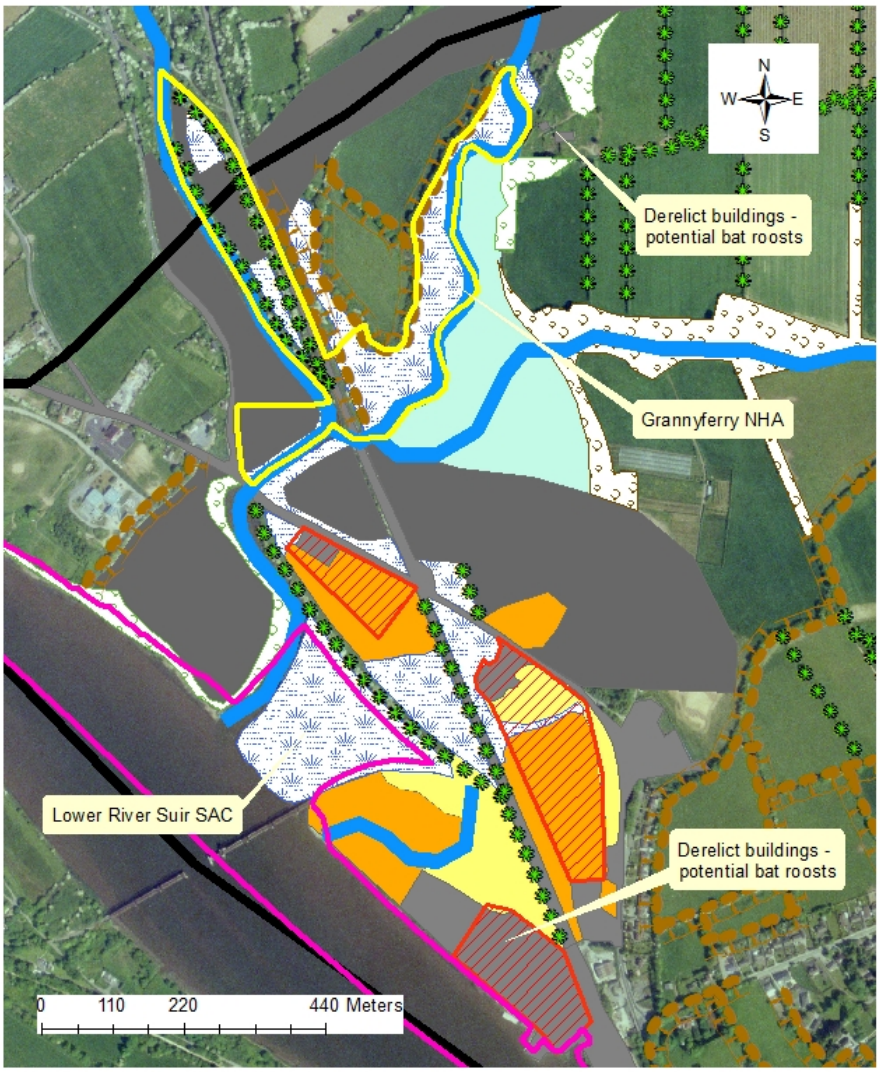
The Grannyferry area features a portion of the SAC and the Grannyferry NHA. It is also the focal point for Waterford city's road and rail transport and new Dublin-Waterford and Waterford bypass motorways are under construction here. Legal and illegal infilling of wetlands has also occurred. The result of all this human activity is an extremely fragmented landscape in terms of the habitats present. What was once probably an unbroken area of marsh and tall reed swamp is now numerous smaller habitats, some retaining features of the original while others are significantly altered. The impact of this disturbance and fragmentation is not clear. While disturbance is always a bad thing for biodiversity, in wetland systems the key is hydrology, and infilling and paved surfaces will alter and inhibit flows of water in unpredictable ways that can lead to flooding and pollution (Otte, 2003). The habitats of Grannyferry are shown in figure 2.

2.4.1 Flora

A total of 12 Fossitt habitats were classified within this area. A habitat map is shown in figure 2. No species listed in the Flora Protection Order (1999) were found to be growing on the site (although a number have been recorded from it). One Red Data list species (Curtis & McGough, 1988), the Bee orchid *Ophrys apifera* was found. A full species list for each habitat can be found in Appendix 3 of this report.

It should be noted that definite boundaries between each habitat type do not exist on the ground as there are frequently broad zones where features of two adjacent habitats are present. There are also instances where two different habitats form intimate mosaics with one anther and where this occurs a judgement is made on the dominant characteristics of the site.

Figure 2 - Habitats of the Grannyferry area



2.4.1.1 Built land

This habitat type consists of man-made, or artificial surfaces and is shown in figure 2 as **BL3 – Buildings and artificial surfaces**. This habitat is represented by roads, railways and existing buildings and is generally not associated with biodiversity. Floral species are generally absent with the exception of occasional ruderals. Normally this habitat is not mapped but is shown here to demonstrate the level of fragmentation that has occurred in the area.

2.4.1.2 Disturbed ground

Human disturbance of habitats can occur through movement of soil and the removal of vegetation. While never preferable to original semi-natural habitat, disturbed ground has the potential to be rich in biodiversity (Fossitt, 2000).

This habitat is represent by two distinct types. **ED2 – Spoil and bare ground** occurs where earth has been moved for on-going construction projects and vegetation has not had the opportunity to establish itself. This is present on the road construction sites and is of little biodiversity value.

ED3 – Recolonising bare ground is to be found where vegetation has established itself after disturbance and covers in excess of 50% of the ground cover. The sites within the Grannyferry area were originally wetland sites that have been in-filled, typically with builder's rubble. As a result they retain some of their wetland features with occasional stands of Common reed *Phragmites australis* and some other typical wetland species such as rushes *Juncus sp.*, sedges *Carex sp.,* and horsetails *Equisetum sp.* This is combined with ruderal species like clovers *Trifolium sp.,* Colt's-foot *Tussilago farfara*, buttercups *Ranunculus sp.* and willowherbs *Epilobium sp.* In some areas there is scrub formation with Gorse *Ulex europaeus* and Willow *Salix sp.* Floral diversity is high and on two sites orchids were recorded: the Heath spotted-orchid *Dactylorhiza maculata* was growing in some numbers near the Texaco petrol station; while the Bee orchid *Ophrys apifera* was found near the river. The latter is listed as rare in the Red Data List (Curtis & McGough, 1988). In a typical habitat a process known as succession will take over after a site has been disturbed under which it will revert to its original state. However, in the case of in-filled wetlands this will not occur without intervention to remove the infill material. As a result a mosaic of different habitats will develop but will be likely to retain the features of disturbed ground indefinitely.

2.4.1.3 Scrub

WS1 – Scrub is a feature of the aforementioned process of succession. It is generally an intermediate state between disturbed ground and the 'climax' vegetation, which in Ireland is forest. It is characterised by stands of Gorse and Willow and can be quite species poor when compared to disturbed ground. In this area, scrub is intimately associated with ED3 – Recolonising bare ground as the two habitats tend to blend into one another. It is probable that areas of richer soil, perhaps where infilling was of soil itself, are allowing the development of scrub. Other species that were recorded include Ash *Fraxinus excelsior* and Oak *Quercus sp.* but they were predominantly immature specimens.

2.4.1.4 Freshwater

The area is characterised by the brackish estuary of the river Blackwater as it enters the river Suir. The lowland topography results in slow moving water that has a broad, shallow bed with a very muddy substrate. This is **FW2 – Depositing/lowland river**. It is intimately associated with the stands of Common reed along its bank that form the habitat **FS2 – Reed and large sedge swamps**. This is to be found sporadically throughout the area, including much of the NHA and the SAC. The reed beds provide important ecosystem services in stabilising the muddy banks, preventing erosion, moderating flood waters and are particularly well known for their ability to attenuate pollution (Otte, 2003). The reed beds in this area are predominantly composed of Common reed and are floristically species poor. The portion of this habitat to the north of the NHA also consists of significant tall sedges, Star sedge *Carex echinata* as well as rushes *Juncus effusus and Scirpus maritimus.*

This habitat has been reduced in size and greatly fragmented as a result of the number of infrastructure projects in the area as well as infilling.

2.4.1.5 Wet grassland – GS4

This habitat is to be found to the east of the NHA but is not included in the designated area. It is characterised by grasses and rushes but is periodically inundated and contains may distinctively wetland species. Attempts have been made to drain the land through digging channels and ditches and so the ground is probably a lot drier than it otherwise would have been. Nevertheless it retains much of its wetland characteristics including numerous sedges and rushes, the grasses Yorkshire fog *Holcus lanatus*, Floating sweet-grass *Glyceria fluitans* and Crested dog's-tail *Cynosurus cristatus.* There are also broad leaved herbaceous species, although these do not dominate, including Ragged robin *Lychnis flos-cuculi,* Marsh ragwort *Senecio aquaticus* and Meadow buttercup *Ranunculus acris.* Also present are localised stands of Common reed and Reed canary-grass *Phalaris arundinacea*.

2.4.1.6 Woodland

Woodlands in the area include both continuous blocks of mature broad-leaved trees and linear woodland features such as hedgerows.

Woodlands are categorised as being **WD1 – Mixed broad-leaved woodland** if they are predominantly composed of non-native tree species, particularly in this case Sycamore *Acer pseudoplatanus* and Beech *Fagus sylvatica.* **WN2 – Oak-Ash-Hazel woodland** is of higher conservation value as it has a >50% canopy of native tree species such as Oak, Ash and Hazel *Corylus avellana*. Because of human activity, this type of woodland is extremely rare in Ireland (Fossitt, 2000) and it is consequently worthy of protection. Both woodland types are specialist habitats for woodland flora such as Bluebell *Hyacinthoides non-scripta,* Ramsons *Allium ursinum* and Pignut *Conopodium majus*. Unlike some surrounding woodlands, sites in this study area are not infested with the invasive Cherry laurel *Prunus laurocerasus*. This greatly enhances their value for biodiversity and their long-term conservation prospects.

Linear woodland includes **WL1 – Hedgerow** which are widespread and familiar features of the Irish countryside. Where hedgerows have not been managed, and mature trees have been allowed to emerge, they become **WL2 – Treelines**. Treelines in this area tend to be composed of native species such as Ash and Hawthorn *Crataegus monogyna* and of particular note is the local abundance of Oak. Linear woodland can harbour some typical woodland flora and they are particularly valuable as ecological corridors in today's countryside that is dominated by intensive agriculture and built infrastructure. This term describes a feature that allows for the movement of species across wide areas and between larger areas of specialist habitat. A good example is how bats will only follow the lines of hedgerows when foraging at night, and will not cross open fields (Hickie, 2004).

Hedgerows are particularly vulnerable to cumulative impacts as small sections are removed and not replaced, or replaced with monocultures of alien species. On the other hand, numerous new road projects in recent years have promoted planting of native woodlands along motorway margins, showing how infrastructure and habitat creation can be combined.

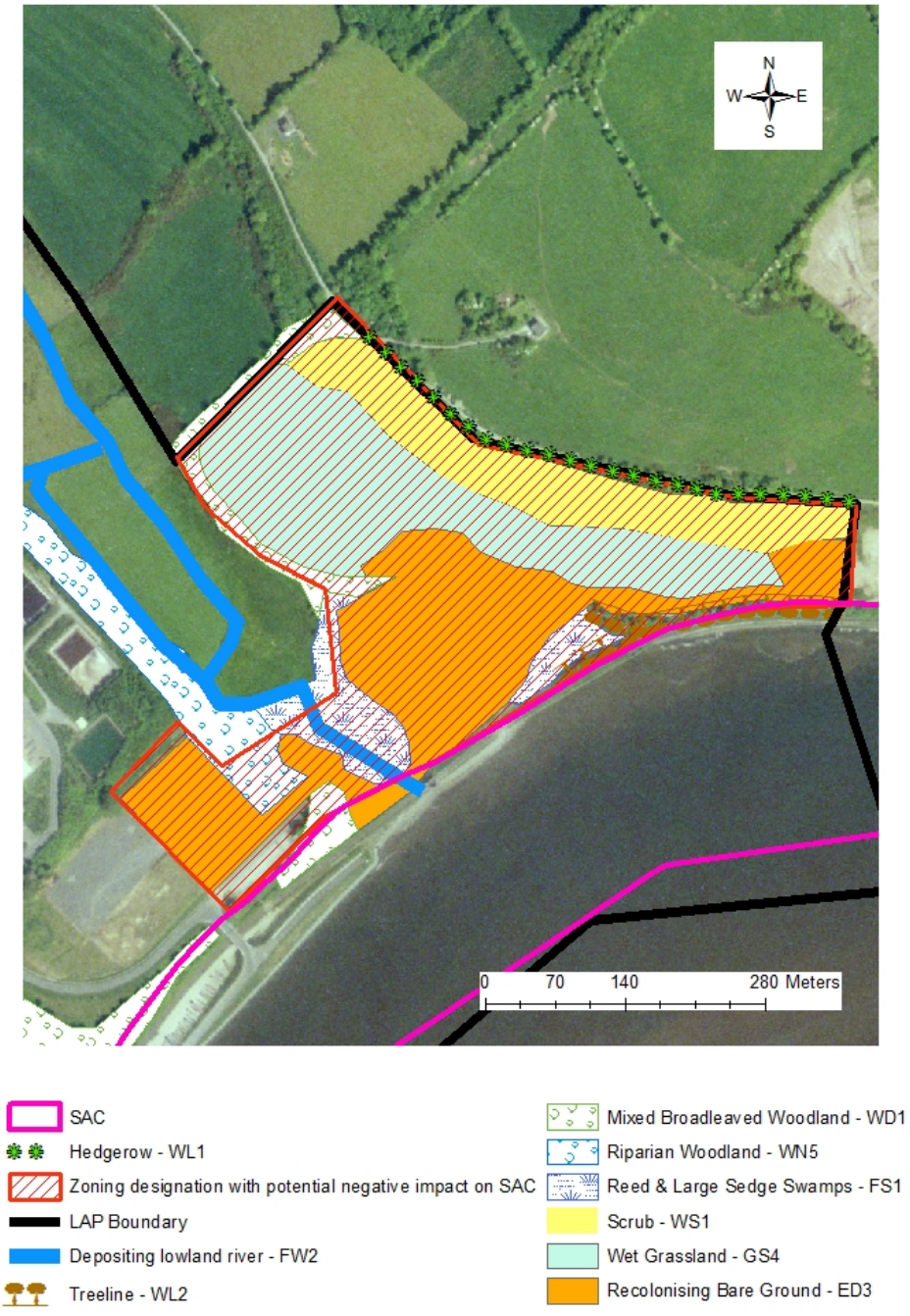
2.5 Belview

Like the Grannyferry area, Belview is a centre for transport and economic activity in the south-east, particularly with regard to the port facility. Also in common with the Grannyferry area is the presence of a tributary of the Suir and what was once a wetland zone at its estuary. This wetland has been all but completely in-filled and so the remaining habitat is a combination of some wetland species and other more ruderal ones. The habitats of Belview are shown in figure 3.

2.5.1 Flora

The floral composition is similar to that found in the Granny area. A particular feature in common is the presence on an in-filled wetland which has developed disturbed ground communities alongside some wetland specialists. These descriptions can be found in sections 2.4.1.2 and are not repeated here.

Figure 3 - Habitats of the Belview area



2.5.1.2 Scrub

The main scrub feature in the Belview area is the steep embankment that runs along the north-east of the site. It is species poor, being predominantly Gorse, with some patches of Willow.

2.5.1.3 Freshwater

A remnant fragment of **FS1 – Reed & large sedge swamp** remain at two locations and are dominated by Common reed and Yellow iris *Iris pseudacorus.* Despite being much smaller in extent than the original site, these areas continue to perform valuable functions, not only for biodiversity but also for maintaining water quality and flood alleviation. Since the stream flows into the SAC, this factor is important in the context of maintaining the conservation status of this important site.

2.5.1.4 Woodland

Areas of **WL1 – Hedgerow**, **WL2 – Treeline**, and **WD1 – Mixed broadleaved woodland** all occur in this area and are similar to those discussed under section 2.4.1.6. Of particular interest on this site is the presence of **WN5 – Riparian woodland**. This semi-natural woodland is predominantly composed of native species, particularly Willow, and has a distinctive ground flora that is characteristic of periodic inundation, including Nettle *Urtica dioica*, Creeping buttercup *Ranunculus repens*, and Hemlock water-dropwort *Oenanthe crocata*. All semi-natural woodland types are of conservation importance but riparian woodlands also perform important ecosystem services that are associated with other wetland types. This characteristic enhances its value, especially since water quality in the SAC is dependant on water quality in the tributaries flowing into it.

2.5.1.5 Grassland

To the south of the scrub area there is some **GS4 – Wet grassland**. This is characterised by numerous rushes and some sedges. Species diversity is low however, with relatively few herbaceous species. It may be that this area was recently fertilised in an attempt to provide grazing land. Species richness increases around its margins where it blends with **ED3 – Recolonising bare ground** where wetland specialists can be found such as Bugle *Ajuga reptans*, Brooklime *Veronica beccabunga* and Cuckoo flower *Cardemine pratensis.*

2.6 Fauna

Since a dedicated fauna survey was not carried out, the presence of various species is deduced from the presence of suitable habitat. During the survey, Otter *Lutra lutra* spraint was recorded on a sluice gate adjacent to the Blackwater river (Grannyferry area) and along the tributary leading into the Belview port area. Conversations with the local wildlife ranger indicate that the local population is strong (Conroy, pers. comm.). The Otter is listed on Annex II of the Habitats Directive and the Red Data Book as ‘internationally important’ (Whilde, 1993). Also of interest in the presence of Irish hare *Lepus timidus hibernicus* which was recorded from scrubland in the Belview area. Mammals of conservation value known from the zone of influence are listed in table 3.

Old stone or derelict buildings are common refuges for roosting bats. There are currently nine species of bat recognised in Ireland (Browne, 2005) and all

are protected under the provisions of the Wildlife (Amendment) Act 2000 and Annex IV of the Habitats Directive. It is therefore an offence to disturb their roosting sites and accidental disturbance is not a recognised defence. Bats can use old buildings either as places to hibernate during the winter or as maternity roosts where the young are reared during spring and summer. The derelict factory and associated buildings on the water front near the Newrath area (shown on map) provide a suitable habitat for bats. There are also old farm buildings to the north, adjacent to the NHA. The only way of determining whether bats are actually using the site is to carry out a bat survey.

Table 3 – 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
Brown long-eared bat *Plecotus auritus*	Annex IV Habitats Directive; Wildlife (Amendment) Act, 2000	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
Irish hare *Lepus timidus hibernicus*	Annex V Habitats Directive; Wildlife (Amendment) Act, 2000	A wide range of habitats
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

Incidental recordings of birds were made and include many typical countryside species. Of particular note are the following:

- Herons *Ardea cinerea* breeding in the wetland at Belview
- Breeding Grasshopper warbler *Locustella naevia* in the Grannyferry NHA and listed on BirdWatch Ireland's Amber list of birds of conservation concern (Lynas et al., 2007).
- Both Linnet *Carduelis cannabina* and Barn owl *Tyto alba* are known from the area (Durkin, P., pers. comm.) – the former Amber listed while the latter is Red listed by BirdWatch.

- Water rail *Rallus aquaticus* is recorded from the NHA and is Amber listed.

Amphibians were not noted on the sites but wetlands of all types provide habitat for the Common frog *Rana temporaria* and the Smooth newt *Triturus vulgaris,* both are protected under the Wildlife (Amendment) Act, 2000 while the frog is also protected under Annex V of the Habitats Directive.

A large number of invertebrate species are likely to be present at both sites and areas of disturbed ground are known to be rich in insect diversity. 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.

2.7 Determination of Value

Appendix 3 of the NRA guidelines (NRA, 2006) outlines a 'site evaluation scheme' that is designed to assign value to ecological features.

Table 4 lists the habitats that were recorded and their associated value.

Table 4 – Valuation of habits with reference to Appendix 3 of the NRA guidance.

Habitat	Rating	Criteria
Any area within the SAC	A – Internationally important	Sites designated as SAC under the EU's Habitats Directive
Any area within the NHA	B – Nationally important	Sites designated as NHA
FW2 – Depositing/lowland river	C – High value, locally important	Important for maintaining wildlife corridors and water quality associated with the SAC/NHA. Also containing important species (Otter, possibly Common frog & Smooth newt)
FS2 – Reed and large sedge swamps		
GS4 – Wet grassland (Grannyferry)		
WN5 – Riparian woodland		
WD1 – Mixed broad-leaved woodland	C – High value, locally important	Sites containing semi-natural habitat types with high biodiversity in a local context.
WN2 – Oak-Ash-Hazel woodland		
WL2 - Treelines		
BL3 – Buildings and artificial surfaces	Potentially C – High Value, locally important (derelict buildings)	Sites containing resident or regularly occurring species protected under Annex IV of the Habitats Directive and the Wildlife (Amendment) Act, 2000. In this case, bats.

Habitat	Rating	Criteria
ED3 – Recolonising bare ground	D – Moderate value, locally important	Sites containing some semi-natural habitat or locally important for wildlife. The wet grassland in this case is species poor. Sites may also contain protected species such (Irish hare, Barn owl)
WS1 - Scrub		
GS4 – Wet grassland (Belview)		
WL1 - Hedgerow		
ED2 – Spoil and bare ground	E – Low value	Artificial or highly modified habitats with low species diversity

2.8 Further study

The 'Guidelines for Baseline Ecological Assessment' (IEA, 1995) recommends that further, more detailed study be carried out on birds where the baseline survey "indicates that suitable breeding habitat is available on the development site in proximity to known populations of Schedule 1 [not relevant to Ireland where the BWI Red List is an appropriate equivalent] or Annex 1 [of the EU Birds Directive] species" (section 5.1). In this instance Barn owls are known from the general area but site-specific information is not available.

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]". In this area the presence of bats is likely in derelict buildings, Otter is confirmed from two sites in Grannyferry and Belview, while the Hare is known from the area. Protected amphibians, Common frog and Smooth newt, can also be included here.

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

2.9 'Do-nothing' scenario

In the absence of the LAP much fragmentation of habitats will occur since major road projects are already underway. Where legal infilling of wetlands has occurred, these will be rehabilitated. Where illegal infilling has occurred, there is no chance that these sites will revert to their original condition. Some of these sites may already be benefiting biodiversity through the provision of a varied habitat. The presence of the Red Data Listed Bee orchid on such a site is confirmation of this. The natural process of succession has been halted here and so while some areas of scrub may develop into small woodlands, most are predicted to remain much as they are within the short to medium term.

3.0 IMPACT ASSESSMENT

3.1 Impact prediction

There will be no direct loss of habitat within either the SAC or the NHA as a result of the LAP.

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 LAP.

Potential indirect impacts may occur through the loss of adjacent habitats, disruption of hydrological flow, decrease in population of key species (otter, bats, barn owl, plus species listed in tables 1 and 2 that were not recorded during the site survey). An attempt will be made to quantify these indirect impacts and determine their significance.

There is also an indirect impact from zoning areas of conservation value as 'passive open space'. This does not adequately communicate the importance or function of these sites and may lead to ambiguity, particularly where planning applications for amenity are concerned.

Specifically, there are five potential impacts from this development.

1 Loss of recolonising bare ground and scrub on two sites in the Grannyferry area (see figure 2). Potential further loss of connectivity between semi-natural habitats and permanent disruption of hydrological flow within the broader wetland area.
2 Loss of bat roosts at a cluster of derelict buildings in the Grannyferry area (see figure 2). Bats have been identified as a conservation aspect of the NHA.
3 Loss of habitats, including scrub, wet grassland, recolonising bare ground, mixed broad-leaved woodland, riparian woodland and reed and tall sedge swamp, in the Belview area.
4 Loss of biodiversity and pollution of water courses through the construction of buildings in these areas.
5 Threat from development pressure through designation of conservation areas as 'passive open space'.

3.2 Nature of predicted impacts

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

Impact	Direct/ Indirect	Cumulative	Time Scale	Permanent/ Temporary	Positive/ Negative
1	Direct	Yes	Long term	Permanent	Negative
2	Direct	Yes	Long term	Permanent	Negative
3	Direct	Yes	Long term	Permanent	Negative
4	Indirect	No	Short term	Temporary	Negative
5	Indirect	Yes	Long term	Permanent	Negative

3.3 Scale and likelihood of predicted impacts

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

Impact	Magnitude	As proportion of resource	Likelihood
1	5.2ha	~39%	Certain
2	Not possible to quantify due to insufficient data	-	Certain if bats are present
3	Total area to be developed is ~17 ha including: 2.9 ha of scrub; 5 ha of wet grassland; 6 ha of recolonising bare ground; 1.16 ha of reed and tall sedge swamp; 0.6 ha of mixed broad-leaved woodland; and 0.4 ha of riparian woodland	100% of scrub, wet grassland, and recolonising bare ground; 77% of reed and tall sedge swamp; 17% of riparian woodland; 46% of mixed broad-leaved woodland	Certain
4	Not possible to quantify	-	Likely in the absence of mitigation
5	Not possible to quantify	-	Possible

3.4 Assessment of impact significance

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.

Impact	Significance
1	Minor negative – permanent impacts on a small part of a the site, which is of D rating
2	Major negative – permanent impacts on a potentially significant population of important species

3	Moderate negative – permanent impacts on a small part of the site which is both C and D rating
4	Minor negative – temporary impacts on a small part of the site
5	Indeterminate

Overall, the following statements can be made:

- There is one potentially minor negative impact on the SAC in the Grannyferry area as a result of habitat loss.
- There is one potentially major negative impact on the NHA depending on the significance of the derelict factory buildings for bats.
- There is a potential for moderate negative impacts on the SAC in the Belview area as a result of habitat loss.
- There is a potential for minor negative impacts as a result of construction works in both the Grannyferry and Belview areas.
- There are potential indeterminate impacts on both sites though zoning important conservation areas as ‘passive open space’.

These issues are addressed in section 4.

4.0 RECOMMENDATIONS FOR MITIGATION

According to accepted methodologies (EPA, 2003; IEEM, 2006) mitigation is required where there are likely, significant, negative impacts. Four negative impacts have been identified and it is proposed to address these through appropriate mitigation measures. Current best practice however, promotes the idea of 'no net loss' of ecological resources. This is a better approach for achieving true sustainable development and can frequently reveal opportunities for ecosystem enhancement.

4.1 Impact Mitigation

4.1.1 Loss of scrub and recolonising bare ground in the Grannyferry area.

Permanent loss of habitat cannot be mitigated for. The preferred option in this case is avoidance of the impact altogether. This can be done by rezoning these areas for biodiversity conservation. There are a number of reasons why avoidance would be of benefit to the area:

1 This sensitive ecological area has already suffered significant damage through built infrastructure and illegal infilling of wetlands. Further built development would exacerbate this loss of habitat and is unsustainable.

2 The zoned areas are important buffer zones around both the SAC and the NHA, retaining them as conservation areas would ensure that they continue to act as wildlife corridors between the two designated sites.

3 While damaged, these sites continue to perform certain ecosystem services, albeit to a lesser degree then when they were intact. This includes attenuation of flood events. It is likely that continued built development will contribute to flooding in the area.

Recommendation 1:
Permission for development at the site of the Red Bridge filling station, near the Granny roundabout, has recently been granted by An Bord Pleanála. This has been done in consultation with NPWS and with their agreement.

According to NPWS, the site at the other filling station, near the Newrath roundabout, was until recently wetland habitat. This has no been in-filled and the legality of this action is under question. It is therefore recommended, in consultation with NPWS personnel, that there should be no zoning for built development in this area. Instead the zoning designation should be changed for biodiversity conservation.

This action would reduce this **minor negative** impact to **neutral**.

4.1.2 Loss of bat populations through destruction of derelict buildings

There is currently insufficient data to determine the nature of this impact or to predict its likely significance.

Recommendation 2:
Commission a specialist bat ecologist to survey these sites and recommend avoidance or mitigation measures in compliance with the Wildlife (Amendment) Act, 2000. There is no imminent threat to the farm buildings to the north however it would be good practice to survey this area as a pre-emptive measure given its potential importance for the NHA.

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

4.1.3 Loss of habitats in the Belview area and disturbance to wildlife/pollution during construction

Again, the direct loss of habitats cannot be mitigated for. However, the significance of the various habitats in this area is not uniform. Those that are rating C (woodlands and reed swamp) are of greater value than rating D (scrub, disturbed ground and wet grassland). It is possible at the project stage to avoid significant impacts, and even incorporate enhancement measures, through careful design. The retention of wetlands are particularly important as they are a form of Sustainable Drainage System (SUDS) and could be an asset for any future development.

Recommendation 3:
Ensure that an Ecological Impact Assessment is requested of the developer at the design stage of future building projects in this area. This will not only help to avoid negative impacts but would also include measures to minimise construction impacts in terms of disturbance to wildlife and pollution of water courses.

4.1.4 Indeterminate impacts through ‘passive open space’ zoning

It is impossible to quantify this impact or even determine its potential magnitude. It can be seen as representing a threat to important conservation areas that is potentially major negative.

Recommendation 4:

Rezone areas of conservation value from ‘passive open space’ to ‘biodiversity conservation’.

This action would reduce the magnitude of this impact from **indeterminate** to **neutral**.

4.2 Monitoring

Monitoring is required where there may be residual impacts despite implementation of mitigation measures. There is currently a lack of data regarding bat populations and the proposed project in the Belview area. It is therefore not certain whether residual impacts will occur. However, suggested monitoring at this stage would be pre-emptive as these issues will be dealt with in greater detail in the reports to be commissioned under recommendations 2 & 3.

4.3 Conclusion

The Ferrybank - Belview LAP has the potential for impacts that are major, moderate and minor on the conservation status of both the Grannyferry NHA and the Lower river Suir SAC. However, implementing the four avoidance and mitigation measures as recommended in this study could reduce these to Neutral. These measures would ensure that the conservation status of internationally and nationally important sites found to occur in this area will not be compromised as a result of the LAP and will therefore make a positive contribution to sustainable development in the county.

5.0 REFERENCES

Anonymous. 1994. *Site Synopsis. Grannyferry Natural Heritage Area (Site Code: 833).* National Parks and Wildlife Service.

Anonymous. 2005. *Site Synopsis. Lower River Suir Special Area of Conservation (Site Code: 2137).* National Parks and Wildlife Service.

Cabot D. 2004. *Irish Birds*. Collins.

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy – more commonly known as the Water Framework Directive

Curtis T.G.F.& McGough H.N. 1988. *The Irish Red Data Book 1: Vascular Plants.* Stationary Office.

Department of Environment, Heritage and Local Government, 2002. *Making Ireland's Development Sustainable*

Dúchas. 2002. *National Biodiversity Action Plan.* Department of the Arts, Heritage, Gaeltacht and the Islands.

EPA, 2003. *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)*

EPA, 2007. *2020 Vision: Protecting and Improving Ireland's Environment*

Fitter R., Fitter A. & Farrer A. 1984. *Grasses, sedges, rushes and ferns of Britain and Northern Europe.* Collins.

Fossitt J. 2000. *A Guide to Habitats in Ireland*. Heritage Council.

Gibbons D.W., Reid J.B. & Chapman R.A. 1993. *The New Atlas of Breeding Birds in Britain and Ireland: 1988 – 1991.* T&AD Poyser.

Lack P. 1986. *The Atlas of Wintering Birds in Britain and Ireland.* T&AD Poyser.

Heritage Council. 2002. *Draft Habitat Survey Guidelines*. The Heritage Council.

Hickie D. 2004. *Irish Hedgerows: Networks for Nature*. Networks for Nature.

IEEM. 2006. *Guidelines for Ecological Impact Assessment in the United Kingdom.* Institute of Ecology and Environmental Management.

Institute of Environmental Assessment, 1995. *Guidelines for Baseline Ecological Assessment*'

Kilkenny County Council. 2008. *Kilkenny Draft County Development Plan.* Kilkenny county council.

Lynas P., Newton S.F., & Robinson J.A. 2007. *The Status of birds in Ireland: an analysis of conservation concern 2008 – 2013.* Irish Birds: Volume 8; Number 2.

Mitchell-Jones A.J., Amori G., Bogdanowicz W., Krystufek B., Reijnders P.J.H., Spitzenberger F., Stubbe M., Thissen J.B.M., Vohralik V & Zima J. 1999. *The Atlas of European Mammals*. T&AD Poyser.

Morris P. & Therivel R., 2001. *Methods of Environmental Impact Assessment,* Spon Press

NRA. 2006. *Guidelines for Assessment of Ecological Impacts of National Road Schemes.* National Roads Authority.

OPENFIELD. 2008. *Screening of Ferrybank - Belview Draft Local Area Plan for Appropriate Assessment in relation to the Lower River Suir SAC and the Grannyferry NHA.* Unpublished.

Otte M.L. 2003. *Wetland of Ireland.* University College Dublin Press.

Oxford Brookes University. 2001. *Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.* European Commission, Environment DG.

Peterson R., Mountfort G. & Hollom P.A.D. 2004. *Collins Field Guide – Birds – Britain and Europe.* Harper Collins.

Preston C.D., Pearman D.A. & Dines T.D. 2002. *New Atlas of the British & Irish Flora*. Oxford University Press.

Scannell M.J.P. & Synnott D.M. 1987. *Census catalogue of the Flora of Ireland*. Stationary Office.

South Eastern River Basin District. 2007. *Water Matters – have your say!*
Souty-Grosset C., Holdich D.M., Noël P.Y., Reynolds J.D. & Haffner P (eds). 2006. *Atlas of Crayfish in Europe*. Muséum national d'Histoire naturelle, Paris.

*Statutory Instrument No. 94 of 1999. Flora (Protection) Order

Treweek J., 1999. *Ecological Impact Assessment*, Blackwell Science.

Webb D.A., Parnell J. & Doogue D. 1996. *An Irish Flora*. Dundalgan Press.

Whilde A. 1993. *Threatened Mammals, Birds, Amphibians and Fish in Ireland. Irish Red Data Book 2: Vertebrates.* Belfast: HMSO.

Appendix 1 – NPWS Site Synopsis for The Lower River Suir SAC

SITE SYNOPSIS
SITE NAME : LOWER RIVER SUIR
SITE CODE : 002137

This site consists of the freshwater stretches of the River Suir immediately south of Thurles, the tidal stretches as far as the confluence with the Barrow/Nore immediately east of Cheekpoint in Co. Waterford and many tributaries including the Clodiagh in Co. Waterford, the Lingaun, Anner, Nier, Tar, Aherlow, Multeen and Clodiagh in Co. Tipperary. The Suir and its tributaries flows through the counties of Tipperary, Kilkenny and Waterford. Upstream of Waterford city, the swinging meanders of the Suir crisscross the Devonian sandstone rim of hard rocks no less than three times as they leave the limestone-floored downfold below Carrick In the vicinity of Carrick-on-Suir the river follows the limestone floor of the Carrick Syncline. Upstream of Clonmel the river and its tributaries traverse Upper Palaeozoic Rocks, mainly the Lower Carboniferous Visean and Tournaisian. The freshwater stretches of the Clodiagh River in Co. Waterford traverse Silurian rocks, through narrow bands of Old Red Sandstone and Lower Avonian Shales before reaching the carboniferous limestone close to its confluence with the Suir.

The Aherlow River flows through a Carboniferous limestone valley, with outcrops of Old Red Sandstone forming the Galtee Mountains to the south and the Slievenamuck range to the north. Glacial deposits of sands and gravels are common along the valley bottom, flanking the present-day river course.

The site is a candidate SAC selected for the presence of the priority habitats on Annex I of the E.U. Habitats Directive - alluvial wet woodlands and Yew Wood. The site is also selected as a candidate SAC for floating river vegetation, Atlantic salt meadows, Mediterranean salt meadows, old oak woodlands 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, Crayfish, Twaite Shad, Atlantic Salmon and Otter. Alluvial wet woodland is declining habitat in Europe as a result of drainage and reclamation. The best examples of this type of woodland in the site are found on the islands just below Carrick-on-Suir and at Fiddown Island. Species occurring here include Almond Willow (*Salix triandra*), White Willow (*S. alba*), Grey Willow (*S. cinerea*), Osier (*S. viminalis*), with Iris (*Iris pseudacorus*), Hemlock Water-dropwort (*Oenanthe crocata*), Angelica (*Angelica sylvestris*), Pendulus Sedge (*Carex pendula*), Meadowsweet (*Filipendula ulmaria*) and Valerian (*Valeriana officinalis*). The terrain is littered with dead trunks and branches and intersected with small channels which carry small streams to the river. The bryophyte and lichen floras appear to be rich and require further investigation. A small plot is currently being coppiced and managed by National Parks and Wildlife. In the drier areas the wet woodland species merge with other tree and shrub species including Ash (*Fraxinus excelsior*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*) and Blackthorn (*Prunus spinosa*). This adds further to the ecological interest of this site.

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*).

Old oak woodlands are also of importance at the site. The best examples are seen in Portlaw Wood which lies on both sides of the Clodiagh River. On the south-facing side the stand is more open and the Oaks (mainly *Quercus robur)* are well grown and spreading. Ivy (*Hedera helix*) and Bramble (*Rubus fruticosus*) are common on the ground, indicating relatively high light conditions. Oak regeneration is dense, varying in age from 0-40 years and Holly (*Ilex aquifolium*) is fairly common but mostly quite young. Across the valley, by contrast, the trees are much more closely spaced and though taller are poorly grown on average. There are no clearings; large Oaks extend to the boundary wall. In the darker conditions, Ivy is much rarer and Holly much more frequent, forming a closed canopy in places. Oak regeneration is uncommon since there are as yet few natural clearings. The shallowness of the soil on the north-facing slope probably contributes to the poor tree growth there. The acid nature of the substrate has induced a “mountain” type Oakwood community to develop. There is an extensive species list present throughout including an abundance of mosses, liverworts and lichens. The rare lichen *Lobaria pulmonaria,* an indicator of ancient woodlands, is found.
Inchinsquillib Wood consists of three small separate sloping blocks of woodland in a valley cut by the young Multeen River and its tributaries through acidic Old Red Sandstone, and Silurian rocks. Two blocks, both with an eastern aspect, located to the north of the road, are predominantly of Sessile oak (*Quercus petraea*) and Hazel, with Downy Birch (*Betula pubescens*), Ash and Holly. The ground flora is quite mixed with for example Wood sedge (*Carex sylvatica*), Bluebell (*Hyacinthoides non-scriptus*), Primrose (*Primula vulgaris*), Wood-sorrel (*Oxalis acetosella*), Pignut (*Conopodium majus*) and Hard fern (*Blechnum spicant*). The base poor nature of the underlying rock is, to some extent masked by the overlying drift. The third block, to the south of the road, and with a northern aspect, is a similar although less mature mixture of Sessile Oak, Birch and Holly, the influence of the drift is more marked, with the occurrence of Wood anemone (*Anemone nemorosa*) amongst the ground flora.

Floating river vegetation is evident in the freshwater stretches of the River Suir and along many of its tributaries. Typical species found include Canadian Pondweed (*Elodea canadensis*)*,* Milfoil (*Myriophyllum* spp.), Fennel Pondweed (*Potamogeton pectinatus*)*,* Curled Pondweed (*P. crispus*), Perfoliate Pondweed (*P. perfoliatus*), Pond Water-crowfoot (*Ranunculus peltatus*), other Crowfoots (*Ranunculus* spp.) and the moss *Fontinalis antipyretica.* At a couple of locations along the river, Oppositeleaved Pondweed (*Groenlandia densa*) occurs. This species is protected under the Flora (Protection) Order, 1999.

The Aherlow River is fast-flowing and mostly follows a natural unmodified river channel. Submerged vegetation includes the aquatic moss *Fontinalis antipyretica* and Stream Water-crowfoot (*Ranunculus pencillatus*), while shallow areas support species such as Reed Canary-grass (*Phalaris arundinacea*), Brooklime (*Veronica beccabunga*) and Water Mint (*Mentha aquatica*). The river bank is fringed in places with Alder (*Alnus glutinosa*) and Willows (*Salix* spp.).

The Multeen River is fast flowing, mostly gravel-bottomed and appears to follow a natural unmodified river channel. Water Crowfoots occur in abundance and the aquatic moss *Fontinalis antipyretica* is also common. In sheltered shallows, species such as Water-cress (*Rorippa nasturtium-aquaticum*) and Water-starworts (*Callitriche* spp.) occur. The river channel is fringed for most of its length with Alder, Willow and a narrow strip of marshy vegetation.

Salt meadows occur below Waterford City in old meadows where the embankment is absent, or has been breached, and along the tidal stretches of some of the in-flowing rivers below Little Island. There are very narrow, non-continuous bands of this habitat

along both banks. More extensive areas are also seen along the south bank at Ballynakill, the east side of Little Island, and in three large salt meadows between Ballynakill and Cheekpoint. The Atlantic and Mediterranean sub types are generally intermixed. The species list is extensive and includes Red Fescue (*Festuca rubra*), Oraches (*Atriplex* spp.), Sea Aster (*Aster tripolium*), Sea Couch Grass (*Elymus pycnanthus*), frequent Sea Milkwort (*Glaux maritima*), occasional Wild Celery (*Apium graveolens*), Parsley Water-dropwort (*Oenanthe lachenalii*), English Scurvygrass (*Cochlearia anglica*) and Sea Arrowgrass (*Triglochin maritima*). These species are more representative of the Atlantic sub-type of the habitat. Common Cord-grass (*Spartina anglica*), is rather frequent along the main channel edge and up the internal channels. The legally protected (Flora (Protection) Order, 1999) Meadow Barley (*Hordeum secalinum*) grows at the landward transition of the saltmarsh. Sea Rush (*Juncus maritimus*), an indicator of the Mediterranean salt meadows, also occurs. Other habitats at the site include wet and dry grassland, marsh, reed swamp, improved grassland, coniferous plantations, deciduous woodland, scrub, tidal river, stony shore and mudflats. The most dominant habitat adjoining the river is improved grassland, although there are wet fields with species such as Yellow Flag (*Iris pseudacorus*), Meadow Sweet (*Filipendula ulmaria*), Rushes (*Juncus* spp.), Meadow Buttercup (*Ranunculus acris*) and Cuckoo Flower (*Cardamine pratensis*).
Cabragh marshes, just below Thurles, lie in a low-lying tributary valley into which the main river floods in winter. Here there is an extensive area of Common Reed (*Phragmites australis*) with associated marshland and peaty fen. The transition between vegetation types is often well displayed. A number of wetland plants of interest occur, in particular the Narrow-leaved Bulrush (*Typha angustifolia*), Bottle Sedge (*Carex rostrata*) and Blunt-flowered Rush (*Juncus subnodulosus*). The marsh is naturally eutrophic but it has also the nutritional legacy of the former sugar factory which discharged into it through a number of holding lagoons, now removed. Production is high which is seen in the size of such species as Celery-leaved Buttercup (*Ranunculus sceleratus*) as well as in the reeds themselves.

Throughout the Lower River Suir site are small areas of woodland other than those described above. These tend to be a mixture of native and non-native species, although there are some areas of semi-natural wet woodland with species such as Ash and Willow. Cahir Park Woodlands is a narrow tract of mixed deciduous woodland lying on the flatlying floodplain of the River Suir. This estate woodland was planted over one hundred years ago and it contains a large component of exotic tree species. However, due to original planting and natural regeneration there is now a good mix of native and exotic species. About 5km north west of Cashel, Ardmayle pond is a long, possibly artificial water body running parallel to the River Suir. It is partly shaded by planted Lime (*Tilia* hybrids), Sycamore (*Acer pseudoplatanus*) and the native Alder. Growing beneath the trees are shade tolerant species such as Remote sedge (*Carex remota*).

The site is of particular conservation interest for the presence of a number of 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 species of Lampreys - Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*) and River Lamprey (*Lampetra fluviatilis*) and Otter (*Lutra lutra*). This is one of only three known spawning grounds in the country for Twaite Shad.

The site also supports populations of several other animal species. Those which are listed in the Irish Red Data Book include Daubenton's Bat (*Myotis daubentoni*), Natterer's Bat (*M. nattereri*), Pipistrelle (*Pipistrellus pipistrellus*), Pine Marten (*Martes martes*), Badger (*Meles meles*), the Irish Hare (*Lepus timidus hibernicus*),

Smelt (*Osmerus eperlanus*) and the Frog (*Rana temporaria*). Breeding stocks of Carp are found in Kilsheelan Lake.
This is one of only two lakes in the country which is known to have supported breeding Carp.

Carp require unusually high summer water temperatures to breed in Ireland and the site may therefore support interesting invertebrate populations. Parts of the site have also been identified as of ornithological importance for a number of Annex I (EU Birds Directive) bird species, including Greenland White-fronted Goose (10), Golden Plover (1490), Whooper Swan (7) and Kingfisher. Figures given in brackets are the average maximum counts from 4 count areas within the site for the three winters between 1994 and 1997. Wintering populations of migratory birds use the site. Flocks are seen in Coolfinn Marsh and also along the reedbeds and saltmarsh areas of the Suir. Coolfinn supports nationally important numbers of Greylag Geese on a regular basis.

Numbers between 600 and 700 are recorded. Other species occurring include Mallard (21), Teal (159), Wigeon (26), Tufted Duck (60), Pintail (4), Pochard (2), Little Grebe (2), Black-tailed Godwit (20), Oystercatcher (16), Lapwing (993), Dunlin (101), Curlew (195), Redshank (28), Greenshank (4) and Green Sandpiper (1). Nationally important numbers of Lapwing (2750) were recorded at Faithlegg in the winter of 1996/97. In Cabragh marshes there is abundant food for surface feeding wildfowl which total at 1,000 or so in winter. Widgeon, Teal and Mallard are numerous and the latter has a large breeding population - with up to 400 in summer. In addition, less frequent species like Shoveler and Pintail occur and there are records for both Whooper and Bewick's swans.

Kingfisher, a species that is listed on Annex I of the EU Birds Directive, occurs along some of the many tributaries throughout the site.

Landuse at the site consists mainly of agricultural activities including grazing, silage production, fertilising and land reclamation. The grassland is intensively managed and the rivers are therefore vulnerable to pollution from run-off of fertilisers and slurry.

Arable crops are also grown. Fishing is a main tourist attraction on stretches of the Suir and some of its 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. The Aherlow River is a designated Salmonid Water under the EU Freshwater Fish Directive. Other recreational activities such as boating, golfing and walking are also popular. Several industrial developments, which discharge into the river, border the site including three dairy related operations and a tannery.

The Lower River Suir contains excellent examples of a number of Annex I habitats, including the priority habitat Alluvial Forest. The site also supports populations of several Annex II animal species and a number of Red Data Book animal species. The presence of two legally protected plants (Flora (Protection) Order, 1999) and the ornithological importance of the river adds further to the ecological interest of this site.

Appendix 2 – NPWS Site Synopsis for Grannyferry pNHA

SITE SYNOPSIS
SITE NAME : GRANNYFERRY
SITE CODE : 000833

The Blackwater is a small tributary of the River Suir in south Kilkenny joining the main river upstream of Waterford. Its lower reaches (5km or so) are tidal and although the river embankments are still generally intact, various sluices and valves do not always operate successfully so that there is some flooding in the valley bottoms, especially on spring tides.

This site consists of reedswamp, marshes and wet fields with a salt influence which declines from south to north. At the southern end there are saltmarsh communities with Saltmarsh Rush (*Juncus gerardi*), Sea Arrowgrass (*Triglochin maritimum*), Sea Aster (*Aster tripolium*) and various sedges (*Carex distans, C. otrubae*). Slender Spike-rush (*Eleocharis uniglumis*), Strawberry Clover (*Trifolium fragiferum*) and Brookweed (*Samolus valerandi*) are species of interest which grow in the fresher conditions just above the saltmarsh. There is also a little Meadow Barley (*Hordeum secalinum*) which is now a protected species because of its marked decline this century, caused by drainage and grassland improvement.

Upstream, the vegetation changes into beds of Pond Sedge (*Carex acutiformis*), Hard Rush (*Juncus inflexus*) and Yellow Flag (*Iris pseudacorus*) along the railway line, though the persistence of Sea Club-rush (*Scirpus maritimus*) reminds one of the proximity of the sea. On the eastern side Common Reed (*Phragmites australis*) occurs in abundance with Marsh-marigold (*Caltha palustris*) and some sedges. There has been some reclamation here and the vegetation has been extensively modified from its natural condition.

Small numbers of Mallard and Water Rail occur within the area and in summer there are, most probably, Sedge Warbler and Reed Bunting nesting.

Appendix 3 – Species lists for surveyed habitats

1. Hedgerows (WL1) and Treelines (WL2)

*Acer pseudoplatanus**	Sycamore
Anthriscus sylvestris	Cow parsley
Bellis perennis	Daisy
Cardamine pratensis	Cuckooflower
Cirsium arvense	Creeping thistle
Crataegus monogyna	Hawthorn
Dactylis glomerata	Cock's-foot
Epilobium angustifolium	Rosebay willowherb
*Fagus sylvatica**	Beech
Fraxinus excelsior	Ash
Galium aparine	Cleavers
Geranium robertianum	Herb-Robert
Hedera helix	Ivy
Heracleum sphondylium	Hogweed
Holcus lanatus	Yorkshire-fog
Hyaninthoides non-scripta	Bluebell
Ilex aquifolium	Holly
Lonicera periclymenum	Honeysuckle
Medicago lupulina	Black medick
**Petasites fragrans*	Winter heliotrope
Pinus sylvestris	Scots pine
Prunus spinosa	Blackthorn
Quercus sp.	Oak
Ranunculus acris	Meadow buttercup
*Reynoutria japonica**	Japanese knotweed
Rubus fruticosus	Bramble
Rumex obtusifolius	Broad-leaved dock
Salix sp.	Willow
Sambucus nigra	Elder
Senecio jacobaea	Common ragwort
Sisymbrium officinale	Hedge mustard
Sonchus arvensis	Perennial sow-thistle
*Symphoricarpos albus**	Snowberry
Pteridium aquilinum	Bracken
Taraxacum sp.	Dandelion
Ulex Europaeus	Gorse
Ulmus glabra	Wych elm
Urtica dioica	Common nettle
Veronica chamaedrys	Germander speedwell
Vicia cracca	Tufted vetch

2. Scrub (WS1)

*Acer pseudoplatanus**	Sycamore
Achillea millefolium	Yarrow
Agrostis stolonifera	Creeping bent
Alnus glutinosa	Alder
Anagallis arvensis	Scarlet pimpernel
Angelica sylvestris	Cow parsley
Anthoxanthum odoratum	Sweet vernal-grass
Anthyllis vulneraria	Kidney vetch
Bellis perennis	Daisy
*Buddleja davidii**	Butterfly-bush
Calystegia sepium	Hedge bindweed
Cardamine pratensis	Cuckooflower
Carex flacca	Glaucous sedge
Carex hirta	Hairy sedge
*Chamomilla suaveolens**	Pineappleweed
Crataegus monogyna	Hawthorn
Crepis capillaris	Smooth hawk's-beard
Cichorium radicata	Cat's-ear
Cirsium arvense	Creeping thistle
Conopodium majus	Pignut
Dactylis glomerata	Cock's-foot
Daucus carota	Wild carrot
Epilobium angustifolium	Rosebay willowherb
Equisetum sp.	Horsetail
Festuca rubra	Red fescue
Fumaria officinalis	Common fumitory
Galieopsis angustifolia§	Red hemp-nettle
Geranium molle	Dove's-foot cranes-bill
Geranium robertianum	Herb-Robert
Holcus lanatus	Yorkshire-fog
Hyaninthoides non-scripta	Bluebell
Hypericum perforatum	Perforate St. John's-wort
Hypochoeris radicata	Cat's-ear
Juncus effusus	Soft rush
Juncus inflexus	Hard rush
Leucanthemum vulgare	Oxeye daisy
Lotus corniculatus	Common bird's-foot-trefoil
Luzula campestris	Field wood-rush
Medicago lupulina	Black medick
Plantago lanceolata	Ribwort Plantain
Potentilla anserina	Silverweed
Primula veris	Cowslip
Pteridium aquilinum	Bracken
Ranunculus acris	Meadow buttercup
Ranunculus repens	Creeping buttercup
Reseda luteola	Weld
Rubus fruticosus	Bramble
Rumex acetosa	Common sorrel
Rumex acetosella	Sheep's sorrel
Rumex crispus	Curled dock
Rumex obtusifolius	Broad-leaved dock
Salix sp.	Willow

Scrophularia auriculata	Water figwort
Sedum anglicum	English stonecrop
Senecio jacobaea	Common ragwort
Senecio vulgaris	Groundsel
Solanum dulcamara	Bittersweet (Woody nightshade)
Sonchus arvensis	Perennial sow-thistle
Sonchus oleraceus	Smooth sow-thistle
Stellaria graminae	Lesser stitchwort
Stellaria media	Common chickweed
Sisymbrium officinale	Hedge mustard
Taraxacum sp.	Dandelion
Teucrium scorodonia	Wood sage
Trifolium pratense	Red clover
Trifolium repens	White clover
Ulex Europaeus	Gorse
Urtica dioica	Common nettle
*Centranthus ruber**	Red valerian
Veronica chamaedrys	Germander speedwell
Vicia cracca	Tufted vetch
Vicia sepium	Bush vetch

3. Reed and large sedge swamps (FS2)

Calystegia sepium	Hedge bindweed
Carex echinata	Star sedge
Carex rostrata	Bottle sedge
Epilobium angustifolium	Rosebay willowherb
Galium palustre	Common marsh-bedstraw
Juncus effusus	Soft rush
Juncus inflexus	Hard rush
Phragmites australis	Common reed
Ranunculus flammula	Lesser spearwort
Scirpus maritimus	Sea club-rush

4. Wet grassland (GS4) – Grannyferry

Arrhenatherum elatius	False oat-grass
Calystegia sepium	Hedge bindweed
Cardamine pratensis	Cuckooflower
Carex diandra	Lesser tussock-sedge
Carex hirta	Hairy sedge
Carex otrubae	False fox-sedge
Carex riparia	Greater pond-sedge
Carex rostrata	Bottle sedge
Cirsium palustre	Marsh thistle
Cynosurus cristatus	Crested dog's-tail
Dactylis glomerata	Cock's-foot
Daucus carota	Wild carrot
Dipsacus fullonum	Teasel
Epilobium angustifolium	Rosebay willowherb
Epilobium montanum	Broad-leaved willowherb
Festuca arundinacea	Tall fescue
Glyceria fluitans	Floating sweet-grass
Holcus lanatus	Yorkshire-fog
Juncus bulbosus	Bulbous rush
Juncus effusus	Soft rush
Juncus inflexus	Hard rush
Lolium perenne	Perennial rye-grass
Lychnis flos-cuculi	Ragged-Robin
Phalaris arundinacea	Reed canary-grass
Phleum pratense	Timothy
Phragmites australis	Common reed
Plantago major	Greater plantain
Poa pratensis	Smooth meadow-grass
Ranunculus acris	Meadow buttercup
Ranunculus repens	Creeping buttercup
Ranunculus sceleratus	Celery-leaved buttercup
Rubus fruticosus	Bramble
Rumex crispus	Curled dock
Salix sp.	Willow
Scrophularia auriculata	Water figwort
Senecio aquaticus	Marsh ragwort
Trifolium pratense	Red clover
Urtica dioica	Common nettle

5 Wet grassland (GS2) – Belview

Anthoxanthum odoratum	Sweet vernal-grass
Calystegia sepium	Hedge bindweed
Cardamine pratensis	Cuckooflower
Carex diandra	Lesser tussock-sedge
Carex flacca	Glaucous sedge
Epilobium angustifolium	Rosebay willowherb
Fraxinus excelsior	Ash
Holcus lanatus	Yorkshire-fog
Juncus effusus	Soft rush
Juncus inflexus	Hard rush
Plantago lanceolata	Ribwort Plantain
Ranunculus repens	Creeping buttercup
Rumex crispus	Curled dock
Salix sp.	Willow
Stellaria media	Common chick-weed
Ulex Europaeus	Gorse
Urtica dioica	Common nettle

6. Mixed Broadleaved Woodland (WD1)

*Acer pseudoplatanus**	Sycamore
*Aesculus hipposcastanum**	Horse-chestnut
Agrostis stolonifera	Creeping bent
Allium ursinum	Ramsons
Anthoxanthum odoratum	Sweet vernal-grass
Anthriscus sylvestris	Cow parsley
Arum maculatum	Lords-and-ladies
Athyrium filix-femina	Lady-fern
Betula sp.	Birch
*Buddleja davidii**	Butterfly-bush
Carex pendula	Pendulus sedge
Carex remota	Remote sedge
Carex sylvatica	Wood sedge
*Castanea sativa**	Sweet chestnut
Circaea lutetiana	Enchanter's-nightshade
Conopodium majus	Pignut
Calystegia sepium	Hedge bindweed
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Dactylis glomerata	Cock's-foot
Dryopteris dilatata	Broad buckler-fern
Dryopteris filix-mas	Male-fern
Epilobium angustifolium	Rosebay willowherb
*Fagus sylvatica**	Beech
Galium aparine	Cleavers
Geum urbanum	Wood avens
Geranium molle	Dove's-foot cranes-bill
Geranium robertianum	Herb-Robert
Hedera helix	Ivy
Heracleum sphondylium	Hogweed
Holcus lanatus	Yorkshire-fog
Hyaninthoides non-scripta	Bluebell
Hypericum androsaemum	Tutsan
Ilex aquifolium	Holly
Juncus inflexus	Hard rush
Leucanthemum vulgare	Oxeye daisy
Lonicera periclymenum	Honeysuckle
Medicago lupulina	Black medick
Mentha aquatica	Water mint
Oxalis acetosella	Wood-sorrel
*Petasites fragrans**	Winter heliotrope
Phyllitis scolopendrium	Hart's-tongue
Plantago lanceolata	Ribwort Plantain
Polystichum setiferum	Soft Shield-fern
Populus sp.	Poplar
Primula vulgaris	Primrose
*Prunus laurocerasus**	Cherry laurel
Pteridium aquilinum	Bracken
Quercus sp.	Oak
Ranunculus ficaria	Lesser Celandine
Ranunculus repens	Creeping buttercup
Rubus fruticosus	Bramble

Rumex acetosa	Common sorrel
Rumex crispus	Curled dock
Rumex obtusifolius	Broad-leaved dock
Sanicula europaea	Sanicle
Sambucus nigra	Elder
Smyrnium olusatrum§	Alexanders
Stellaria graminae	Lesser stitchwort
Taraxacum sp.	Dandelion
Taxus baccata	Yew
Teucrium scorodonia	Wood sage
Ulmus glabra	Wych elm
Umbilicus rupestris	Navelwort
Urtica dioica	Common nettle
Veronica chamaedrys	Germander speedwell
Viola riviniana	Common dog-violet

7. Oak-Ash-Hazel Woodland (WN2)

*Acer pseudoplatanus**	Sycamore
Ajuga reptans	Bugle
Allium ursinum	Ramsons
Alnus glutinosa	Alder
Betula sp.	Birch
Blechnum spicant	Hard fern
Carex remota	Remote sedge
Carex sylvatica	Wood-sedge
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Dactylis glomerata	Cock's-foot
Dryopteris dilatata	Broad buckler-fern
Dryopteris filix-mas	Male-fern
Epilobium montanum	Broad-leaved willowherb
*Fagus sylvatica**	Beech
Fraxinus excelsior	Ash
Filipendula ulmaria	Meadowsweet
Fraxinus excelsior	Ash
Galium aparine	Cleavers
Geranium molle	Dove's-foot cranes-bill
Geum urbanum	Wood avens
Hedera helix	Ivy
Heracleum sphondylium	Hogweed
Holcus lanatus	Yorkshire-fog
Hyaninthoides non-scripta	Bluebell
Juncus effusus	Soft rush
Ilex aquifolium	Holly
Juncus inflexus	Hard rush
Lonicera periclymenum	Honeysuckle
Luzula sp.	Wood-rush
Lysimachia nemorum	Yellow pimpernel
Nasturtium officinale	Water-cress
Phyllitis scolopendrium	Hart's-tongue
Polystichum setiferum	Soft Shield-fern
Prunus spinosa	Blackthorn
Quercus sp.	Oak
Ranunculus acris	Meadow buttercup
Ranunculus ficaria	Lesser celandine
Ranunculus repens	Creeping buttercup
Rosa arvensis	Field-rose
Rubus fruticosus	Bramble
Rumex crispus	Curled dock
Salix sp.	Willow
Scrophularia auriculata	Water figwort
Sonchus arvensis	Perennial sow-thistle
Teucrium scorodonia	Wood sage
Urtica dioica	Common nettle
Veronica chamaedrys	Germander speedwell
Vicia cracca	Tufted vetch
Viola riviniana	Common dog-violet

8. Riparian Woodland (WN5)

*Acer pseudoplatanus**	Sycamore
Agrostis stolonifera	Creeping bent
Ajuga reptans	Bugle
Alnus glutinosa	Alder
Anthoxanthum odoratum	Sweet vernal-grass
Anthriscus sylvestris	Cow parsley
Athyrium filix-femina	Lady-fern
Blechnum spicant	Hard fern
Cardamine pratensis	Cuckooflower
Carex remota	Remote sedge
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Digitalis purpurea	Foxglove
Dryopteris dilatata	Broad buckler-fern
Epilobium angustifolium	Rosebay willowherb
Equisetum sp.	Horsetail
*Fagus sylvatica**	Beech
Fraxinus excelsior	Ash
Filipendula ulmaria	Meadowsweet
Fraxinus excelsior	Ash
Galium aparine	Cleavers
Geum urbanum	Wood avens
Geranium robertianum	Herb-Robert
Hedera helix	Ivy
Heracleum sphondylium	Hogweed
Hyaninthoides non-scripta	Bluebell
Ilex aquifolium	Holly
Iris pseudacorus	Yellow iris
Lonicera periclymenum	Honeysuckle
Juncus effusus	Soft rush
Lychnis flos-cuculi	Radded-Robin
Mentha aquatica	Water mint
Nasturtium officinale	Water-cress
Oenanthe crocata	Hemlock water-dropwort
*Petasites fragrans**	Winter heliotrope
*Phorium tenax**	New Zealand flax
Phyllitis scolopendrium	Hart's-tongue
Plantago lanceolata	Ribwort Plantain
Polystichum setiferum	Soft Shield-fern
Potentilla erecta	Tormentil
Prunus avium	Wild cherry
*Prunus laurocerasus**	Cherry laurel
Quercus sp.	Oak
Ranunculus acris	Meadow buttercup
Ranunculus ficaria	Lesser Celandine
Ranunculus repens	Creeping buttercup
Rubus fruticosus	Bramble
Rumex crispus	Curled dock
Rumex obtusifolius	Broad-leaved dock
Salix sp.	Willow
Sambucus nigra	Elder
Sanicula europaea	Sanicle

Scrophularia auriculata	Water figwort
Sonchus arvensis	Perennial sow-thistle
Trifolium pratense	Red clover
Ulex Europaeus	Gorse
Ulmus glabra	Wych elm
Urtica dioica	Common nettle
Veronica chamaedrys	Germander speedwell
Vicia cracca	Tufted vetch
Vicia sepium	Bush vetch
Viola riviniana	Common dog-violet